New Marking Scheme: Mathematics: Example of a task for S2/3

This exercise is taken form Bowland Maths http://bowlandmaths.org.uk/ and edited by Alison Copner and Denise Baines at Brussels 4. This version was trialed on a group of S3 English section students.

Geoboard Squares

Aim: To encourage students to investigate sequences of numbers in relation to geometric shapes, look for number patterns and try to find a formula for the nth term in the sequence.

Students Investigate patterns in the number of nails on a geoboard (right) used to form a square.
This task can be done in a single period, with possible extension and follow-up in a second period.

Resources: A4 or A3 sheets of 1 cm squared dotted paper

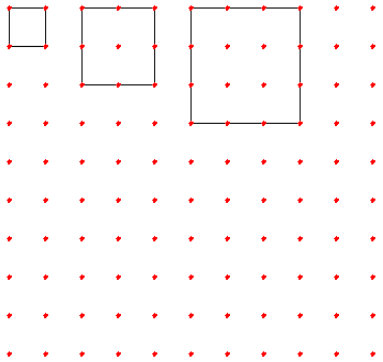
This can be an individual or group task. If done as a group, it can be extended to cover multiple competences, for example one member of the group can be responsible for putting the data into an excel table, and another for constructing a PowerPoint presentation which the group can present to the class. (To make it more interesting, each group could be given a different geometric shape to explore.)

Competences developed

- **Problem solving and analysing**: Read and follow the instructions to draw squares and count the 'nails' round the edge and in the centre of their squares. Collect results into a table and look for patterns in the numbers.
- **Interpretation**: Use their patterns to devise a formula and make predictions.
- **Communication**: Explain what patterns they have found and how they have used them.

Introduction

Introduce the concept of a geoboard with a square on it and check they understand how to count the nails around the edge and those in the middle.

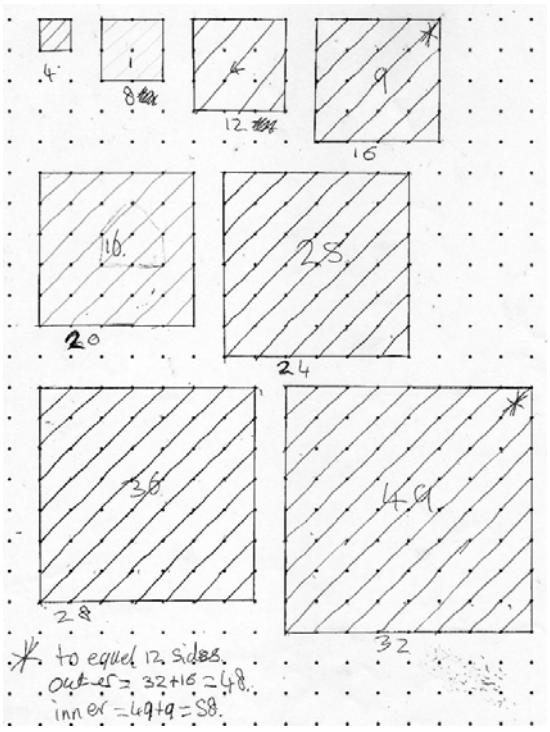


Student instructions (given as a worksheet)

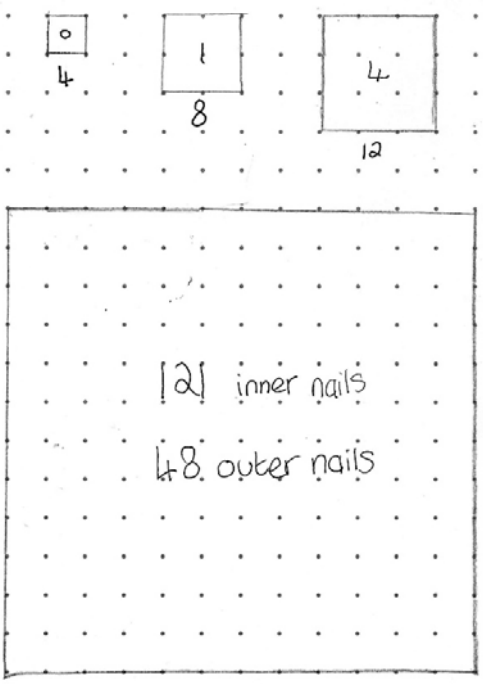
1. Continue the pattern of squares on the right. Create a number series by counting the number of nails on the edges of each square. Repeat with the number of nails on the inside of each square.
2. Once you have created a number series, look for a pattern. Describe your patterns using mathematical terms, and if possible, algebra.
3. Can you use your patterns to make predictions about larger squares?
   a) How many edge nails and how many inside nails are there for the 12^{th} square in the sequence?
   b) Explain whether or not there is a square which has 2025 nails inside it.
   c) Is there a square which has the same number of edge nails as inside nails?
4. *Extensions:* Create a question of your own to test another groups knowledge. (make sure you know the answer!) Can you find any more number series?

Sample results (taken from Bowland Maths)

Student 1



Student 2



Student 3

A. I drew a square with sides 12 on paper.
→ Inner nails → 121
Edge nails → 48

B. → 45 + 1 = 46
I got this by finding the square route of 2025

C. → NO! because there is always more nails on the outside than in the middle.
Also you always times by 4 to get the outside amount of Nails and square for the inside!

Student 4

side nails	inner nails	side length
4	0	1
8	1	2
12	4	3
16	9	4
20	16	5
24	25	6
28	36	7
32	49	8
36	64	9
40	81	10
44	100	11
48	121	12

- the side nails go up in fours or you times the side length by 4 giving 4n
- the inner nails are square numbers or the side length before the number times its self. For example if you wanted to work out the inner nails if the side length is 7, you do the number before (6) and times it by itself (6x6=36). For n it is $(n-1)^2$.

a. side nails — 48 inner nails — 121

b. 2025 is a square number $\sqrt{2025}$ = 45
45+1 = 46 the square will have a side length of 46.

c. NO! side length 5 side nails = 20 ← bigger like 1, 2, 3 and 4
inner nails = 16
side length 6 side nails = 24 ← smaller like 7, 8, 9, 10, ...
inner nails = 25
To be the same it is between 5 and 6!

Assessment

Following a reasonably intuitive approach, we can assign grades to each of the three competences we have decided to evaluate in this exercise.

Student	**Problem Solving** (Results generated, Routine: counting and calculating; Non-routine: Establishing a pattern)	**Interpretation** (Making predictions from formula or pattern)	**Communication** (Clarity and completeness of written work)
Student 1	Draws some squares & counts nails but makes no attempt to find patterns in the numbers; does not draw the 12^{th} square. **Grade: E**	None: only incorrect attempt to work out values for the 12^{th} square **Grade: FX**	Drawing are clean and accurate but very little description or mathematical notation. **Grade: E**
Student 2	Draws some squares, finds the number of edge and inside nails for the 12^{th} square; makes no attempt to find patterns in the numbers. **Grade: D**	Values for 12^{th} square found but no explanation as to how. Presumably by counting only, not by interpreting a pattern **Grade: F**	Communicates the work clearly and the reasoning can be followed, but little mathematical notation or reasoning. **Grade: E**
Student 3	Draws squares and finds some patterns and rules to find the number of edge and inside nails. **Grade: C**	Correctly finds the values for the 12^{th} square and some patterns in the numbers. Answer to question 3c is incorrect but there is an attempt to evaluate **Grade: C/D**	Communicates the work clearly and the reasoning can be followed easily, but explanations are incomplete, and mathematical terms are not translated into symbols. **Grade: D**
Student 4	Draws up a table of results finds patterns and describes them as formulae **Grade: A**	Successfully finds the n^{th} terms and uses them. Interprets the patterns and applies knowledge. **Grade: A**	Explains the work clearly and completely, using mathematical terms correctly, Could be better organised. **Grade: B**

For many exercises, this will be enough to explain to the student the level at which he or she worked.

If an 'overall' grade is required, we could give a simple average grade, based on weighting the 3 competences roughly equally. This would give student 1 an F (fail); student 2 a grade E (just passing); student 3 a grade C and student 4 a grade A. However, it would be meaningful to discuss with each the breakdown of their grades, and pose some questions for reflection.

An alternative approach is to treat this more analytically. To do this we build a rubric which assigns numbers to the specific achievements of each student. In the following example we have weighted the competences so that problem-solving and interpretation carry the most weight, and communication only half the weighting we gave to the others. When building such a rubric it is important to keep the attainment descriptors in mind, so these are included in brackets after the description of each grade.

Detailed rubric for assessment (attainment descriptors in brackets)

Competence	A	B	C	D	E	F	FX
Problem solving:	Draws squares, finds patterns in terms of formulae (Translates challenging problems into mathematical symbols and reasons to a correct result)	Draws squares, finds patterns and attempts to shows them algebraically (Translates some non-routine problems into mathematical symbols and reasons to a correct result)	Draws squares, finds patterns (Translates routine problems into mathematical symbols and reasons to a correct result)	Draws squares, lists numbers, extends pattern to 12th square (Translates routine problems into mathematical symbols and reasons to a result)	Draws some squares and lists numbers (Translates routine problems into mathematical symbols and attempts to reason to a result)	N/A	N/A
Points given:	10	9	8	7	6	0	0
Interpretation	At least 2 formulae found, discussed and applied (Draws full and relevant conclusions from information; evaluates reasonableness of results and recognises own errors)	1 formula correctly applied or 2 formulae found (Draws relevant conclusions from information, evaluates reasonableness of results and recognises own errors)	Correctly explains results using patterns or formulae (Draws relevant conclusions from information and attempts to evaluate reasonableness of results)	A fair attempt to explain results using patterns (Attempts to draw conclusions from information given, shows some understanding of the reasonableness of results)	Attempts to relate patterns to answer questions (Attempts to draw conclusions from information and shows limited understanding of the reasonableness of results)	Some correct results but no evidence of using patterns (Makes little attempt to interpret information)	N/A
Points given:	10	8	7	6	4	2	0
Communication (Attainment descriptors used)	Consistently presents reasoning and results in a clear, effective and concise manner; uses mathematical terminology and notation correctly	Consistently presents reasoning and results in a clear and effective manner; uses mathematical terminology and notation correctly	Generally presents reasoning and results in a clear and effective manner; uses mathematical terminology and notation correctly	Generally presents reasoning and results effectively; uses mathematical terminology and notation correctly	Generally presents reasoning and results adequately; using some mathematical terminology and notation	Attempts to present reasoning and results using mathematical terms	Displays insufficient reasoning and use of mathematical terms
Points given:	5	4	3	2	2	1	0

Once the rubric is built and applied to the students' work, we must convert the total number of points back to a summary letter grade. Note that in this example 9 points out of 25 is considered sufficient for a 'pass'.

Results for the 4 students out of 25

Student 1:	6 + 0 + 2 = 8 (F)
Student 2:	7 + 2 + 2 = 11 (E)
Student 3:	8 + 6.5 + 3 = 17.5 (C)
Student 4:	10 + 10 + 4 = 24 (A)

Suggested scale:

Points	Grade
22-25	A
19-21	B
16-18	C
13-15	D
9-12	E
3-8	F
0-2	FX

The second approach appears to offer more precision than the more general assessment given first, but this could be misleading. The final grade assigned to each student using the scale suggested here agrees with the average grade we gave using the first (intuitive) approach, but this might not always be the case. Descriptors never perfectly match the performance of a student.

Note about the floating pass mark

Students and parents are very sensitive about grades, and where to draw the pass/fail boundary needs careful reflection. In this example, 9/25 is a passing grade. In another example you might decide that 15/25 is a 'pass'. However, if you do this, a student with 13/25 will certainly want to know why he or she has failed the exercise.

The important message to the student is how he or she is meeting the goals set in the attainment descriptors. For a student in S1,2 and 3 who receives a final letter grade it will probably not be too difficult to explain why 13/25 is not a pass. In S4 and above, however, it is bound to cause concern, since results will still be published as marks on a scale of 1-10 with a pass mark of 5. It is therefore advisable to devise the rubric if possible so that 50% of the marks corresponds to a pass. This is not mandatory, but in cases where a mark above 50% results in a failing grade, the teacher will have to justify the mark in terms of the attainment descriptors.

The rubric used, or a simplified version of it, can be attached to the front of a test or exercise to show the student his grades corresponding to each competence. He can then see the areas he needs to work on.

Conclusion to the task

The sample work we used for the exercise above was taken from Bowland Maths. In our classroom we gave this exercise to 7 groups of 4 students, with some suggestions for extensions into rectangles for the faster groups. The best group produced results of a similar standard to student 4 in the examples, and the weakest did plenty of drawings but not get much further in their analysis than student 2. The groups then presented their results to the class.

Overall, we felt this was a good exercise for developing mathematical reasoning skills and exploring links between geometry, sequences and beginning ideas of mathematical modelling. We were able to encourage and assess team work, as well as interpretation and communication skills in a non-traditional way. Since it was a team exercise, we felt the first, simpler method of assessment was sufficient, but a full assessment rubric would have been necessary in the case of a more formal individual written test.

S5 Lab Samples:

Background Information (1) and Assessments (2)

1) **Material Available to the Students after discussion of the expt and results but BEFORE they wrote it up.**

NOTE: Students' Graphs were reviewed in class and formatively marked BEFORE the final report and assessment. Ideas for analysing the graph was developed from discussing their graphs in class before the final write up.

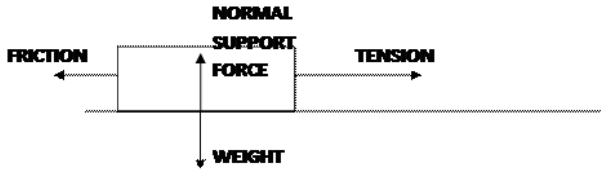
Experiment to investigate the acceleration of a moving object and the force pulling it forward.

Theory

The pulling force is the tension in the string but this is the weight of the falling mass = $m\,g$

where g is 10 Nkg^{-1}

But because friction on these tracks is significant we have the following Free Body Force Diagram



Also we will use the fact that the gradient of a velocity time graph gives the acceleration instead of the usual equation $a = \frac{v-u}{t}$

Finally Newton's 2nd law states that the acceleration is proportional to the resultant force so we will check this against our results.

The mass of the moving object also affects its acceleration so we have to control this variable and keep it constant.

Looking at the Maths more closely:

$Resultant\ Force = m\,a$ where m is the constant mass of the sytem of moving objects

But the $Resultant\ Force = T - F_R$ where T is Tension force and F_R is Friction Force

So $T - F_R = m\,a$

Now if $Tension$ is our y variable and $accel$ is our x then

$T = m\,a + F_R$

This means the graph will be a straight line whose gradient = moving mass and the graph will have an intercept = Friction. We can make these predictions about our results and check to see if the results agree.

Photo of apparatus set up:

Results

Total moving mass = kg

Pull Force (Tension) /N	Acceleration Trial 1 / ms^{-2}	Acceleration Trial 2 / ms^{-2}	Acceleration Trial 3 / ms^{-2}	Average Acceleration / ms^{-2}

Write a lab report for the experiment with sections Aim, Theory, Method (with diagram), Results, Conclusion and Evaluation
Publish your report on OneNote but write it on Word using Logger Pro to produce the graph of F against a.

2) **Assessments.** An Overall Mark was not assigned to each piece of work. Instead the tables below would be given as feedback. Over the semester all competence assessments are recorded (using sufficient variety of assessment tasks) and an average mark in each competence is calculated. Cumulatively all competences should carry equal weight (to be discussed?) since they are equally valued and a straight average of the summative competence marks can be used to find a overall semester mark. This respects the aim of assessing competences rather than averaging assignment or test marks.
If the teacher wishes to give an overall mark for this piece of lab work, various approaches are possible. In the suggestions below the emphasis of the exercise fell on the manipulation of the lab equipment, data collection and the use of specific analytical tools and methods. Therefore, the Teamwork mark is not very highly weighted in the suggested Overall Mark. Also, it could be commented that a single collaborative exercise is insufficient to assess the student's Teamwork competence and this is another reason why the Teamwork Competence is not taken much into account in the suggested mark. Other competences were weighted equally.

In this case a simple conversion was used with the 4 priority competences to arrive a numerical "equivalent" average and the result converted back to a letter grade.

A->	7	<u>Example student 4:</u> F, FX, C, E = (2+1+5+3)/4 = 2.75. Corresponding to just below an E overall. Given the student's Teamwork engagement (B) an overall mark of E could be given but other views could be taken!
B->	6	
C->	5	
D->	4	
E->	3	
F->	2	
FX->	1	

1. EXCELLENT Suggested Overall Mark: A

	Attainment Description with features of quality linked to task	Level	Other Comments
Comprehension	The student has shown a thorough command of the concepts and principles through the application of the theory to the analysis of the data	A	
Analysis	Detailed and critical analysis of the raw data is evident through an appropriate graph with a line of best fit. Analysis extends to the interpretation of the gradient and intercept results (complexity). There are valid explanations presented.	A	
Experimental Work	Organised the practical investigation using the range of techniques required and obtained a good range of data with excellent precision. Took care to clear the equipment and return it tidily, keeping other users in mind (ethics of lab work).	A	
Communication (written)	The report is well structured and organised: excellent presentation. The descriptions and arguments are logical and use scientific vocabulary correctly.	A	
Teamwork	This student led the group with initiative to make sure the members achieved the objectives of the task.	A	

2) EXCELLENT Suggested Overall Mark: A

	Attainment Description	Level	Other Comments
Comprehension	The student has shown a thorough command of the concepts and principles through the application of the theory to the analysis of the data	A	
Analysis	Detailed and critical analysis of the raw data is evident through an appropriate graph with a line of best fit. Analysis extends to the interpretation of the gradient and intercept results (complexity). The student has proposed explanations to expected results and deviations from them.	A	
Experimental Work	Organised the practical investigation using the range of techniques required and obtained a good range of data with excellent precision. Took care to clear the equipment and return it tidily, keeping other users in mind (ethics of lab work).	A	
Communication (written)	The report is well structured and organised: excellent presentation. The descriptions and arguments are logical and use scientific vocabulary correctly.	A	
Teamwork	This student led the group with initiative to make sure the members achieved the objectives of the task.	A	

3) GOOD Suggested Overall Mark: C

	Attainment Description	Level	Other Comments
Comprehension	Understand the basic F=ma concepts in this experiment not sufficient to apply them to the deeper interpretation of the results.	D	
Analysis	Good analysis of the raw data to produce an appropriate linear graph but did not interpret the graph correctly as linear but not proportional. The complexity of the results was difficult for the student to interpret.	C	
Experimental Work	Followed the written procedure accurately and safely but needed additional guidance for steps not explicitly contained in the instructions: did not plan steps independently. Recorded and presented data in tables and as a graph: different techniques.	C	
Communication (written)	The report is well structured and organised: good presentation but leaves out some of the information provided. Uses scientific vocabulary correctly most of the time which introduces some ambiguity to the descriptions and explanations.	C	
Teamwork	This student worked constructively with his lab partner but the partner was the leader on this occasion	B	

4) SUFFICIENT Suggested Overall Mark: E

	Attainment Description	Level	Other Comments
Comprehension	Limited understanding the basic F=ma concepts in this experiment. Relevant data collected but no relevant processing.	F	
Analysis	Even after discussion of the graph required and how to interpret it the student does not use the data adequately.	FX	
Experimental Work	Followed the written procedure satisfactorily and records relevant data with the required techniques.	C	
Communication (written)	The descriptive report is satisfactorily structured (satisfactory presentation). Uses only some scientific vocabulary correctly but the descriptions lack clarity and are incomplete	E	
Teamwork	This student worked well with his lab partner.	C	

5) SATISFACTORY Suggested Overall Mark: D

	Attainment Description	Level	Other Comments
Comprehension	Limited understanding the basic F=ma concepts in this experiment. Relevant data collected and relevant processing. Does not apply theory to results.	D	
Analysis	A basic analysis has produced an appropriate graph but this basic analysis is not extended to more sophisticated results like intercepts and gradients.	D	
Experimental Work	Followed the written procedure satisfactorily and records most relevant data with the required techniques.	D	
Communication (written)	The descriptive report is well structured (good presentation). Uses scientific vocabulary but the descriptions lack clarity and are incomplete	D	
Teamwork	This student worked well with his lab partner and is influential in moving the task forward	B	

6) GOOD / SATISFACTORY Suggested Overall Mark: C

	Attainment Description	Level	Other Comments
Comprehension	Understand the basic F=ma concepts in this experiment not sufficient to apply them to the deeper interpretation of the results.	D	
Analysis	Good analysis of the raw data to produce an appropriate linear graph but did not interpret the graph correctly as linear but not proportional. The complexity of the results was difficult for the student to interpret.	C	
Experimental Work	Followed the written procedure accurately and safely but needed additional guidance for steps not explicitly contained in the instructions: did not plan steps independently. Recorded and presented data in tables and as a graph but did not plan time to obtain more than one trial of each measurement.	D	
Communication (written)	The report is well structured and organised: good presentation but leaves out some of the information provided. Uses scientific vocabulary correctly most of the time but notably does not use “proportionality” correctly.	C	
Teamwork	This student worked constructively with his lab partner but the partner was the leader on this occasion	B	

S5PHYSENA

04.02.2017

Lab Report

Experiment to investigate the acceleration of a moving object and the force pulling it forward

Aim: To investigate how the acceleration of a moving object changes with the force that is pulling it forward and whether the relationship is directly proportional.

Hypothesis and Theory: In my opinion, the acceleration of a moving object will increase as the force pulling the object forward increases. The pulling force is the weight of the falling mass = mg (where g =10 Nkg^{-1}). Newton's 2nd law states that the acceleration of an object is proportional to the resultant force acting on it. Therefore, as the resultant force increases, so does the acceleration of the moving object.

Resultant Force = ma (where m is the constant mass of the system of moving objects).

But here, *Resultant Force = T - FR* (where T is Tension force and FR is Friction Force).

Therefore, $ma = T - FR$

$T = ma + FR$

On a graph, tension (pull force) will be the y variable, acceleration will be the x variable, mass will be the gradient and friction will be the y intercept.

Variables:

a) Independent: force pulling the moving object forward
b) Dependent: acceleration of that object
c) Constant: mass of system

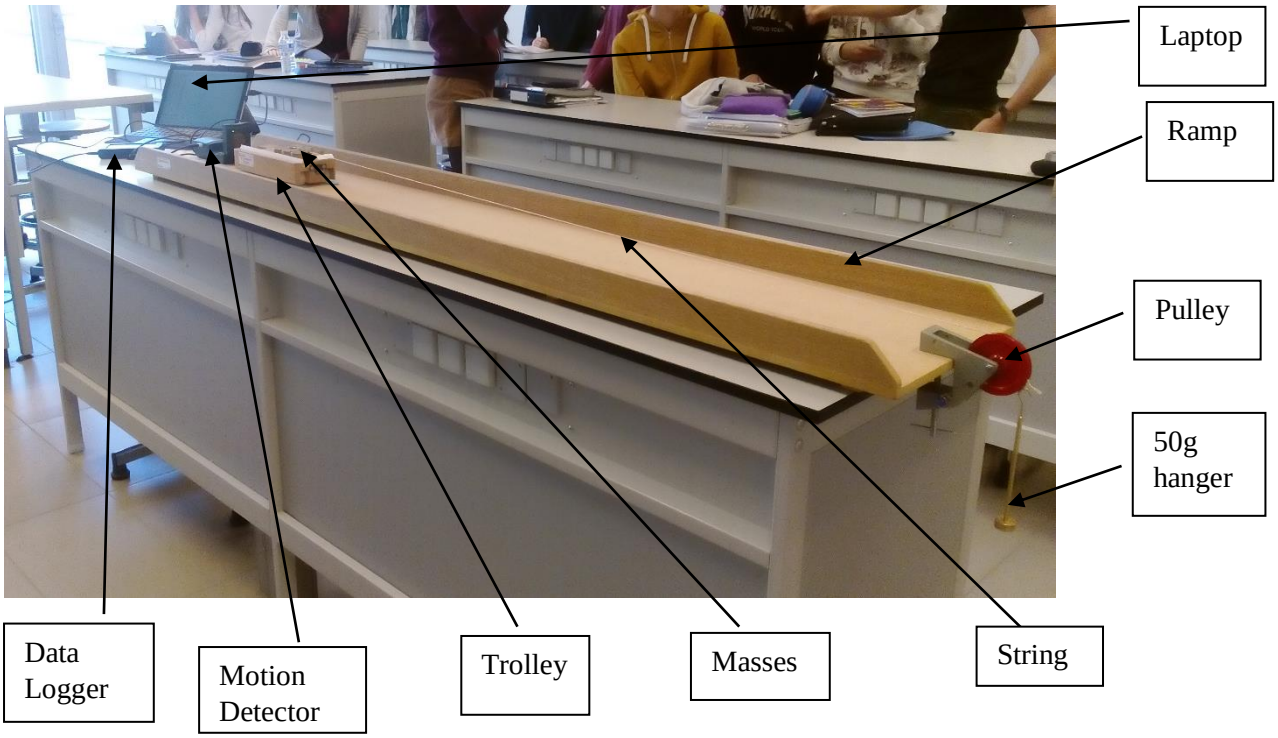
Apparatus:

- Ramp
- Trolley
- A range of masses and a 50gram hanger
- Data logger
- String
- Motion detector
- Logger pro
- Pulley

Procedure:

1. The Data Logger was connected to a laptop and to a motion detector.
2. The motion detector was placed at one end of the ramp, opposite the pulley on which the 50g hanger was attached using a string.
3. A range of masses were placed on the trolley.
4. The trolley was placed in front of the motion detector and was let go so that it could move by the pull force of the hanger.

5. Logger Pro was opened on the laptop. It was used to draw velocity vs time graphs, from which the linear section was identified and the acceleration was calculated.
6. After each run, a mass was moved from the trolley to the hanger so that the overall moving mass is kept constant but the pull force changes.
7. The results for acceleration at each run were recorded from the velocity vs time graph (gradient).
8. Steps 6&7 were carried out with 5 different pull forces and repeated twice for each pull force.



Data and Results:

Total Moving Mass = 1.22kg

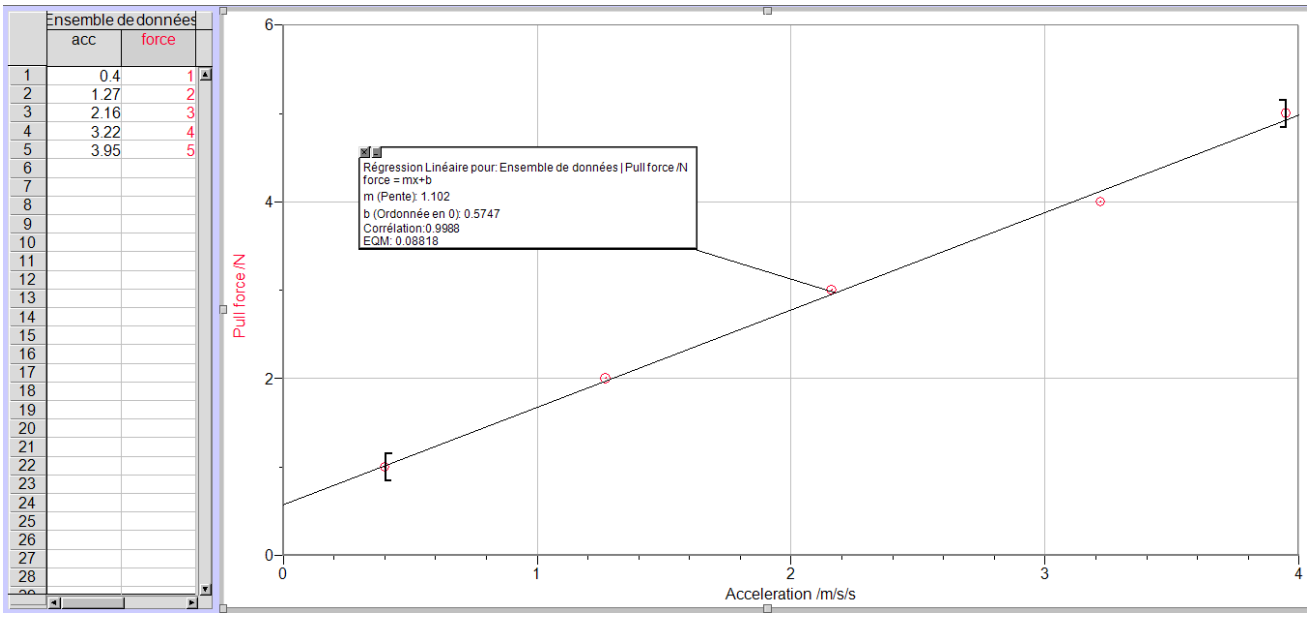
	Acceleration / ms^{-2}		
Pull Force (Tension) / N	**Acceleration Trial 1 / ms^{-2}**	**Acceleration Trial 2 / ms^{-2}**	**Average Acceleration / ms^{-2}**
1	0.38	0.41	0.40
2	1.30	1.24	1.27
3	2.01	2.30	2.16
4	3.14	3.30	3.22
5	3.80	4.10	3.95

Pull force / N	Average acceleration / ms^{-1}
1	0.40
2	1.27
3	2.16
4	3.22
5	3.95

Acceleration = gradient of velocity vs time graph (difference in velocity/difference in time)

Pull force = mg (where m is the mass on hanger and g = $10Nkg^{-1}$)

Graph showing pulling force against average acceleration



y = mx + b

Tension = ma + FR

Tension = 1.102a + 0.5747

T = 1.10a + 0.57

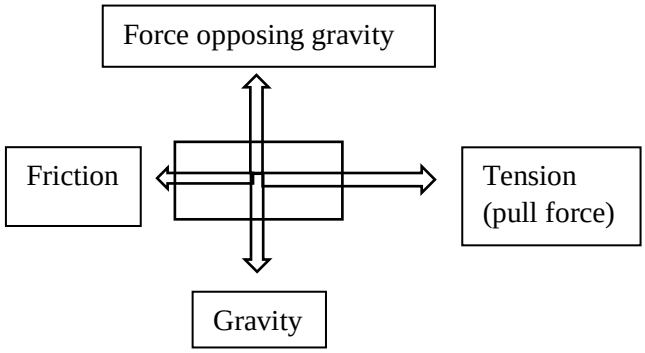
Conclusion:

The results obtained from the experiment confirm the hypothesis and clearly show that a linear relationship between the pull force and the acceleration of the moving object is present.

The shape of the graph is linear and its gradient represents the mass of the system (1.10kg). This mass shown by the gradient differs from the actual mass of the moving system (1.22kg). Taking into account the experimental error (EQM(RMSE) = 0.08818), the value of the mass becomes 1.19kg which is very close to the actual value. Since the graph is linear, this means that it has a constant gradient and therefore a constant mass which is in accordance with the experimental set up (the mass was kept constant in the experiment).

The y intercept on the graph is the friction force between the trolley and the ramp (0.57N). The fact that a y intercept is present means that the relationship isn't directly proportional (it doesn't go through the origin). In order to obtain a directly proportional graph, the conditions must be ideal and friction must be inexistent or extremely small so that it becomes negligible.

The forces acting on the moving object are as follows:



Gravity and the force opposing it are equal thus the resultant vertical force is 0N. The pull force is larger than the friction that acts against it. This means that the object will accelerate and this acceleration will increase as the pull force increases.

Evaluation:

In order to have more experimental results, we should have repeated the experiment with an even wider range of masses (pull force). We should have also repeated each run more times to have a more precise average. Another cause for inaccurate readings might be the fact that we had to identify the linear section in each velocity vs time graph in order to find the gradient (acceleration). This wasn't always simple as in some graphs the linear section wasn't as evident as in others.

S5PHYENA

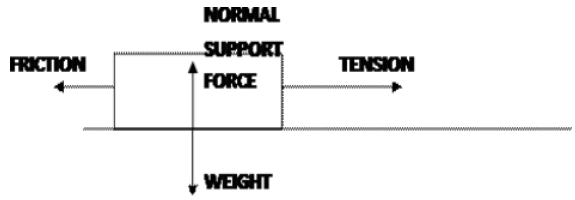
Experiment to determine the relationship between the acceleration of a moving object and the force pulling it forward

Aim:

The aim of this experiment is to investigate the relationship between an objects acceleration and the pulling force acting on it.

Theory:

The pulling force is the tension in the string but this is the weight of the falling mass:
Weight = *mass * gravitational constant* (where *g* is 9.81 Nkg^{-1})
But because friction on these tracks is significant we have the following Free Body Force Diagram:



Also we will use the fact that the gradient of a velocity time graph gives the acceleration instead of the usual equation $a = \frac{v-u}{t}$
Finally, Newton's 2nd law states that the acceleration is proportional to the resultant force so we will check this against our results.
The mass of the moving object also affects its acceleration so we have to control this variable and keep it constant.
Looking at the Maths more closely:
*Resultant Force = m * a* where m is the constant mass of the system of moving objects.
But the *Resultant Force* = $F_t - F_f$ where F_t is Tension force and F_f is Friction Force.
So $F_t - F_f = m\,a$
Now if *Tension* is our y variable and *acceleration* is our x then
$F_t = m\,a + F_f$
This means the graph will be a straight line whose gradient = moving mass and the graph will have an intercept = Friction. We can make these predictions about our results and check to see if the results agree

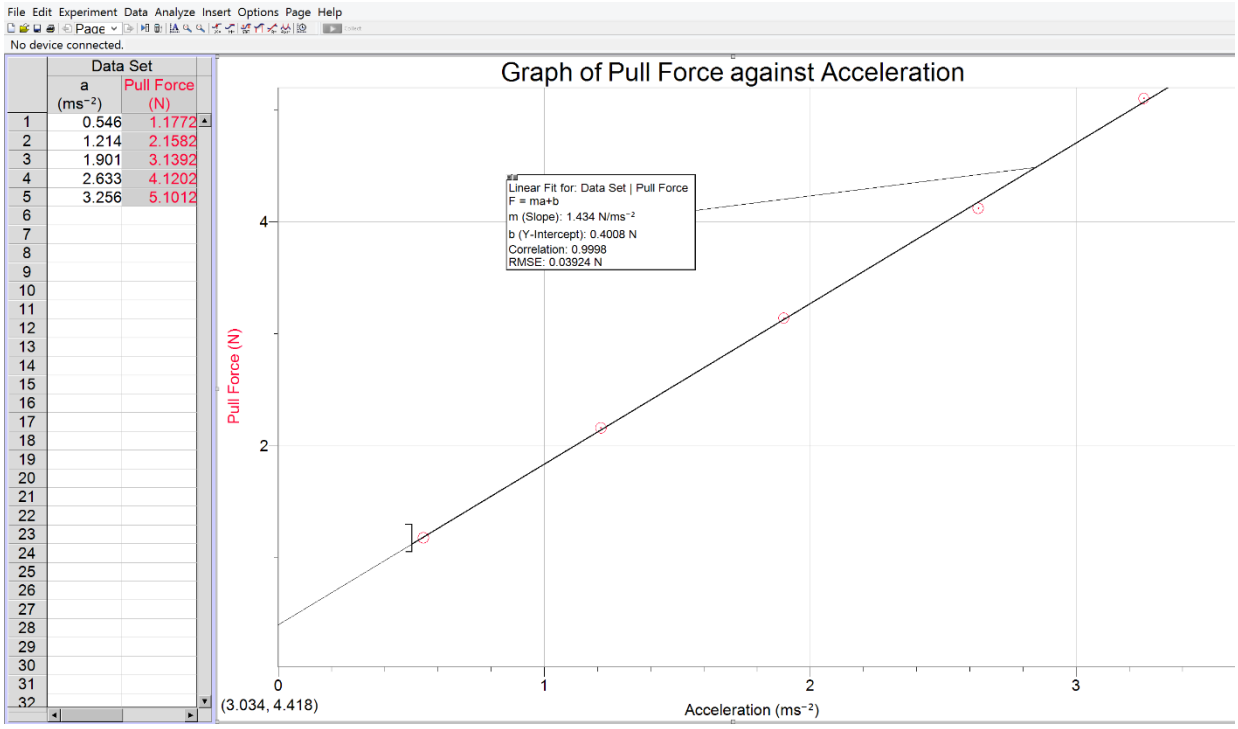
Method:

A wooden board was placed on the desk and a pulley was attached at one end, as seen in the above picture. A motion sensor was placed at the end opposite to the pulley and was connected to a data logger. This data logger was then connected to a computer on which Logger Pro 3.11 was open. Then, a trolley was weighed and placed directly in front of the motion sensor. A long piece of string was then cut, one side of it was tied onto the trolley and the other was tied to a 20 gram weight. This weight was then suspended off of the pulley. An additional 100 grams were placed onto the 20 gram weight, while 400 grams were placed on top of the trolley. The weight was held. A sweater was placed under where the weight would fall. Once the motion detector started taking measurements, the weight was released. Points were plotted on a velocity/time graph inside of Logger Pro. A line of best fit was taken from the points which exhibited a linear pattern (where the trolleys acceleration was constant). The gradient of the line of best fit (i.e. the acceleration) was taken down. The experiment was repeated an additional four times, whereby 100 grams were taken off of the top of the trolley and placed onto the suspended weight (to keep the mass of the entire system constant, whilst changing the force of tension). This entire process was repeated an additional two times to get two supplementary acceleration values for each force value. An average acceleration was calculated for each force value (by adding all three accelerations from each trial and dividing the sum by three). A graph of the pull force against average acceleration was plotted.

Results:

Total mass = Mass of cart + Mass of weights = 0.764 + 520 = **1.284 kg**

Suspended Mass/kg	Pull force (Tension)/N	Acceleration Trial 1/ms^{-2}	Acceleration Trial 2/ms^{-2}	Acceleration Trial 3/ms^{-2}	Average Acceleration/ ms^{-2}
0.12	1.1772	0.547	0.5458	0.568	0.546
0.22	2.1582	1.185	1.243	1.270	1.214
0.32	3.1392	1.905	1.896	2.109	1.901
0.42	4.1202	2.723	2.543	2.948	2.633
0.52	5.1012	3.176	3.336	3.239	3.256



Conclusion:

In conclusion, as we can see from the graph, the relationship between pull force and acceleration is linear, but not proportional (as the y intercept isn't 0). The equation of the line of best fit is $F_t = 1.434a+0.4008$.
This agrees with the theoretical prediction $F_t = ma + F_f$. We can therefore deduce that the gradient of 1.434 represents the mass (in kg) of the entire system in the experiment. This result is close in value to the actual measured total mass, which was measured to be 1.284 kg. The difference of 0.15 kg can be attributed to experimental error.
Finally, the y-intercept represents the force of friction acting on the trolley, which we can see in this case is 0.4008 N. If we had subtracted this value from all of the recorded pull force values, we would see a linear graph exhibiting proportionality (as predicted by Newton's second law: Resultant force = mass * acceleration).

Evaluation:

We can see from the results of the experiment that the predicted mass of the system is 0.15 kg greater than the actual weighed mass. As the mass of the trolley was only measured once, it is more likely that there was an error in zeroing the scale, than it is that there was an error in the results graphed. Moreover, for there to be a mistake in the gradient, there would have to be a constant error in both the force and acceleration. Finally, as the graphed results exhibit a 0.9998 correlation, it is unlikely that there was a large random error present in the experiment.

Otherwise, the experiment was carried out efficiently and cooperatively.

Experiment to investigate the relationship between the acceleration of a moving object and the force pulling it forward

Aim

Our aims are to investigate the relationship between the acceleration of a moving object and the force pulling it forward and to prove the formula $T = m\,a + FR$.

Hypothesis & Theory

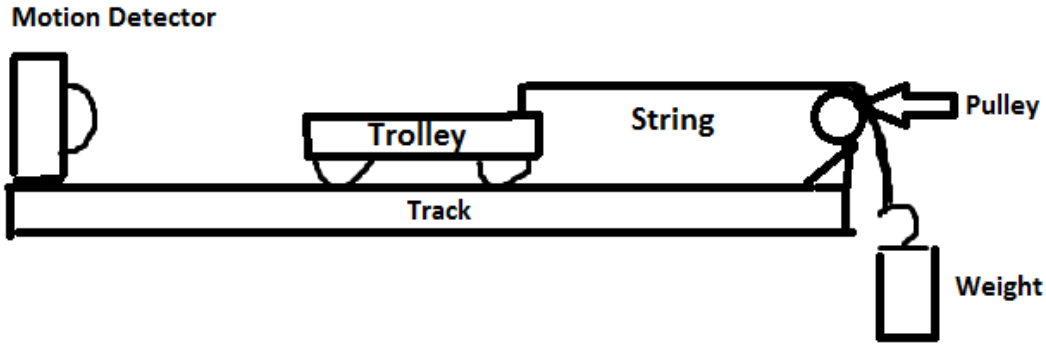
I think what we will find is that the acceleration of the moving object is proportional to the force pulling it forward, because Newton's second law states that the acceleration is proportional to the resultant force and this is an experiment based on that law. We also know that the mass of the moving object will affect its acceleration, which would lead us to believe that the acceleration of the moving object will be slower if it is heavier but pulled with the same force.

Apparatus

- Track
- Trolley
- Lab Quest (data logger)
- Pulley
- Motion detector
- Logger Pro
- String
- Weights

Method

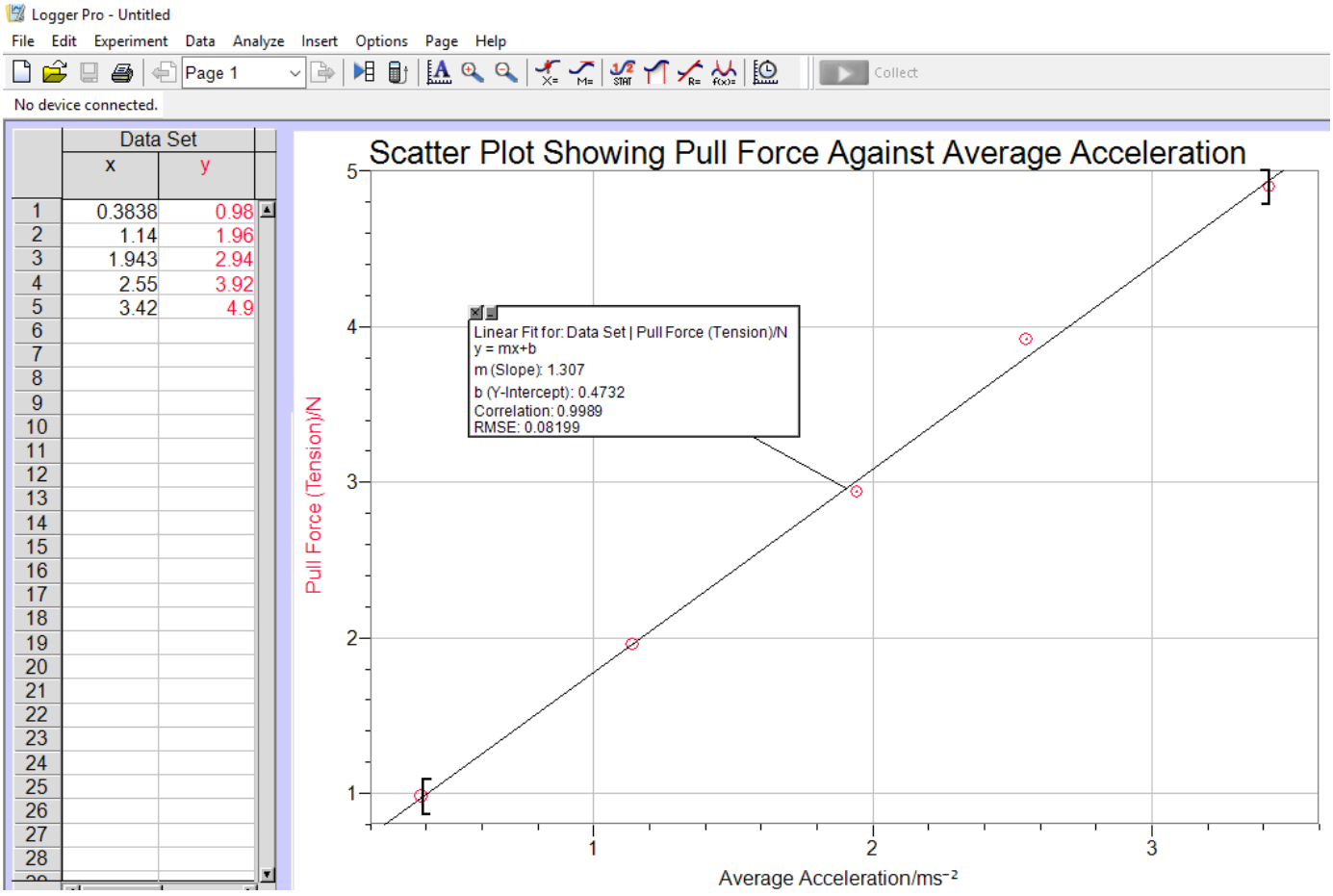
1. The motion detector was connected to the lab quest, which in turn was connected to a computer. The motion detector was placed on one end of the track and the pulley was clamped onto the other end. The piece of string was tied to the trolley, which was placed in front of the motion detector.
2. Tension was created in the string and the trolley was released. The weight that was tied on the end of the string pulled the trolley towards the pulley.
3. The results were recorded and inserted into Logger Pro
4. More weights were put on and the experiment was repeated.



Results

Pull Force (Tension) /N	Acceleration Trial 1 / ms^{-2}	Acceleration Trial 2 / ms^{-2}	Acceleration Trial 3 / ms^{-2}	Average Acceleration / ms^{-2}
0.98	0.3718	0.3988	0.3805	0.3838
1.96	1.158	1.146	1.115	1.140
2.94	1.919	1.932	1.978	1.943
3.92	2.418	2.585	2.647	2.550
4.90	3.387	3.418	3.456	3.420

Graphs and Calculations



Equation of line:

y = 1.307x + 0.4732

Conclusions

Our results show that there is a relationship between pull force and average acceleration. They show that the two factors are indeed proportional. The hypothesis is confirmed. We can see that as the pull force is increased, the average acceleration increases with it. In other words: the acceleration is proportional to the resultant force. The results therefore confirm Newton's 2nd Law. Looking at the scatter plot, we can also conclude that the relationship between the two factors is linear and not exponential, as the line is straight. In this way, the graph proves the formula $T = m\,a + FR$. The aims of our experiment were fulfilled.

Evaluation

The experiment went well, with no major issues. Our method, as any other, has its strengths and weaknesses. It is simple, precise, clear, and easy to execute. This reduces the probability of error while setting up and carrying out the experiment. The only weakness in our method is that the experiment is carried out by humans. This, unfortunately, leaves room for the human-error factor, however, we tried as best as we could to eliminate this factor and make sure that it did not affect our results. Overall the experiment was successful. Some good, reliable results were obtained and some trustworthy conclusions were drawn.

05/02/17

Newton's 2nd law experiment

Aim: to test the relationship between force over acceleration

Hypothesis: The more mass applied the faster the cart will accelerate

Apparatus:

- Cart
- Wooden board to place the cart on
- String
- Pulling ring
- Laptop with logger pro

Method:

The apparatus was setup as in the picture above. The results were taken down when the weight on the end of the string was let go. The cart will start accelerating and come to a stop at the end of the track. The results were taken down on a laptop with logger pro downloaded on it. The same was done after but adding more weight on the end of the string. The experiment was done 3 times to have a more accurate measurement.

Data and results:

Pull Force (Tension) /N	Acceleration Trial 1 / ms^{-}	Acceleration Trial 2 / ms^{-}	Acceleration Trial 3 / ms^{-2}	Average Acceleration / ms^{-2}
0.98	0.3718	0.3988	0.3805	0.3838
1.98	1.158	1.146	1.115	1.140
2.94	1.919	1.932	1.978	1.943
3.92	2.418	2.585	2.647	2.550
4.90	3.387	3.418	3.456	3.420

Conclusion:

The results were as we predicted it to be. The more mass added to the cart the faster it would accelerate. By adding more mass to the end of the string the more mass the was to be pulled by gravity, making it have more pull.

Lab Report

Aim

To determine the correlation between the amount of force used to pull a trolley and it's acceleration

Hypothesis and Theory

I predict that the larger the force acting upon the trolley is, the more acceleration it will have. This prediction is based on Newton's 2nd Law which states that the acceleration is proportional to the resultant force.

Apparatus

- Trolley
- String
- Ramp
- Weights
- Motion Detector
- Graph generator
- Pulley

Method

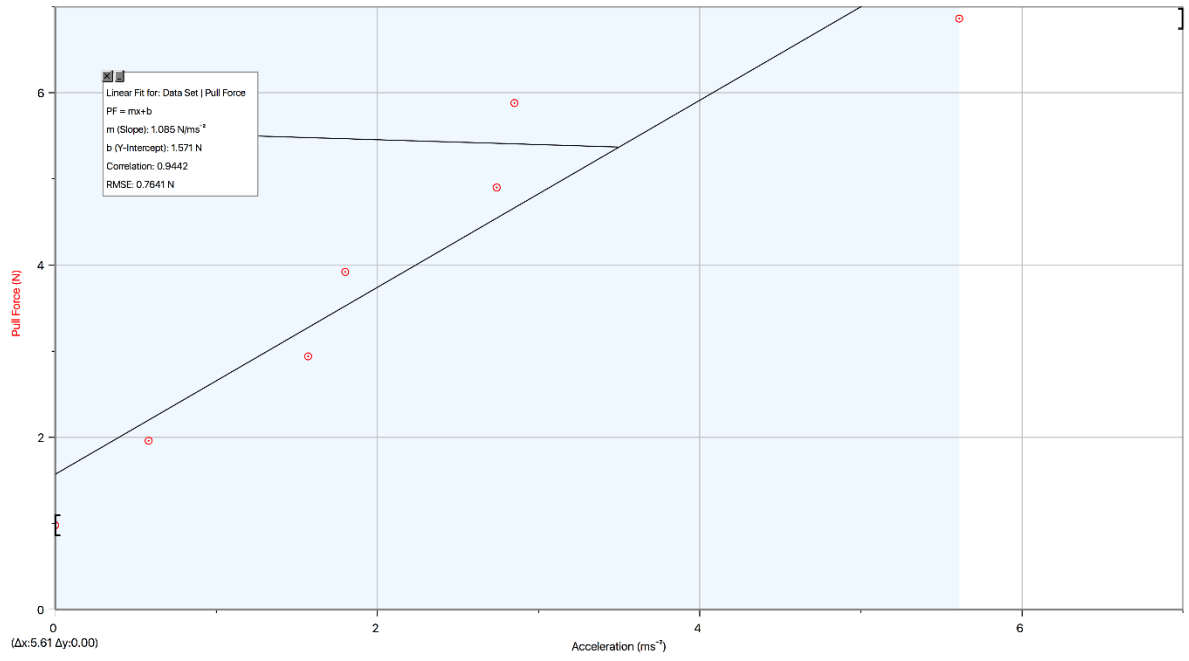
1. First, the experiment was set up as seen in the image

2. 0.6kg was placed on the trolley and different weights were placed on the pull forced throughout the experiment
3. The Pull force weight was dropped and the distance measurer was turned on at the same time. The results were recorded.

Raw Data and Graph

Pull Force (Tension) /N	Acceleration Trial 1 / ms^{-2}	Acceleration Trial 2 / ms^{-2}	Acceleration Trial 3 / ms^{-2}	Average Acceleration / ms^{-2}
1	0	0	0	0
2	0.53	0.55	0.66	0.58
3	1.26	2.31	1.13	1.57
4	1.56	1.56	2.28	1.8
5	3.25	2.26	2.71	2.74
6	3.32	2.61	2.61	2.85
7	6.56	6.26	4.01	5.61

Grap Showing the correlation between pullforce and acceleration



Conclusion

In conclusion, our aim was reached. We found a correlation between the pull force and the acceleration of the trolley. My hypothesis was also proven since it is evident that the trolley's accerlation increased everytime more weight was removed from it and added on to the pull force. However, the graph wasn't as constant as we wanted it to be. This might've been because of inaccurate note taking, or result taking.

Experiment to investigate the acceleration of a moving object and the force pulling it forward.

Aim/Research Question:

To find out if there is a relationship between the acceleration of a moving object and the force which is pulling it.

Hypothesis and Theory:

From what I already know, I can say that in this particular experiment the pulling force is the tension in the string which is in this case the falling mass. We also have to take into account: Friction, as on the tracks that we are using, it is significant. Moreover, the gradient of the linear graph we construct, should be equal to the total moving mass. As the mass of the moving object affects the acceleration we will have to keep it constant. After taking all of this theoretical knowledge into account, I predict that as the mass of the pulling force increases so too will the acceleration of the moving object in proportion to the mass.

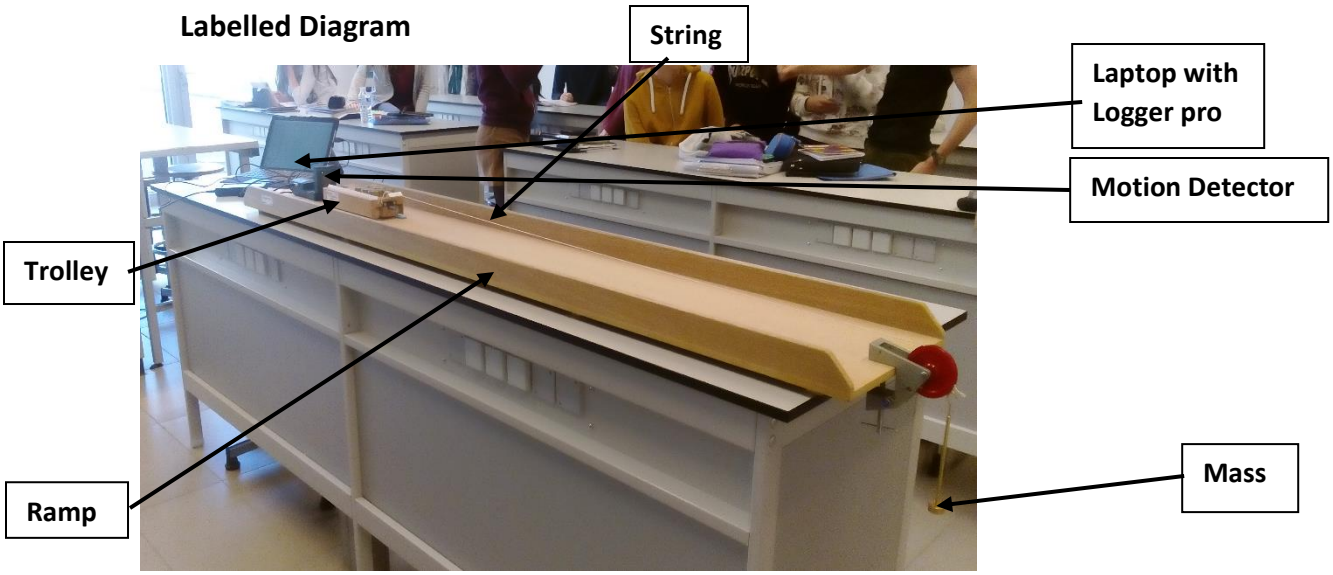
Apparatus:

- Trolley
- Ramp
- String
- Various masses
- Laptop with Logger Pro
- Motion Detector

Method/Procedure:

1. A trolley was placed on a ramp.
2. The trolley was connected to a mass with string tied on both ends.
3. 400g of mass was placed on the trolley.
4. A laptop with Logger Pro was connected to the motion detector.
5. The motion detector was placed directly behind the trolley.
6. The mass was dropped and at the same time the graph on Logger Pro was started.
7. This was repeated multiple times, each time removing 100g from the trolley and placing it on the falling mass.

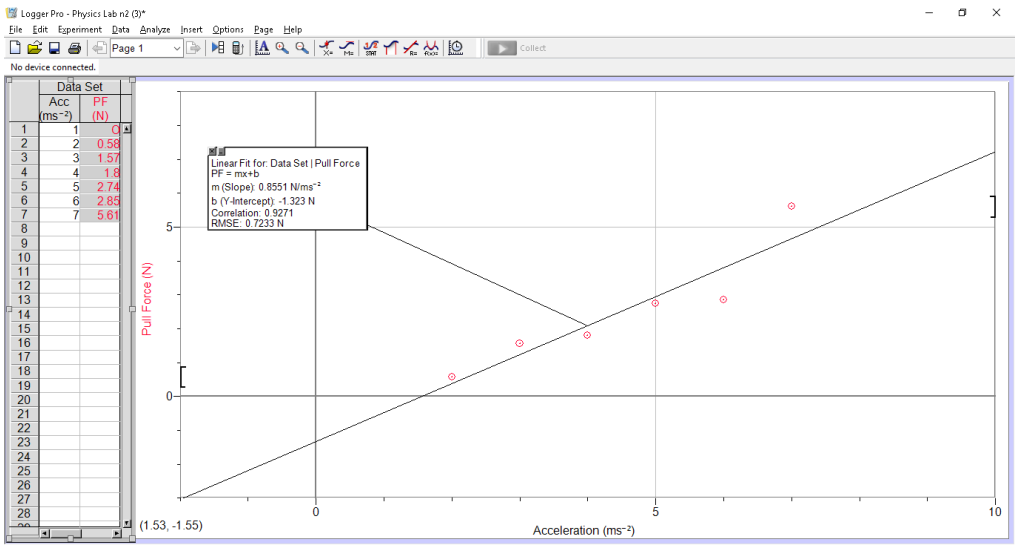
Labelled Diagram



Results/Graph

Pull Force (Tension) /N	Acceleration Trial 1 / ms^{-2}
1	0
2	0.58
3	1.57
4	1.80
5	2.74
6	2.85
7	5.61

Total moving mass: 1.1kg



Conclusion

As we can see from the graph above, force and acceleration are directly proportional because of the graph being linear. Of course, our results are not at all perfect as, the points on the graph do not sit properly on the line of best fit. We found our gradient to be about 0.8 which is evidently not the total moving mass (1.1kg). This might have been due to an imprecision in our experimenting. However, referring back to my hypothesis, I can confirm that it was indeed correct. The acceleration did increase in proportion to the mass which is proven thanks to the presence of a linear relationship in the graph above.

Evaluation

I believe that, all in all, we worked very efficiently and coherently. Each member of the group was allocated a task and to the best of my knowledge that particular task was carried out correctly. For example, we had one person releasing the mass each time, one person starting and stopping the graph on Logger Pro and another recording the results. As is evident from the graph, the points don't lie perfectly on the line of best fit. This may have been due to a mistake on our part; experimental error. However, as I have stated previously our group worked well and collectively as a unit we carried out the task in hand.

Example Biology

Prüfungen – Examinations – Examens
201X/201X – 2nd semester

The European Schools

Klasse *Class* *Classe*	**S5EN**
Fach *Subject* *Matière*	BIOLOGY
Datum *Date*	DATE
Prüfungsdauer *Examination length* *Durée de l'épreuve*	2 periods 1½ hours
Lehrer *Teacher* *Professeur*	TEACHER

Besondere Bemerkungen
Special Remarks
Remarques Particulières

☞ **YOUR NAME:** _____

- ☞ The examination consists of 8 pages, including this cover sheet, numbered 1/8–8/8.
- ☞ The examination consists of 4 sections. All 4 sections must be completed. The total consists of 151 points.
- ☞ Use of a calculator is not permitted.
- ☞ All answers must be neatly written in dark ink. Drawings, sketches, etc., may also be done in pencil, colored pencil, or colored ink.
- ☞ Feel free to mark up this examination sheet.
- ☞ All answers should be written on the separate exam paper provided.
- ☞ Cheating, or attempted cheating, will result in a zero mark for the examination.

SUBJECT 1 – UNCOMBABLE HAIR SYNDROME. 55 POINTS.

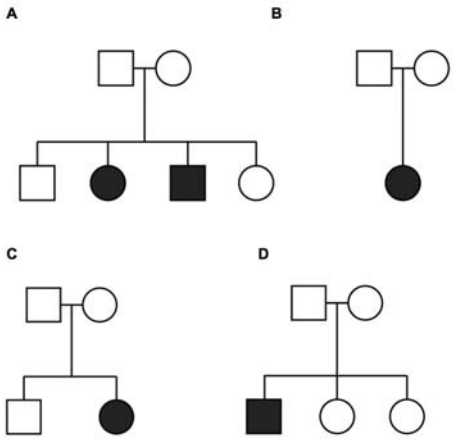
[estimated time: 40 minutes]

People of European descent with "uncombable hair syndrome" (also known as *cheveux incoiffables* or *Struwwelpetersyndrom*) have light-coloured, frizzy, fluffy hair that tangles incessantly (see figure 1).

The American Journal of Human Genetics 2016 99, 1292-1304DOI: (10.1016/j.ajhg.2016.10.004)

Figure 1. *Three children with uncombable hair syndrome.*

Beginning in the 1970s, scientists have studied uncombable hair syndrome (UHS). They realized that, while some cases occur randomly, the character tends to run in families. A team of scientists announced in 2016 that they had found a genetic basis for UHS. Pedigrees of four different families with children with UHS are shown in figure 2.



The American Journal of Human Genetics 2016 99, 1292-1304DOI: (10.1016/j.ajhg.2016.10.004)

Figure 2. *Pedigrees of (A) a British family, (B) a Danish family, (C) a Spanish family, and (D) a Swiss family, all having children with UHS.*

Determine the mode of inheritance of UHS.

1. **Is UHS dominant or recessive? Explain your answer with reference to the pedigrees above.** 4

This trait is not sex-linked.

2. **How can you confirm this statement from the information given in the pedigrees in figure 2?** 6

On the basis of your answers above, consider a scenario in which the daughter of family B marries the son of family C.

3. **What might be the chances that their children have UHS? Use Punnett squares as necessary, and be sure you use appropriate terminology and symbols.** 8

Scientists have figured out that uncombable hair syndrome is caused by a mutation in a gene located on chromosome 1.

4. **Sketch and label the structure of a chromosome in prophase of mitosis.** 4

The gene in question codes for a protein called PADI3. This protein helps to regulate how the protein the hair itself is made of (called keratin) is shaped as the hair grows.

Here is the coding strand of the unmutated, normal stretch of DNA that covers where the mutation has occurred in people with UHS:

AGA	CAT	GAA	TGC	GAA	TGT	CCC	CAG
1	2	3	4	5	6	7	8

5. **Give the sequence of the complementary strand of the DNA.** 4

Here is the sequence of the coding strand of DNA in people with the mutation:

AGA	CAT	GAA	TGC	GTA	TGT	CCC	CAG
1	2	3	4	5	6	7	8

6. **Indicate where the mutation has occurred, and explain how such mutations can occur.** 4

In cross section, the hairs of people with UHS are triangular, rather than round or oval, as in people with the unmutated gene (see figure 3). It is this triangular shape that is responsible for the frizzy kinky uncombability of UHS.

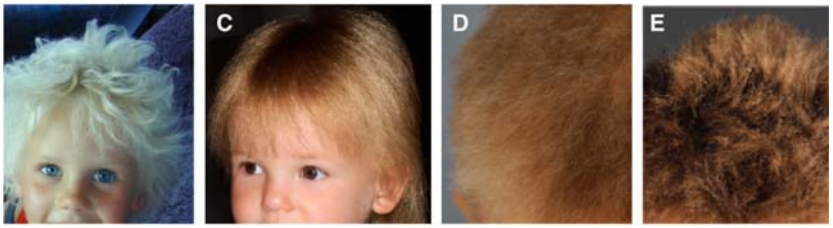


Figure 3. *Scanning electron micrographs of hair. K and L are from the British boy in family A with UHS (see figure 2), and M is from a person with normal hair.*

*Am. J. Hum. Gen.*DOI: (10.1016/j.ajhg.2016.10.004)

All mammals have the PADI3 gene. Two important functions of hair in most mammals are to insulate the body and to shed water in case of rain (although this does not matter for humans, who can wear hats and use umbrellas as necessary). The frizzy hair caused by the mutation does not shed water or insulate very well.

Presumably, random mutations causing "frizzy fur syndrome" (we'll call it that, since mice don't use combs) occur also from time to time in field mice (*Apodemus sylvaticus*, shown in figure 4).

https://commons.wikimedia.org/wiki/File:Apodemus_sylvaticus_(Sardinia).jpg

Figure 4. *A European field mouse* (Apodemus sylvaticus).

7. **Given that field mice live outdoors, how likely is such a mutation to spread and lead to the evolution of a frizzy species of mouse? Explain your reasoning.** 11

8. **Given the different amounts of rainfall and the different average temperatures between Scotland and Sicily, would a frizzy species be more likely to evolve in one place or the other? Explain your reasoning.** 11

Mark for communication skills for questions 7-8: 3

***Source**: F.B. Ü Basmanav et al., "Mutations in Three Genes Encoding Proteins Involved in Hair Shaft Formation Cause Uncombable Hair Syndrome."* The American Journal of Human Genetics, *99 (2016): 1292-1304. DOI: (10.1016/j.ajhg.2016.10.004)*

SUBJECT 2 – "BIOHACKING" OUR OWN DNA. 28 POINTS.

[estimated time: 15 minutes]

Biohackers are using CRISPR on their DNA and we can't stop it.

People are starting to alter their own DNA with cheap, easy gene-editing technology. Is it time to regulate CRISPR?

Gene editing is entering the mainstream. CRISPR, a cheap and easy technique for making precise changes to DNA, has got researchers around the world racing to trial its use in treating a host of human diseases. But this race is not confined to the lab. Last month, Josiah Zayner, a biochemist who once worked for NASA, became the first person known to have edited his own genes with CRISPR.

During a lecture about human genetic engineering that was streamed live on Facebook, Zayner whipped out a vial of edited DNA and a syringe, then injected himself. Now, following in his footsteps, other biohackers are getting ready to take the plunge and tinker with their own genes.

Away from the strict controls of formal science, this self-experimentation might seem dangerously reckless. But if people are allowed to modify their own body through cosmetic surgery, tattoos and other augmentations, should a person's own genome really be off limits?

Zayner's experiment was intended to boost his strength by removing the gene for myostatin, which regulates muscle growth. A similar experiment in 2015 showed that this works in beagles whose genomes were edited at the embryo stage. He injected himself with a copy of his own DNA that had been edited using CRISPR to remove the gene.

Robin Lovell-Badge, a leading CRISPR researcher at the Francis Crick Institute in London, says Zayner's experiment was "foolish" and could have unintended consequences, including tissue damage, cell death, or an immune response.

1. **Is it ethical for humans to alter their own DNA? Would it make a difference if the alteration were cosmetic (changing only a person's looks) or if it were therapeutic (fixing a health problem)? Discuss, using the information above and your own knowledge about DNA and reproduction.** 28

***Source**: Alex Pearlman,* New Scientist, *15 November 2017.*

SUBJECT 3 – INSULIN AND BLOOD GLUCOSE LEVELS. 48 POINTS.

[estimated time: 25 minutes]

Figure 1, below, depicts part of the human endocrine system.

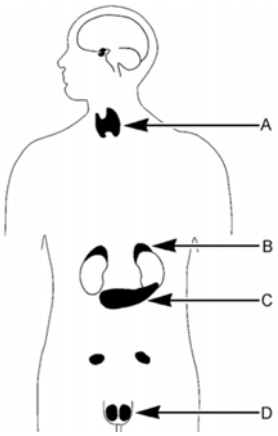


Figure 1.

1. **In your exam paper, give the names of the parts labelled A, B, C, and D.** 4

At the beginning of an investigation, scientists measured the concentration of blood glucose and insulin in a healthy adult man, and found them to be normal. This person then immediately drank a solution of glucose, and the scientists re-measured his blood glucose and insulin levels at intervals over a period of five hours. The man fasted (ate and drank nothing) and did not exercise during this time. The results are shown in the table below.

Time after drinking glucose solution (hours)	*Glucose concentration (mg/100 cm³)*	*Insulin concentration (mM)*
0	80	50
0.5	90	550
1	120	500
2	100	400
3	80	100
4	80	50
5	70	45

2. **Describe the role of insulin in maintaining blood sugar level.** 8
3. **Using the data in the table above and the graph paper provided, draw a line graph showing how insulin concentration changed over the time of the investigation.** 10

4. **At what time did the scientists record the highest ratio of blood glucose to its original concentration? What was this ratio?** 4

5. **How long did it take for blood insulin concentration to return to the starting level from its maximum concentration?** 2

6. **Briefly explain the main reason that the man's blood glucose levels decreased over this period.** 4

7. **Draw a second line on your graph from question 3, above, to predict how the man's blood glucagon concentration will change over the same 5 hours, assuming that he continues to eat and drink nothing. (You may assume that glucagon concentration is measured in the same units and is within the same range.)** 10

Diabetes is a disease that occurs when blood glucose levels consistently remain too high. *Type 1* diabetes occurs when the body does not produce enough insulin. Extreme tiredness is a symptom of diabetes.

8. **Using your knowledge of respiration, explain why a person suffering from diabetes would be extremely tired.** 6

SUBJECT 4 – MEIOSIS. 20 POINTS.

[estimated time: 10 minutes]

Figures 1a and 1b show events occurring with the chromosomes at two different stages of meiosis. Figure 2 depicts spermatogenesis.

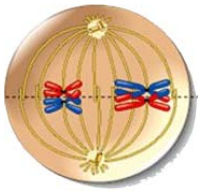


Figure 1a.

Figure 1b.

Adapted from https://www.quia.com/jg/1294967list.html

1. **Give the name of the stage in figure 1a.** 2
2. **Give the name of the stage in figure 1b.** 2

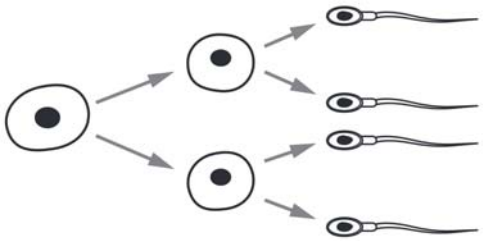


Figure 2.

3. **State how many of the sperm cells shown in figure 2 contain:**
   a. **an X chromosome.** 3
   b. **autosomes.** 2

In contrast with mitosis, meiosis includes a *reducing division*.

4. **At which stage does the reducing division take place?** 2
5. **What is the function of the reducing division? Why does meiosis include it, but mitosis not?** 4

The sperm cells created through spermatogenesis are not identical.

6. **Explain the importance of this fact for understanding evolution.** 5

Subject 1: Uncombable Hair Syndrome (29 points + 3 for W/C globally = 32 points total)

1) UHS is recessive. We can see that in each family, unaffected parents have at least one affected child; this could only happen if both parents were carriers of a recessive allele. In families A, C, and D, only some children are affected [or other reference to a particular case/cases]. **4**

Competences: App 4

2) The trait is not sex-linked, because none of the girls who has it has an affected father, which would have to be the case if it were sex-linked. [Partial answers, but not sufficient for full marks: More girls than boys have it; boys and girls both have it.] **6**

Competences: App 6

3) There are two possibilities: either young Mr. C is a carrier (Punnett square A), in which case the odds are 50-50, or he is not (Punnett square B), in which case the odds are zero **(verbal explanation 4).** Punnett squares **(4)**:

A)

	h	h
H	Hh	Hh
h	hh	hh

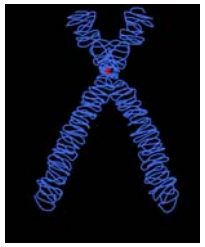
B)

	h	h
H	Hh	Hh
H	Hh	Hh

8

Competences: Ana 8

4) Sketch courtesy of https://en.wikipedia.org/wiki/Centromere#/media/File:Chromosome.svg. Scale not required. 1: sister chromatid; 2: centromere; 3: p-arm; 4: q-arm **(0.5 each).**



4

Competences: K/C: 4

5) TCT GTA CTT ACG CTT ACA GGG GTC **4**

Competences: K/C: 2; App 2		
6)	At codon 5 **(1)**; a substitution **(1)** happened when the chromosome was being duplicated/the DNA was being replicated in meiosis **(2).**	**4**
Competences: K/C 2; App: 2.		
7)	Student must: propose hypothesis; give reasons to support it from text and own knowledge; demonstrate understanding of non-teleological nature of natural selection. Damp, cold frizzy mice would probably not survive to reproductive age as well as normal-furred mice, so the frizzy phenotype would get picked off pretty quickly by natural selection. Given that it's a recessive allele, though, frizziness probably would keep turning up from time to time.	**11**
Competences: K/C 2; App 4; Ana 5 (+W/C global for questions 7-8)		
8)	Student must: propose hypothesis; give reasons to support it from text and own knowledge; demonstrate understanding of non-teleological nature of natural selection. Nevertheless, a frizzy mouse would stand a better chance in Sicily than Scotland, given that it's both warmer and drier, so if frizziness were for some other reason advantageous (for example, if mice found frizziness irresistibly hot in members of the opposite sex), it would be conceivable that a frizzy species might evolve in Sicily.	**11**
Competences: K/C 2; App 4; Ana 5 (+W/C global for questions 7-8)		
Global mark for W/C, questions 7 and 8		**3**

Subject 2: CRISPR (28 points total)		
1)	A global mark to be given. Criteria: • Does the pupil clearly state a personal point of view? • Does the pupil adduce substantive reasons for her/his opinion? • Does the pupil draw on the information given in the text? • Does the pupil discuss scientific considerations based on knowledge acquired in class? • Is the argument presented logically and coherently? • Is the use of language clear and skillful, in terms of vocabulary, syntax, and style?	**28**
Competences: K/C 10; App 7; Ana 7; WC 4; points to be attributed proportionally from global mark		

Subject 3: Blood Sugar Levels (48 points total)

1) A: thyroid, B: adrenal gland, C: pancreas, D: testes **(1 each)** — **4**

Competences: K/C: 4

2) If blood sugar rises too high (e.g. after a meal), **glucose receptors** on **pancreas beta cells** signal them to **release insulin** into the blood. **Insulin receptors** on liver cells tell them to **store** glucose as **glycogen**; **insulin receptors** on **body cells** tell them they can **burn** glucose. Blood sugar levels thus go down. (Key concepts in **bold**; students may formulate answers in various ways that may or may not use all of these explicitly.) — **8**

Competences: K/C: 4; WC: 4

3) **Drawing a line graph given all data:** Maximum of points for each assessment criteria in **bold**, fraction of points not in bold. — **10**

No graph			
Graph present			
Presentation:			
• Data are shown as a line graph **(2.0)**		• Good graphical quality **(1.0)**	
• Data are not not shown as a line graph (0.0)		• Scale correct **(2.0)**	
• axes are not labelled (0.0)		• Correct scale, but not useful **(1.0)**	
• axes incorrectly labelled (0.0)		• Incorrect scale (0.0)	
• axes correctly labelled, no units (1.0)		• Some mistakes in transfer of the data (2.0)	
• axes correctly labelled, units given **(2)**		• At the most 1 mistake in transfer of the data **(3.0)**	

Competences: K/C: 2; App: 5; WC:3

4) Time: 1 hour **(2)** 120/80 = 3/2 (correct numbers: **1**, ratio: **1**; in total **2**) — **4**

Competences: K/C: 3; App: 1

5) 3.5 hours **(2)** for correct answer; if wrong maximum concentration is taken and time difference is adapted to it: **(1)** — **2**

Competences: App: 1; Ana: 1

6) - use of glucose for aerobic respiration (energy production) **(2)**
- uptake of glucose from blood into cells where it is storaged as glycogen **(2)** — **4**

Competences: K/C:2; App: 2

7)	**Drawing a line graph deducing data:** Maximum of points for each assessment criteria in **bold**, fraction of points not in bold. No second line | | **Problem solving:** | Second line is graphed separately (1) | | No use of data, but antagonistic principle alluded to (1.0) | Two lines in one graph **(2)** | | Use of insulin data (in reverse order), but some mistakes (2) | **Presentation:** | | Use of insulin data (in reverse order), at most 1 mistake **(4.0)** | - axes are not labelled (0.0) | | Line begins at t = 0 hours **(1.0)** | - axes incorrectly labelled (0.0) | | Line does not begin at t = 0 hours (0.0) | - axes correctly labelled, no units (1.0) | | Good graphical quality **(1)** | - axes correctly labelled right, units given **(2)** | |	**10**
Competences: K/C:3; App:3; Ana:3; WC:1		
8)	Cells need glucose to **produce energy**. They depend on **insulin receptors** to tell them that glucose is available in the blood. **If there is no insulin in the blood, cells won't know that glucose is available**, and **they will starve to death even though there's plenty of glucose available in the blood.** The result is exhaustion, because the cells can't generate sufficient energy for **metabolism**. (Key concepts in **bold**; students may formulate answers in various ways that may or may not use all of these explicitly.)	**6**
Competences: K/C:3; App:2; WC: 1		

Subject: Meiosis and Evolution (20 points)		
1)	Metaphase 1 **(2)**	**2**
Competences: K/C: 2		
2)	Telophase 2 **(2)**	**2**
Competences: K/C: 2		
3a)	2 of the 4 sperm cells have an X chromosome **(3)**	**3**
Competences: K/C: 2; Ana: 1		
3b)	all 4 of the sperm cells have autosomes **(2)**	**2**
Competences: K/C: 2		
4)	Anaphase 1 **(2)**	**2**

Competences: K/C: 2		
5)	The function of meiosis is to produce haploid gametes. If no reducing division occurs, the number of chromosomes increases at fertilization. The function of mitosis is to produce identical somatic (body) cells; that's why a reducing process is not needed.	**4**
Competences: K/C: 2; App: 2		
6)	The **phenotype** of a living being is the result of the **expression** of its **genotype**. Non-identical **gametes** produce **different allele combinations** at **fertilization**. **Evolution** results from **changes in the frequencies of alleles** in a **population** over generations as a result of **natural selection**, which weeds out certain phenotypes, and therefore alleles, from the population over time. (Students may also make the points by way of an actual or invented example, rather than a theoretical formulation. Key concepts in **bold**; students may formulate answers in various ways that may or may not use all of these explicitly.)	**5**
Competences: K/C: 2; Ana: 2; WC: 1		

Breakdown by Competences—Model S5 Harmonized Exam Biology

Subject	Knowledge/comprehension	Application	Analysis	Written communication
UHS			**Total:**	**55**
1		4		
2		6		
3			8	
4	4			
5	2	2		
6	2	2		
7	2	4	5	3
8	2	4	5	
CRISPR			**Total**:	**28**
1	10	7	7	4
Blood glucose			**Total**:	**48**
1	4			
2	4			4
3	2	5		3
4	3	1		
5		1	1	
6	2	2		
7	3	3	3	1
8	3	2		1
Learning objectives assessed, by competence (sample)	...is able to label parts of endocrine system ...is able to define negative feedback control ...is able to illustrate the role of insulin in maintaining the blood sugar level ...indicates the need of glucose for respiration and energy production …is able to classify cell structures	… is able to use data to draw a line graph with correct labelling of axes and correct use of units …is able to present the right data and calculate a ratio ...is able to use knowledge of blood sugar regulation …is able to link knowledge of respiration and blood regulation ...is able to transfer the key-log-principle for hormon functianal	...is able to use 'maximum concentration' and present the right data ...is able to convert insulin data into glucagon data with outlining the antagonistic principle	...use of required scientific vocabulary … writes logically and clearly … is able to draw in good quality
Meiosis			**Total**:	**20**
1	2			
2	2			
3a	2	1		
3b	2			
4	2			
5	2	2		
6	2		2	1
Total	57	46	31	17
Grand total	247			
%	37,7	30,5	20,5	11,3

Attainment descriptors – Biology – Chemistry – Physics – S4-S5

	A (9.0-10 – Excellent)	**B** (8.0-8.9 – Very good)	**C** (7.0-7.9 – Good)	**D** (6.0-6.9 – Satisfactory)	**E** (5.0-5.9 – Sufficient)	**F** (3.0-4.9 – Failed/Weak)	**FX** (0-2.9 – Failed/Very weak)
Knowledge Comprehension	Displays comprehensive knowledge of facts and a thorough command and use of concepts and principles in science. 55	Displays a very broad knowledge of facts and a good command and use of concepts and principles in science. 53	Displays a broad knowledge of facts and good understanding of main concepts and principles in science. 49	Displays a reasonable knowledge of facts and definitions and understanding of basic concepts and principles in science. 45	Recalls main names, facts and definitions. Understands only basic concepts and principles in science. 40	Displays little recall of factual information and a limited understanding of concepts and principles in science. 20	Displays very little recall of factual information. Shows very little understanding of scientific principles and concepts. 0
Application	Makes connections between different parts of the syllabus and applies concepts to a wide variety of unfamiliar situations and makes appropriate predictions. 44	Makes some connections between different parts of the syllabus and applies concepts and principles to unfamiliar situations. 42	Is capable of using knowledge in an unfamiliar situation. 38	Is capable of using knowledge in a familiar situation. 34	and can use basic knowledge in a familiar situation. 30	/ 15	/ 0
Analysis	Is capable of detailed and critical analysis and explanations of complex data. 30	Analyses and explains complex data well. 28	Produces good analysis and explanations of simple data. 25	Produces basic analysis and explanations of simple data. 22	Given a structure can analyze and explain simple data. 19	Can use data only with significant guidance. 8	Fails to use data adequately. 0

~~Experimental work~~	~~Formulates hypotheses, plans and carries out investigations using a wide range of techniques while being aware of ethical issues.~~	~~Plans and carries out experiments using appropriate techniques, being aware of safety issues.~~	~~Follows a written procedure safely and makes and records observations, presenting them using different techniques.~~	~~Follows a written procedure safely and records observations.~~	~~Follows a written procedure safely and makes basic observations~~	~~Has difficulty following instructions without supervision.~~	~~Is not able to safely follow a written procedure.~~
Communication (~~oral and~~ written)	Communicates logically and concisely using scientific vocabulary correctly. Demonstrates excellent presentation skills. 16	Communicates clearly using scientific vocabulary correctly. Demonstrates very good presentation skills. 15	Communicates clearly most of the time using scientific vocabulary correctly. Demonstrates good presentation skills. 13	Uses basic scientific vocabulary, and descriptions show some structure. Demonstrates satisfactory presentation skills. 11	Uses basic scientific vocabulary, but descriptions may lack structure or clarity. Demonstrates satisfactory presentation skills. 9	Generally produces descriptions that are insufficient or incomplete with a poor use of scientific vocabulary. Lacks acceptable presentation skills. 5	Has very poor communication and presentation skills. 0
~~Teamwork~~	~~Shows initiative – a team leader.~~	~~Works constructively in a team.~~	~~Works well in a team.~~	~~Works satisfactorily in a team.~~	~~and participates in team work.~~	~~Needs assistance when working in a team.~~	~~Does not work in a team.~~

Points	(Grades)	Marks
150 – 151 148 - 149 145 - 147	A (Excellent)	10 9.5 9.0
141 - 144 138 - 140	B (Very Good)	8.5 8.0
131 - 137 125 - 130	C (Good)	7.5 7.0
118-124 112 - 117	D (Satisfactory)	6.5 6.0
104-111 **98** - 104	E (Sufficient)	5.5 5.0
48 - 97	F (Failed (Weak))	3.0 – 4.5
0 – 47	Fx (Failed (Very Weak))	0.0 – 2.5

The minimum mark to pass in the domain *knowledge/comprehension* is set at 40/57, approximately 70%. We believe that, at the end of S5, students should be able to demonstrate solid, rather than minimal, mastery of basic facts, terms, ideas, techniques, etc., hence the relatively high standard set. Knowledge/comprehension questions comprise approximately 40% of the total examination; it is not and should not be possible to pass the examination as a whole merely on the basis of rote memorization.

The minimum mark to pass in the domain *application* is set at 30/46, approximately 65%. We believe that, as for knowledge/comprehension, pupils should be able to apply their base knowledge and skills with a fairly high degree of facility. Application questions comprise approximately 30% of the total examination.

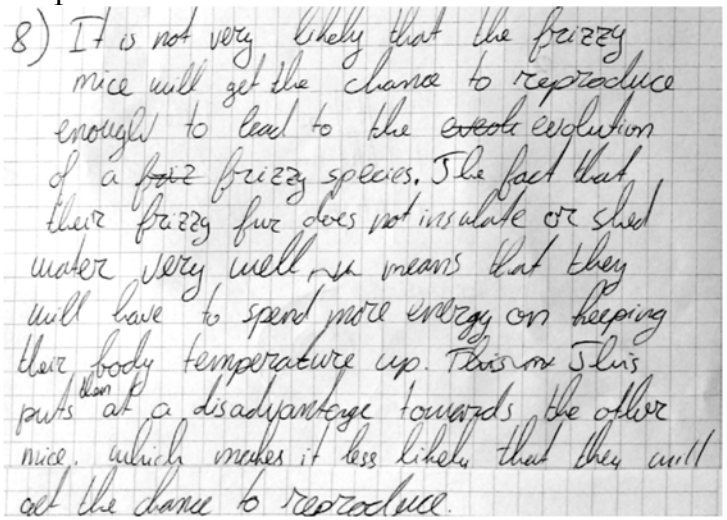
The minimum mark to pass in the domain *analysis* is set at 19/31, approximately 55%. As questions of this nature require the greatest degree of initiative and autonomy from pupils, the minimum passing mark is set rather lower, although we still expect that pupils should be able to succeed to at least a basic degree more often than not. It is largely the full range of marks in this domain, as well as that of *written communication*, that will separate the highest-level students from those whose achievement is merely sufficient. Analysis questions comprise approximately 20% of the total examination.

The minimum mark to pass in the domain *written communication* is set at 9/17, approximately 60%. Science is a social activity that requires scientists to share data and communicate results and theories clearly and according to accepted standards. By the end of S5, pupils should be able to demonstrate that they have acquired the skills of scientific communication: verbal, mathematical, and graphical. The assessment of communication skills is spread throughout the examination (see documents X and Y for details) and comprises approximately 10% of the final mark.

Sample students answers

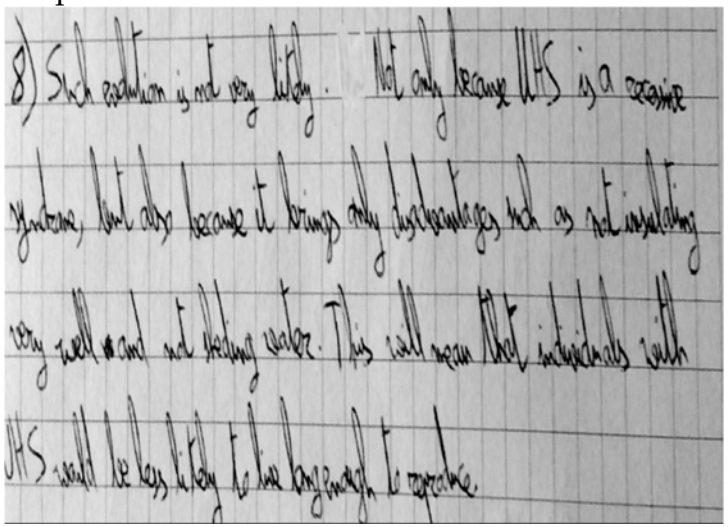
UHS question 7

Response 1: A



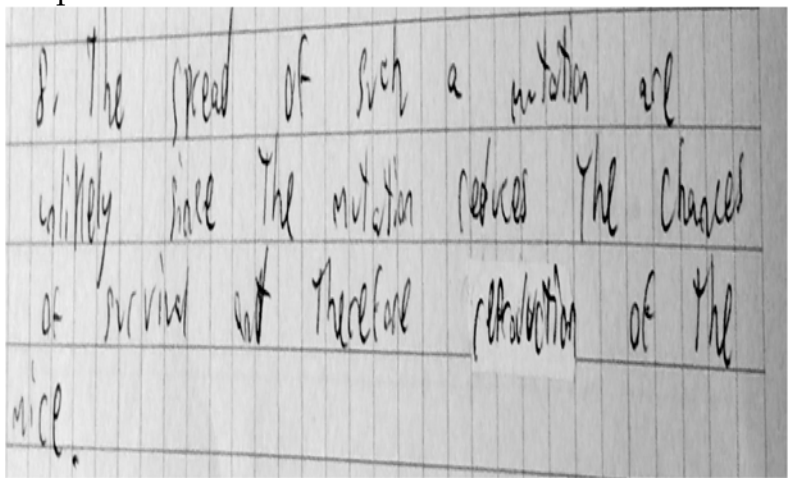
The pupil shows a good understanding of natural selection, and makes a connection to the energy cost of frizzy fur.

Response 2: B



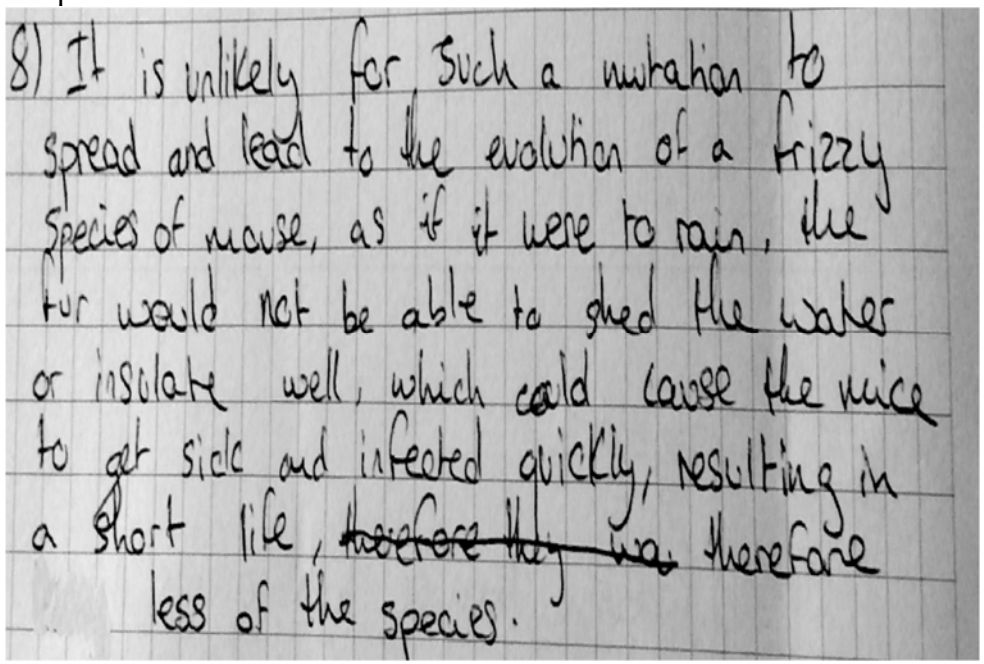
Student shows good understanding of natural selection; observes that fact of UHS being recessive is not enough to account for evolutionary disadvantage.

Response 3: D



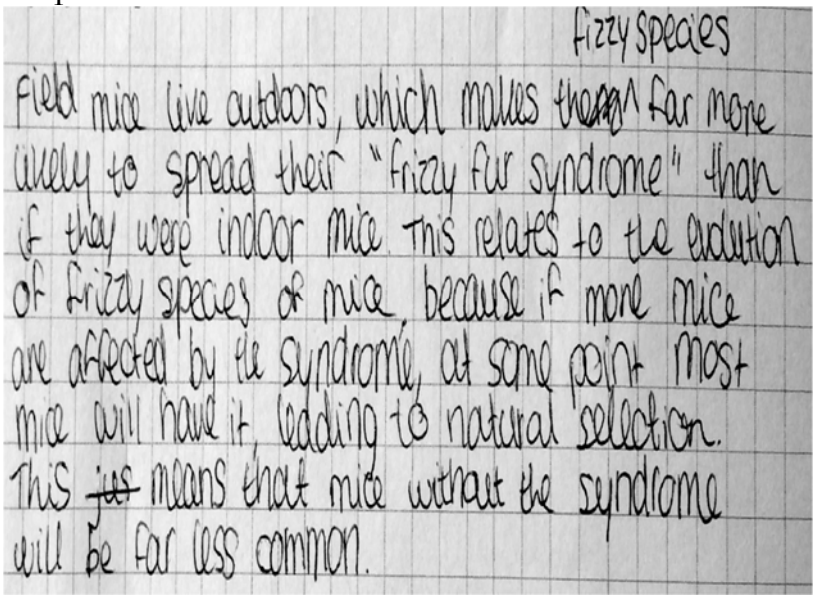
Student covers basics required to demonstrate understanding of natural selection.

Response 3: E



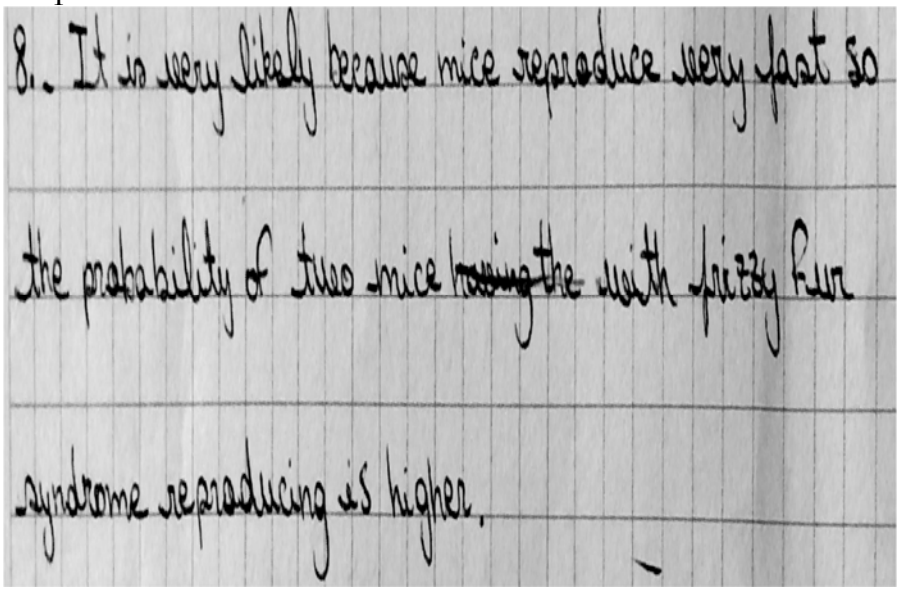
Student understands basic reason that UHS unlikely to spread, but confuses phenotype of current mice with UHS phenotype.

Response 4: F



Student is confused about premises of question, but attempts to reason evolutionarily.

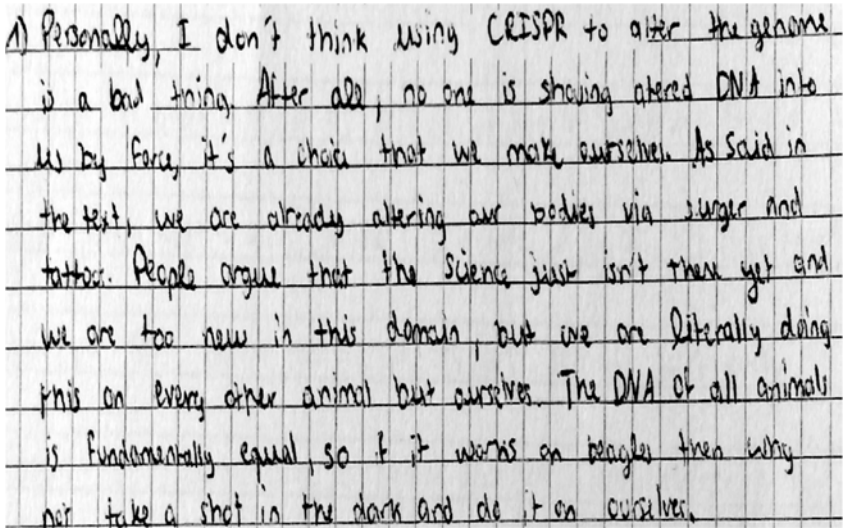
Response 6: Fx



Student does not appear to understand principle of natural selection.

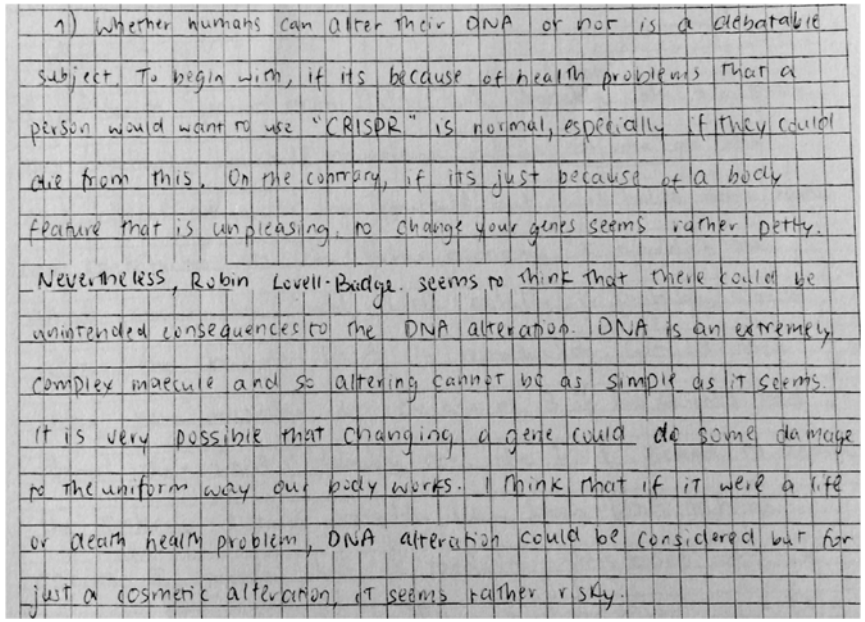
CRISPR sample answers

Response 1: A


1) Personally, I don't think using CRISPR to alter the genome is a bad thing. After all, no one is shoving altered DNA into us by force, it's a choice that we make ourselves. As said in the text, we are already altering our bodies via surgery and tattoos. People argue that the science just isn't there yet and we are too new in this domain, but we are literally doing this on every other animal but ourselves. The DNA of all animals is fundamentally equal, so if it works on beagles then why not take a shot in the dark and do it on ourselves.

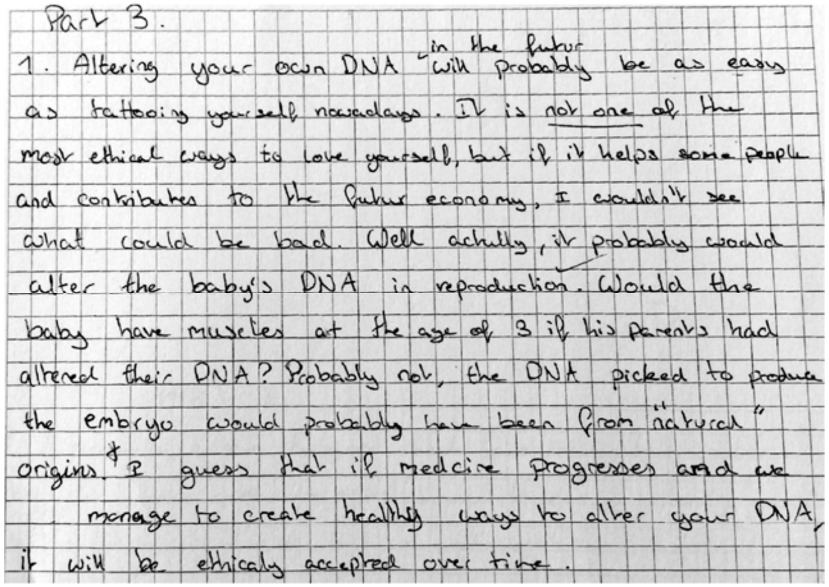
The pupil states a clear point of view, with nuances. S/he adduces evidence both from the article and class.

Response 2: B


1) Whether humans can alter their DNA or not is a debatable subject. To begin with, if its because of health problems that a person would want to use "CRISPR" is normal, especially if they could die from this. On the contrary, if its just because of a body feature that is unpleasing, to change your genes seems rather petty. Nevertheless, Robin Lovell-Badge seems to think that there could be unintended consequences to the DNA alteration. DNA is an extremely complex molecule and so altering cannot be as simple as it seems. It is very possible that changing a gene could do some damage to the uniform way our body works. I think that if it were a life or death health problem, DNA alteration could be considered but for just a cosmetic alteration, it seems rather risky.

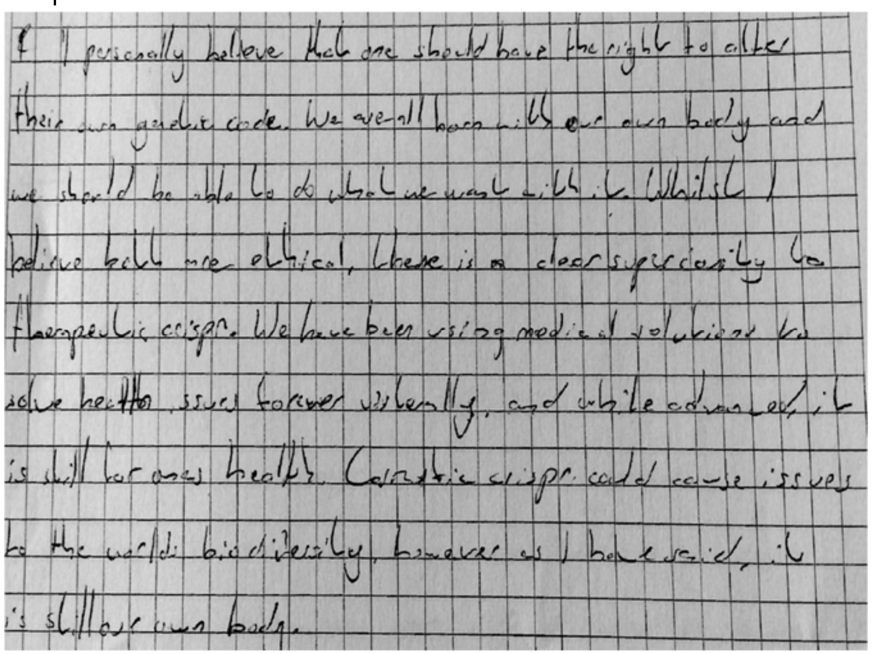
The pupil states a clear point of view. S/he supplies reasoning to support it, but more shallowly than in (1).

Response 3: C


Part 3.
1. Altering your own DNA in the futur will probably be as easy as tattooing yourself nowadays. It is not one of the most ethical ways to love yourself, but if it helps some people and contributes to the futur economy, I wouldn't see what could be bad. Well actully, it probably would alter the baby's DNA in reproduction. Would the baby have muscles at the age of 3 if his parents had altered their DNA? Probably not, the DNA picked to produce the embryo would probably have been from "natural" origins. I guess that if medcine progresses and we manage to create healthy ways to alter your DNA, it will be ethicaly accepted over time.

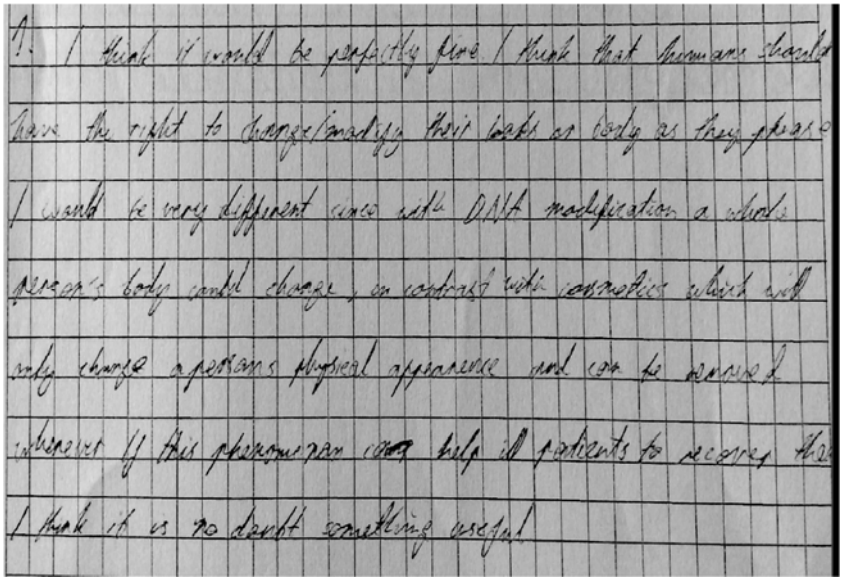
The pupil states a point of view. S/he adduces evidence, but this is shallow. The writing is less controlled.

Response 4: D


I personally believe that one should have the right to alter their own genetic code. We are all born with our own body and we should be able to do what we want with it. Whilst I believe both are ethical, there is a clear superiority to therapeutic crispr. We have been using medical solutions to solve health issues forever virtually, and while advanced, it is still for ones health. Cosmetic crispr could cause issues to the world's biodiversity, however as I have said, it is still our own body.

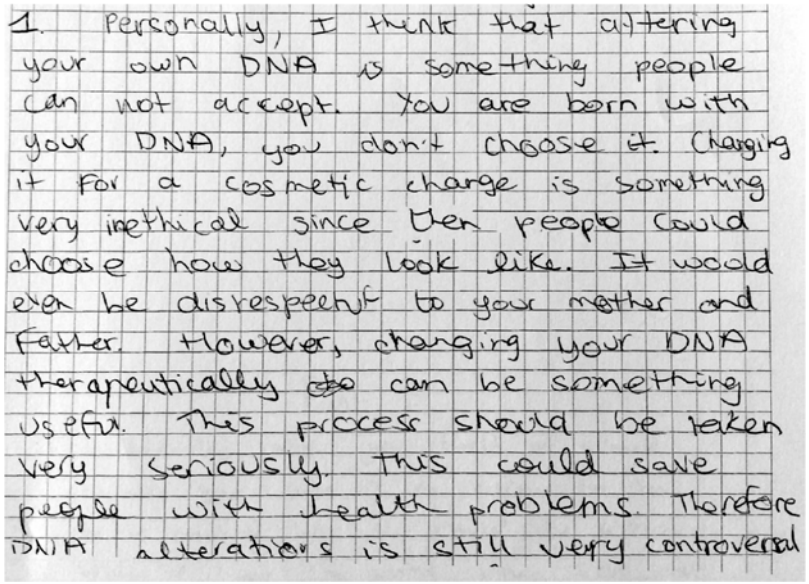
The pupil states a point of view, but does not draw on evidence from the article or class to support it.

Response 5: E


1. I think it would be perfectly fine. I think that humans should have the right to change/modify their looks or body as they please. I would be very different since with DNA modification a whole person's body could change, in contrast with cosmetics which will only change a persons physical appearance and can be removed whenever. If this phenomenon can help ill patients to recover then I think it is no doubt something useful.

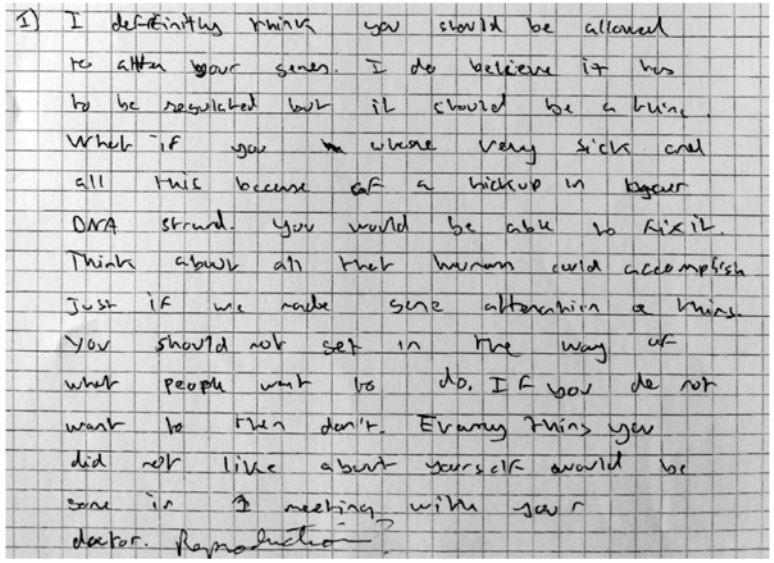
The pupil states a point of view, but with minimal evidence to support it.

Response 6: F


1. Personally, I think that altering your own DNA is something people can not accept. You are born with your DNA, you don't choose it. Changing it for a cosmetic change is something very inethical since then people could choose how they look like. It would even be disrespecht to your mother and father. However, changing your DNA therapeutically ~~to~~ can be something useful. This process should be taken very seriously. This could save people with health problems. Therefore DNA alterations is still very controversal

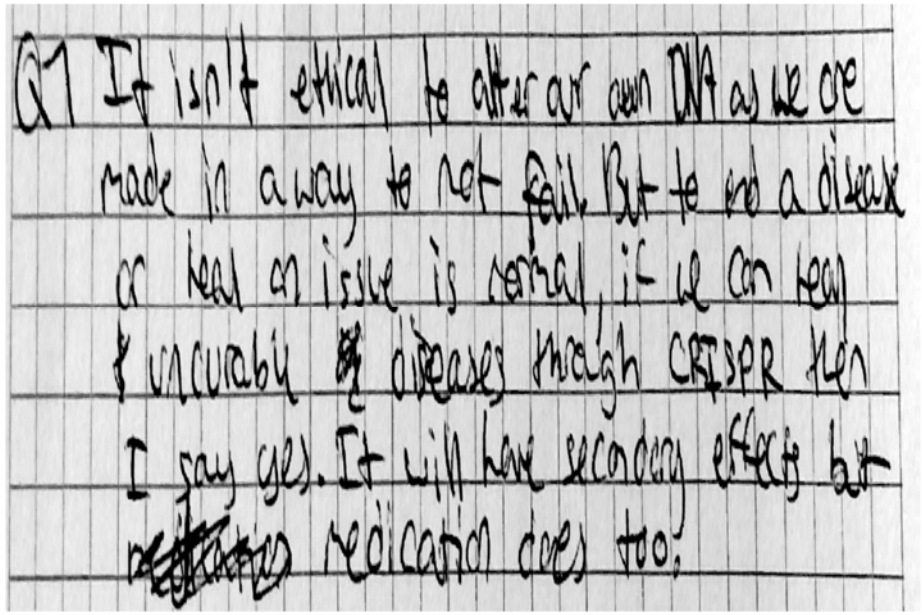
The pupil does not give a personal point of view, but several different arguments. S/he does not draw on material given in the article or discussed in class.

Response 7: Fx


1) I definitely think you should be allowed to alter your genes. I do believe it has to be regulated but it should be a thing. What if you were very sick and all this because of a hickup in your DNA strand. You would be able to fix it. Think about all that human could accomplish just if we made some alterations a things. You should not set in the way of what people want to do. If you do not want to then don't. Everything things you did not like about yourself would be gone in 1 meeting with your doctor. Reproduction?

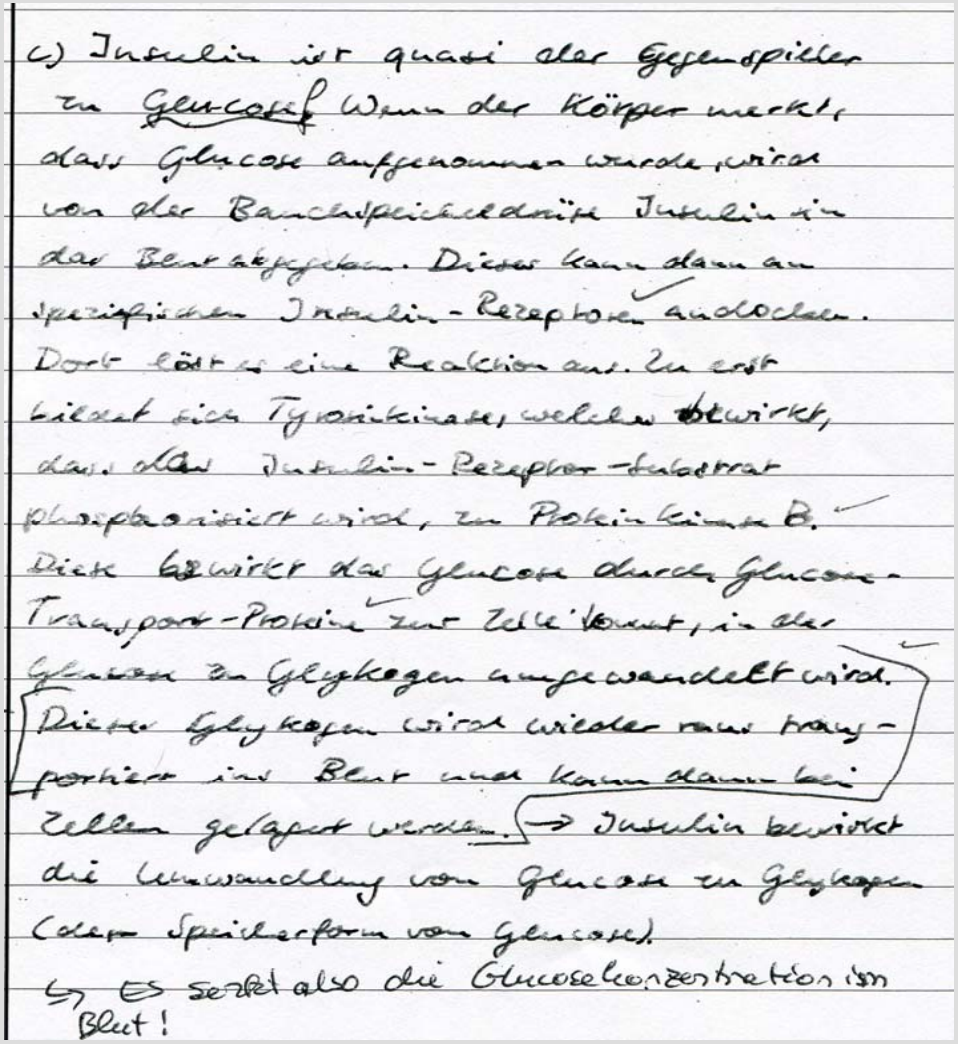
While the pupil expresses a point of view, s/he does not have a clear understanding of DNA and its function. Does not seem to have read the article carefully.

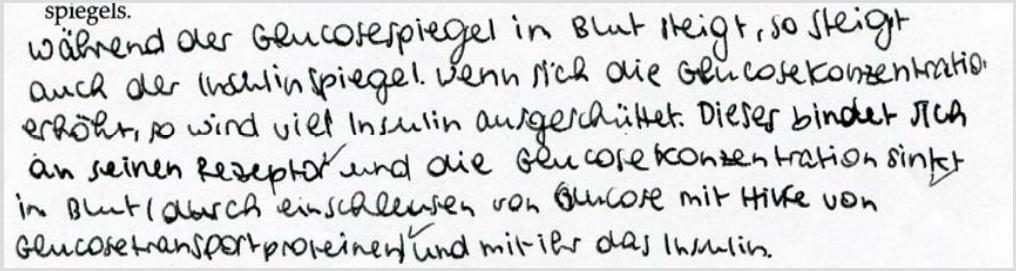
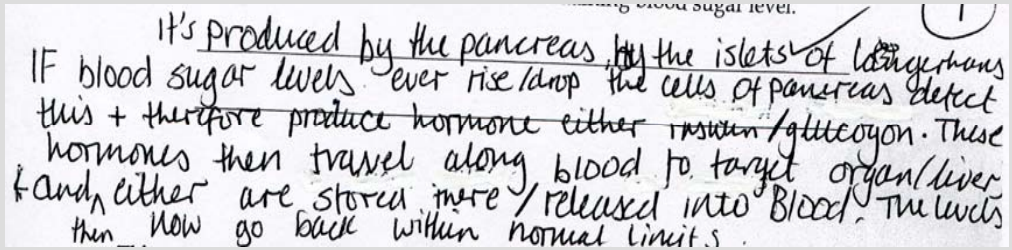
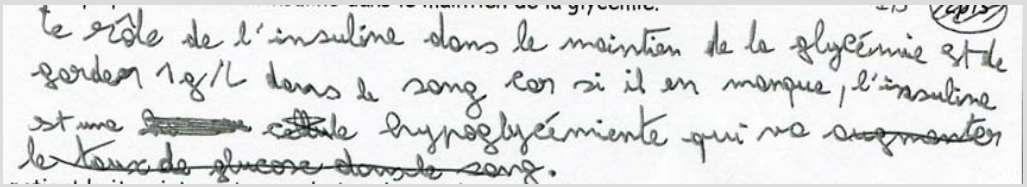
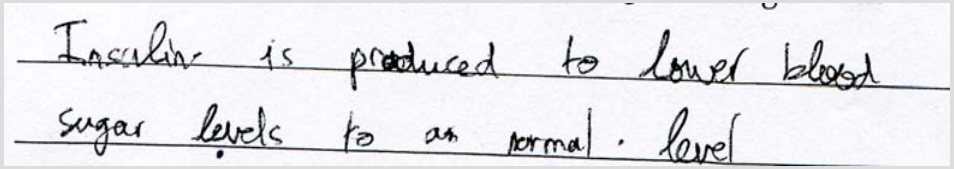
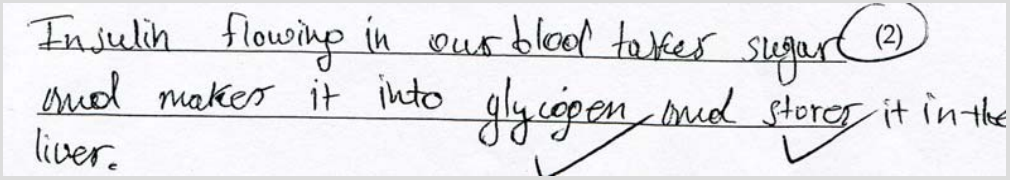
Response 8: Fx

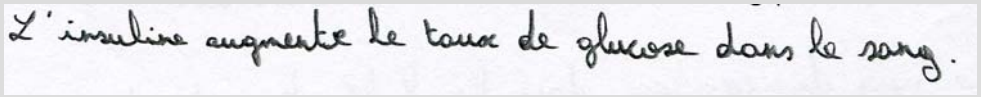
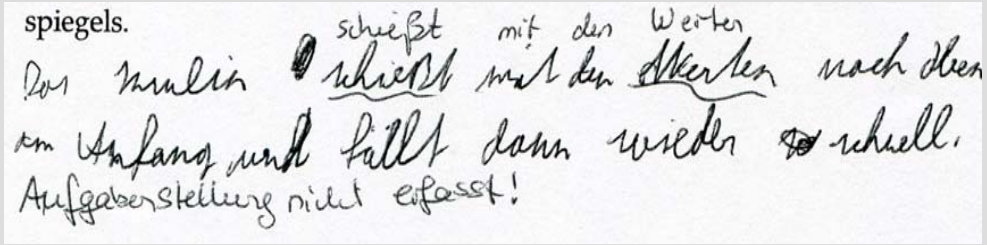

Q1 It isn't ethical to alter our own DNA as we are made in a way to not fail. But to end a disease or heal an issue is normal, if we can heal incurable diseases though CRISPR then I say yes. It will have secondary effects but medication does too.

Incoherent.

Blood glucose - Question 2: Describe the role of insulin in maintaining blood sugar level.

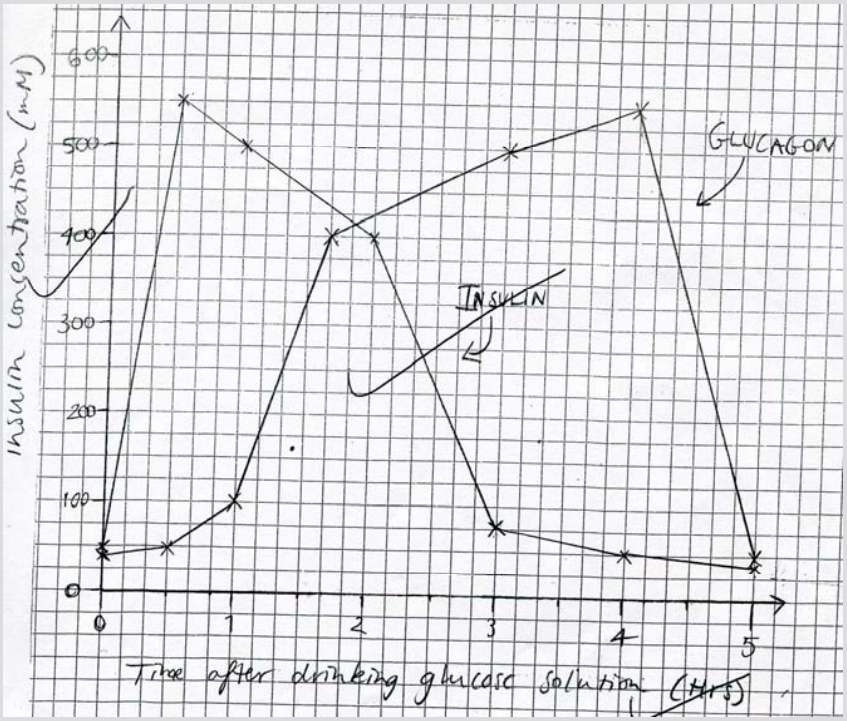
Mark	Answer's examples	Justification
A		Student displays a detailed knowledge and uses the antagonistic principle as well as the concept of information flow between cells. He communicates logically and using scientific vocabulary correctly.

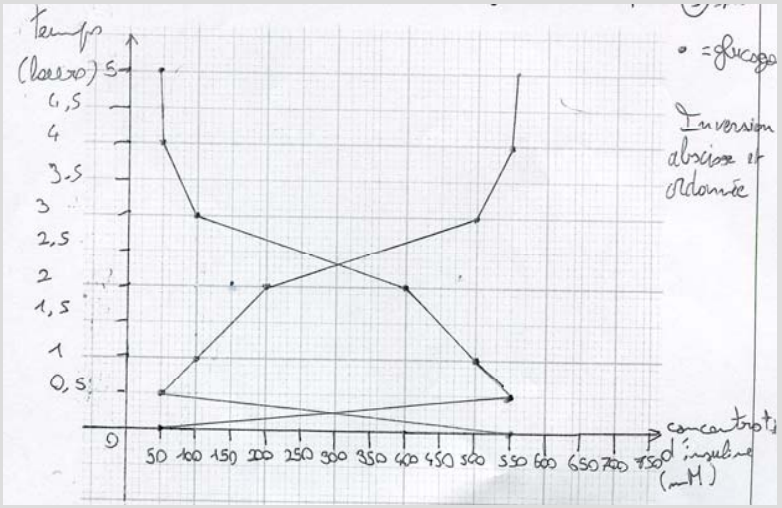
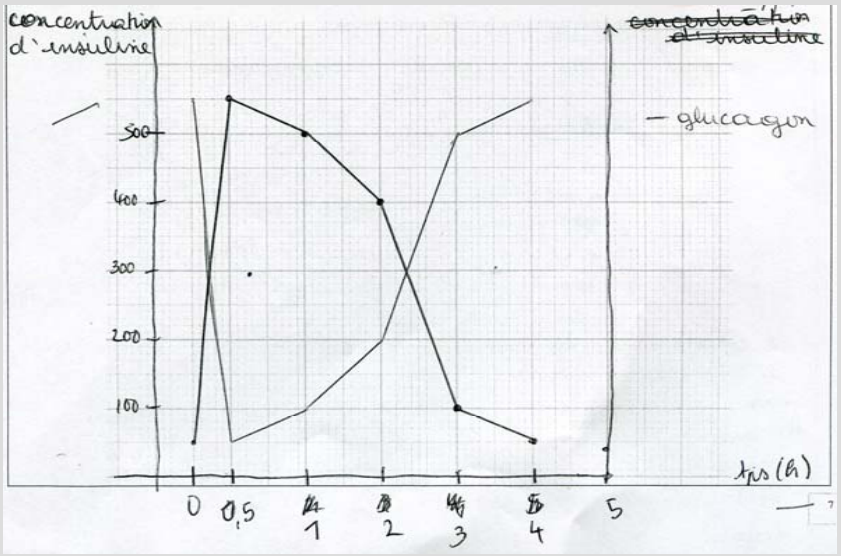
B		Student displays a broad knowledge and uses the concept of information flow well. He communicates clearly using scientific vocabulary correctly.
C		Student displays a good understanding of the functioning of insulin without a clear use of the antagonistic principle either the use of receptors for communication. He communicates clearly most of the time using scientific vocabulary
D		Student shows some understanding of the role of insulin on blood sugar regulation. He communicates clearly using a specific vocabulary of regulation systems.
E		Student recalls the main fact about the role of insulin maintaining blood sugar level. The use of language does not apply to the question's intension.
		Student recalls fact in a non-scientific way without any use of scientific vocabulary.

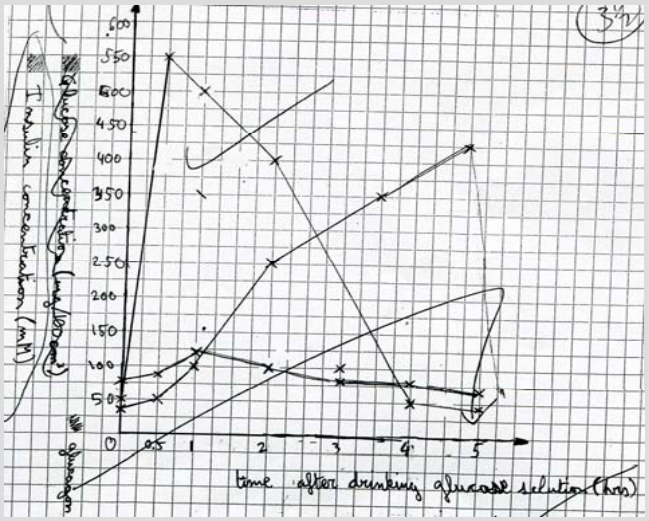
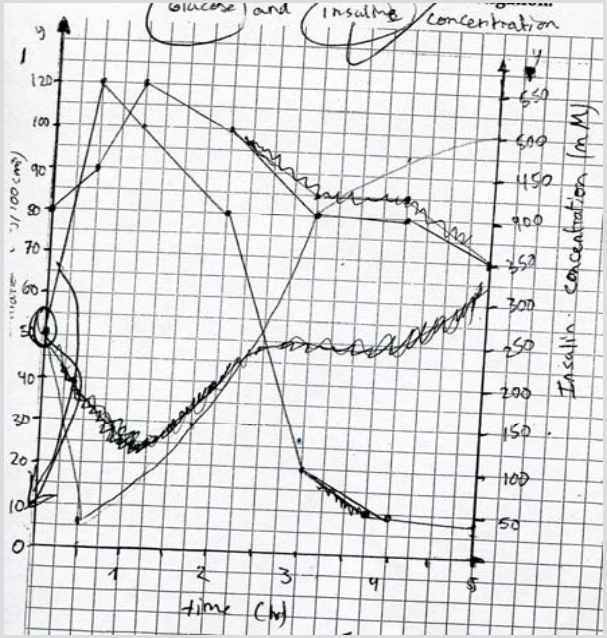
F		Student recalls fact in a non-scientific way without any use of scientific vocabulary.
Fx		Student does not understand the question. He communicates with a lack of precise terms.

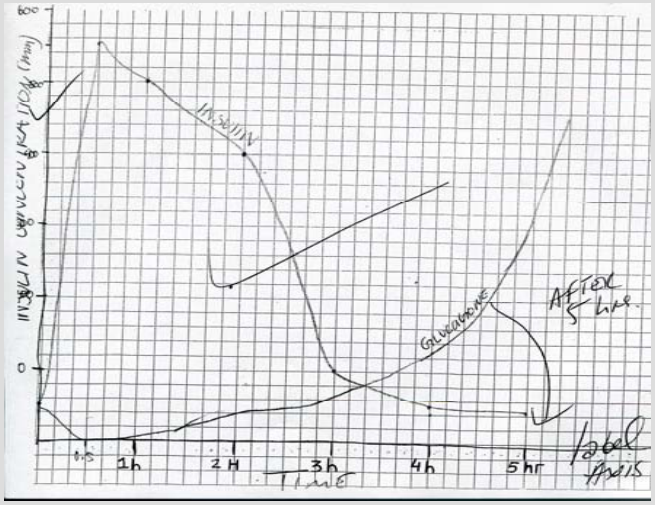
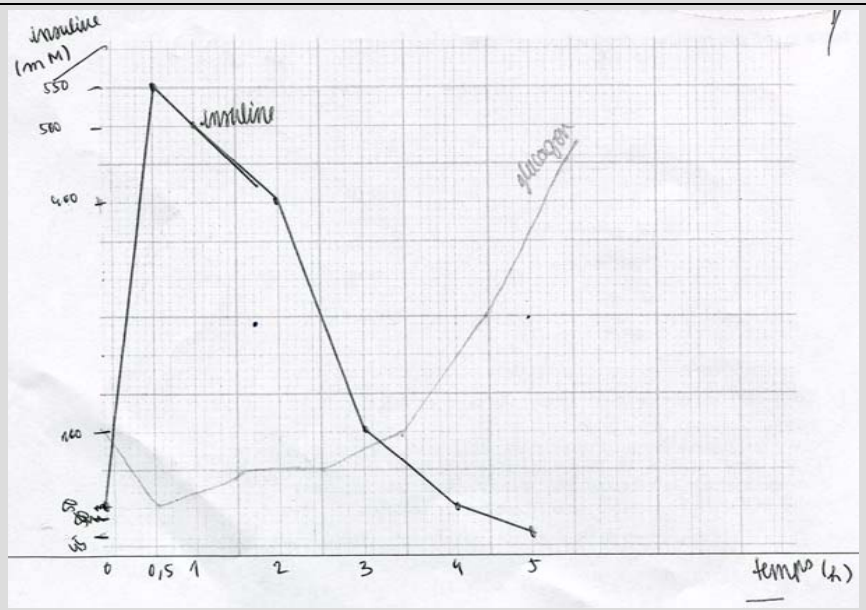
Blood glucose - Question 3 and 7:

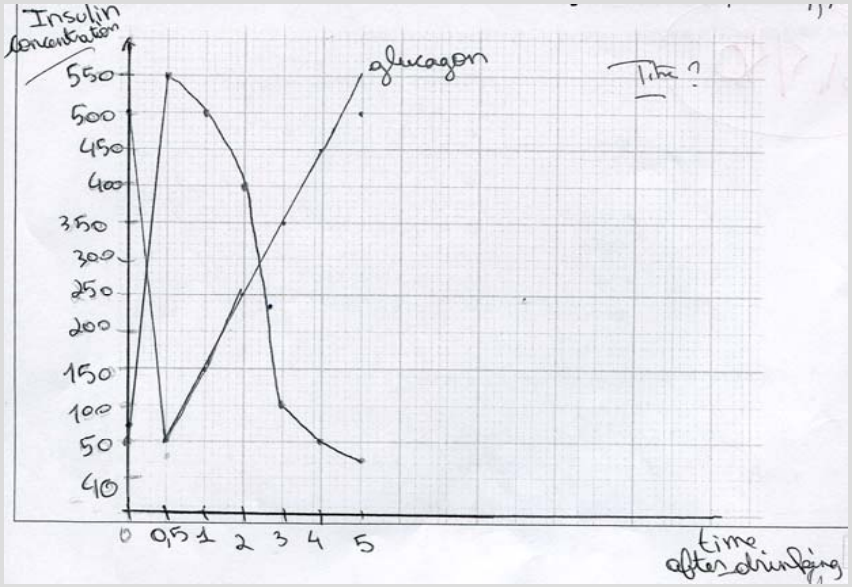
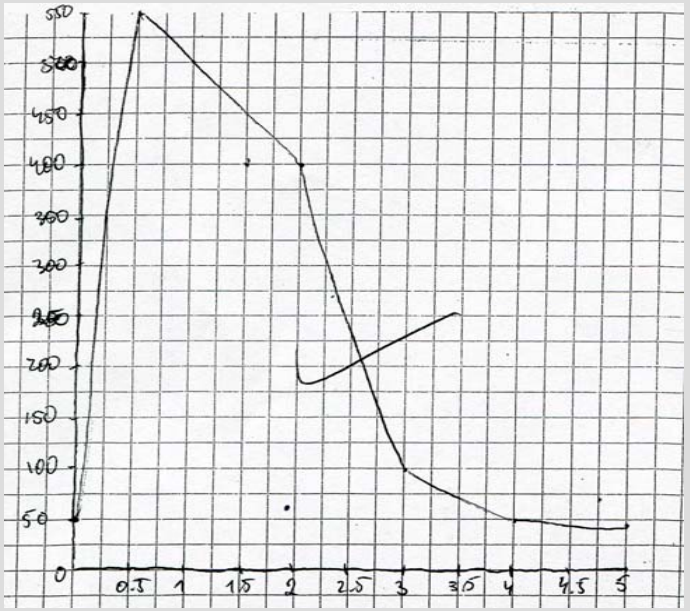
- Using the data in the table above and the graph paper provided, draw a line graph showing how insulin concentration changed over the time of the investigation.
- Draw a second line on your graph from number 4 above, to predict how the man's blood glucagon concentration will change over the same 5 hours, assuming that he continues to eat and drink nothing. (You may assume that glucagon concentration is measured in the same units and is within the same range.)

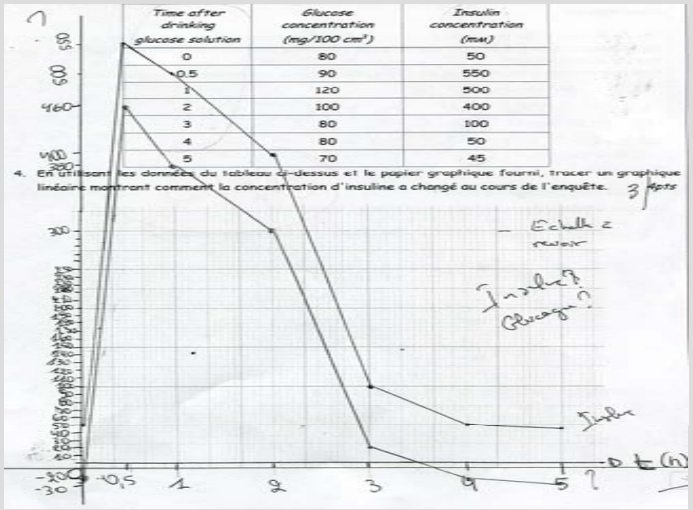
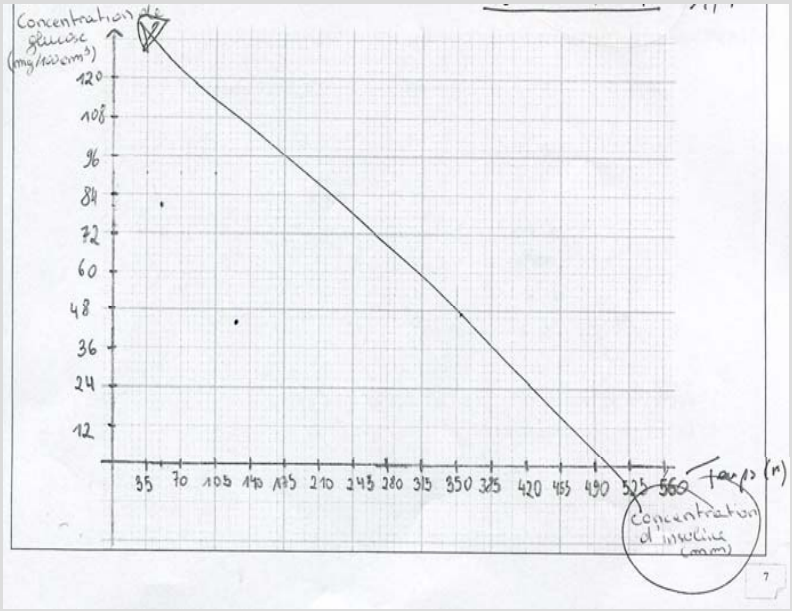
Mark	Answer's examples	Justification
A		Student displays thorough skills in using complex data and presenting them correctly in a line graph. S/he applies the antagonistic principle to infer the glucagon line graph after critical analysis of data. The two line graphs are excellently drawn.

B	 	Student displays very good skills in using complex data and presents a line graph correctly. S/he applies the antagonistic principle for presenting the glucagon line graph after critical analysis of data. The two line graphs are well constructed. Student shows good skills in using data and presenting them in a line graph, which is mostly correct after some trials. The two line graphs are well constructed.

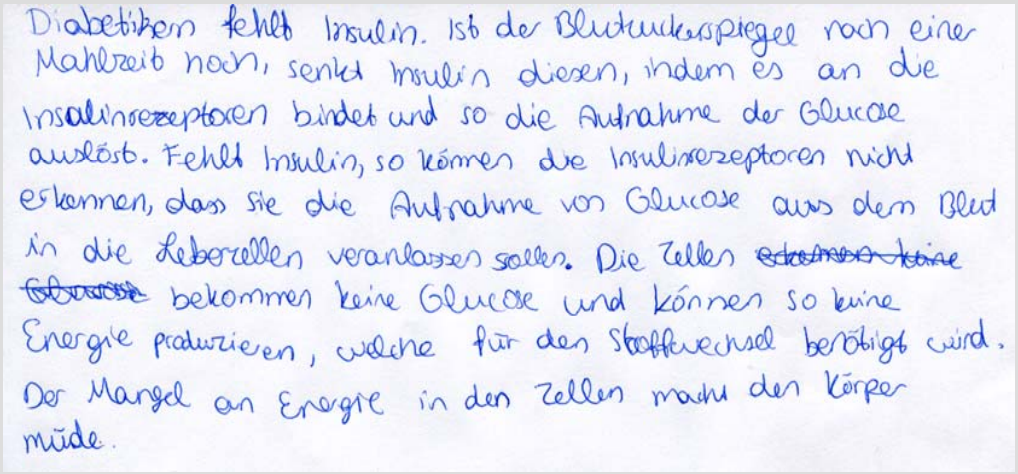
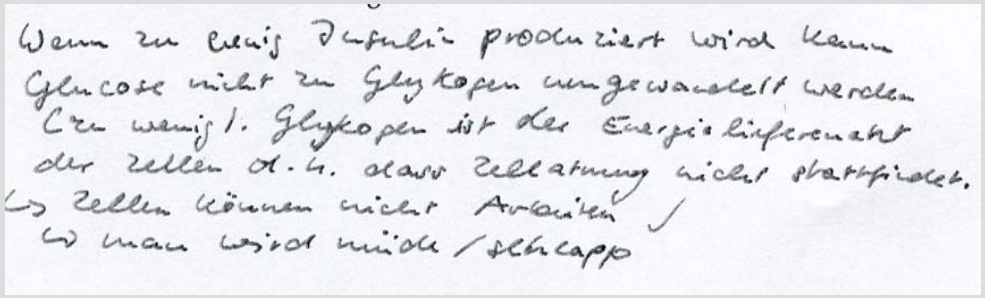
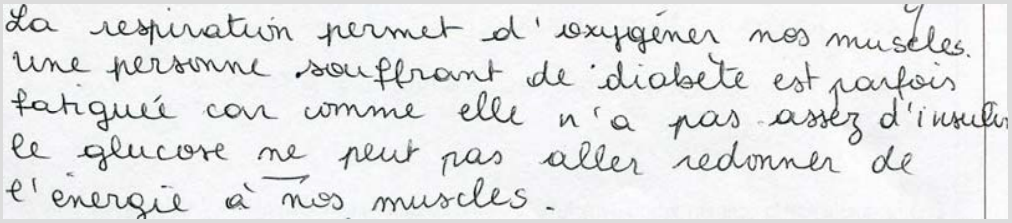
C	 	Student shows good skills in using data and presenting them in a line graph, which is mostly correct after some trials. The two line graphs are well constructed.

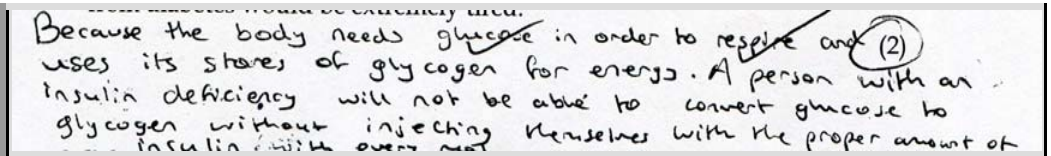
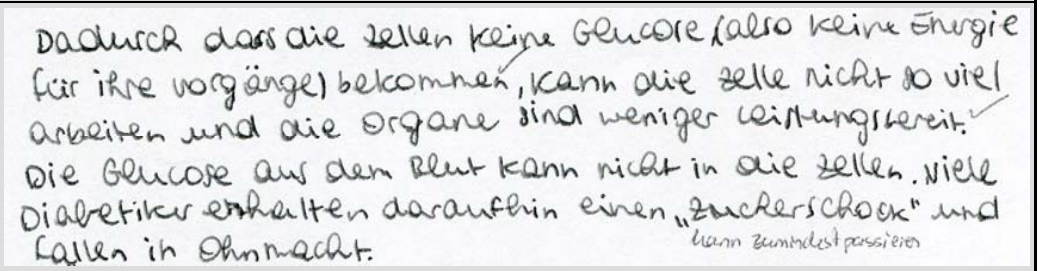
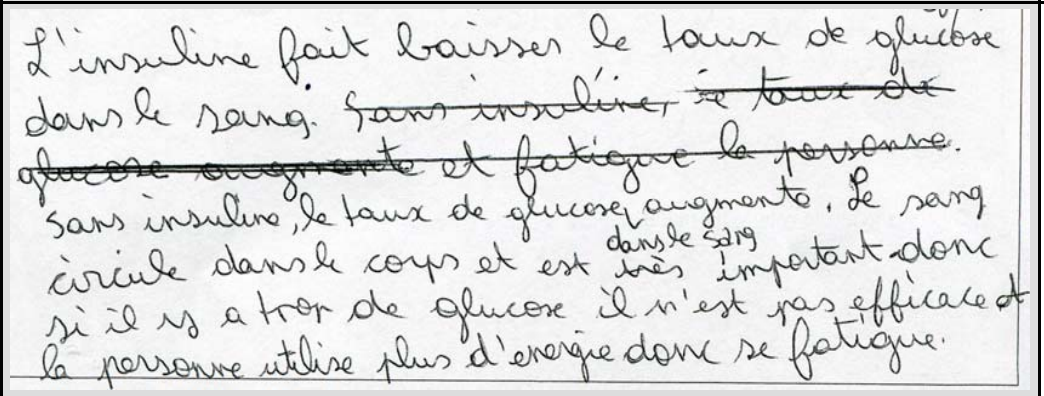
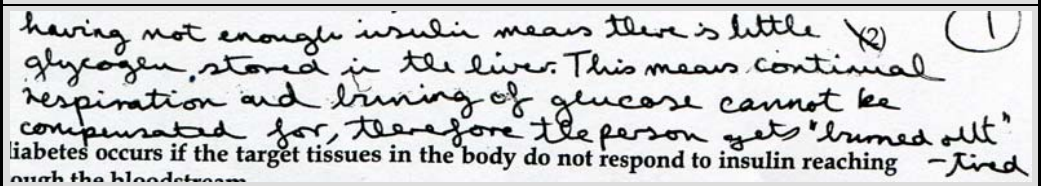
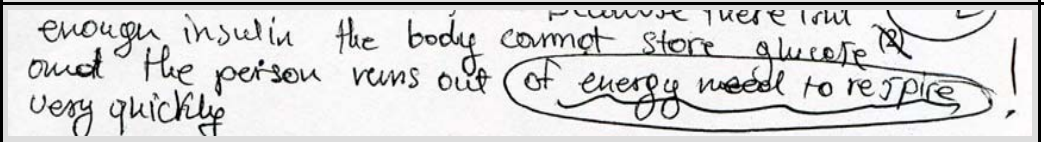
D	 	Student is capable of constructing a line graph with the given data. S/he shows applies the antagonistic principle, but not correctly throughout. The construction of the graph shows some gaps.

E		Student is capable of constructing a line graph with given data. The antagonistic principle can be seen in her/his approach. The construction of the graph shows some lacks.
F		Student is able to construct a line graph with given data. The construction of the graph shows some lacks. The antagonistic principle is not used at all.

F	 | Time after drinking glucose solution	Glucose concentration (mg/100 cm³)	Insulin concentration (mU)
0	80	50
0.5	90	550
1	120	500
2	100	400
3	80	100
4	80	50
5	70	45 | 4. En utilisant les données du tableau ci-dessus et le papier graphique fourni, tracer un graphique linéaire montrant comment la concentration d'insuline a changé au cours de l'enquête. 3 pts 	
Fx	 	Student presents no line graph and shows no understanding of how to use the data.

Blood glucose - Question 8: Using your knowledge of respiration, explain why a person suffering from diabetes would be extremely tired.

Mark	Answer's examples	Justification
A	 Diabetikern fehlt Insulin. Ist der Blutzuckerspiegel nach einer Mahlzeit hoch, senkt Insulin diesen, indem es an die Insulinrezeptoren bindet und so die Aufnahme der Glucose auslöst. Fehlt Insulin, so können die Insulinrezeptoren nicht erkennen, dass sie die Aufnahme von Glucose aus dem Blut in die Leberzellen veranlassen sollen. Die Zellen ~~können keine Glucose~~ bekommen keine Glucose und können so keine Energie produzieren, welche für den Stoffwechsel benötigt wird. Der Mangel an Energie in den Zellen macht den Körper müde.	Student shows a very good understanding of the impact of insulin on the energy production and its consequence for the body. S/he applies the concept of information flow in a unfamilar situation very well. The analysis of the question and presentation of the answer are excellent.
B	 Wenn zu wenig Insulin produziert wird kann Glucose nicht zu Glykogen umgewandelt werden. Da wenig Glykogen ist der Energieliferant der Zellen d.h. dass Zellatmung nicht stattfindet. ↳ Zellen können nicht Arbeiten ↳ man wird müde / schlapp	Student shows a good understanding of the impact of insulin on the energy production and its consequence for the body. S/he analyses the question very well and presents a consistent answer with the use of the correct scientific vocabulary.
C	 La respiration permet d'oxygéner nos muscles. Une personne souffrant de diabète est parfois fatigué car comme elle n'a pas assez d'insuline le glucose ne peut pas aller redonner de l'énergie à nos muscles.	Student shows some understanding of the impact of insulin on energy production. S/he does not consistently answer correctly, but still shows a good understanding of the role of energy in a functional body. Presentation shows some structure.

	 Because the body needs glucose in order to respire and uses its stores of glycogen for energy. A person with an insulin deficiency will not be able to convert glucose to glycogen without injecting themselves with the proper amount of (2)  Dadurch dass die Zellen keine Glucose (also keine Energie für ihre vorgänge) bekommen, kann die Zelle nicht so viel arbeiten und die Organe sind weniger leistungsbereit. Die Glucose aus dem Blut kann nicht in die Zellen. Viele Diabetiker erhalten daraufhin einen „Zuckerschock" und fallen in Ohnmacht. kann zumindest passieren	
D	 L'insuline fait baisser le taux de glucose dans le sang. ~~Sans insuline, le taux de glucose augmente et fatigue la personne.~~ Sans insuline, le taux de glucose augmente. Le sang circule dans le corps et est très important donc si il y a trop de glucose il n'est pas efficace et la personne utilise plus d'energie donc se fatigue. dans le sang  having not enough insulin means there is little (2) (1) glycogen stored in the liver. This means continual respiration and timing of glucose cannot be compensated for, therefore the person gets "burned out" Diabetes occurs if the target tissues in the body do not respond to insulin reaching -tired ough the bloodstream	Student demonstrates satisfactory knowledge of the role of insulin in energy production. S/he does not answer consistently correctly, but still gives a (wrong) idea how insulin concentration and tiredness might be linked. S/he uses basic scientific vocabulary; answer shows some structure.
E	 enough insulin the body cannot store glucose (2) and the person runs out of energy need to respire very quickly	Student shows satisfactory knowledge of the role of insulin in energy production. No link between insulin concentration and tiredness is given. S/he uses basic scientific vocabulary.

F	from diabetes would be extremely tired. Because not enough insulin means the blood sugar levels stay high so the heart has to beat faster (2) to get the glucose used up which results in being more tir	Student shows less recall of facts. Her/his link between insulin concentration and tiredness shows a lack of factual knowledge.
Fx	AS Doing a lot of exercise needs a lot of (2) respiration, and a lot of respiration can make blood sugar levels low → the person feels tired	Student does not understand the question.
	car le sang apporte le glucose vers les organes et comme les diabétiques ont soit trop soit pas assez de sucre ça a un impact sur le sport car quand ils ont pas assez de sucre le sang n'apporte pas assez de glucose dans les organes et donc il prise dans sa respiration pour pouvoir faire du sport.	
	Weil der Körper zu wenig Insulin hat	

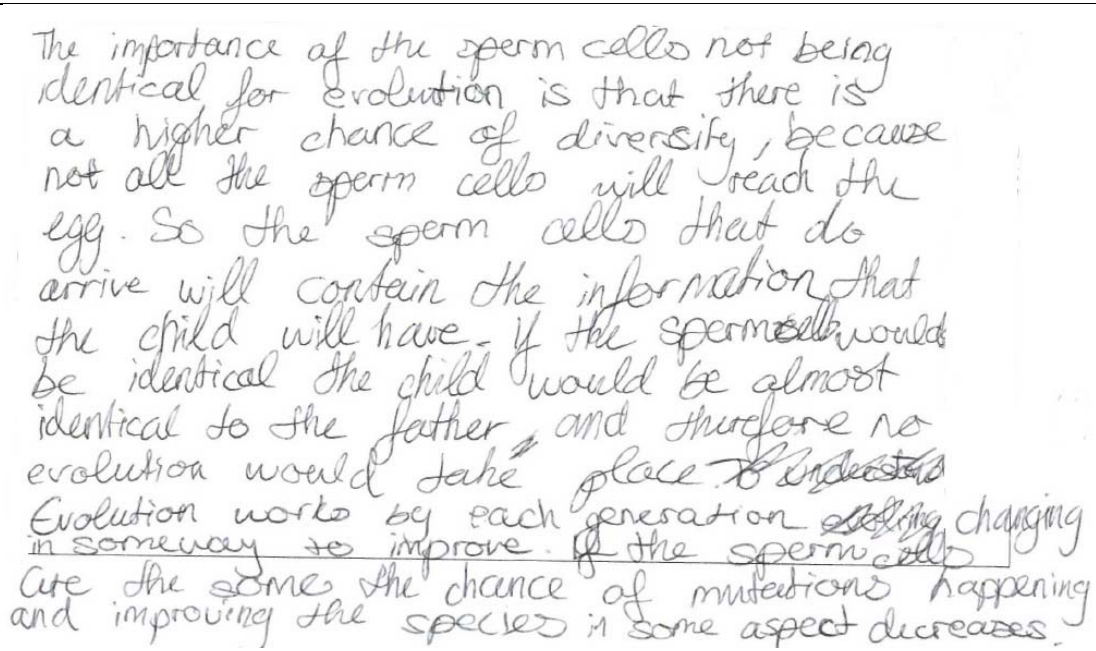
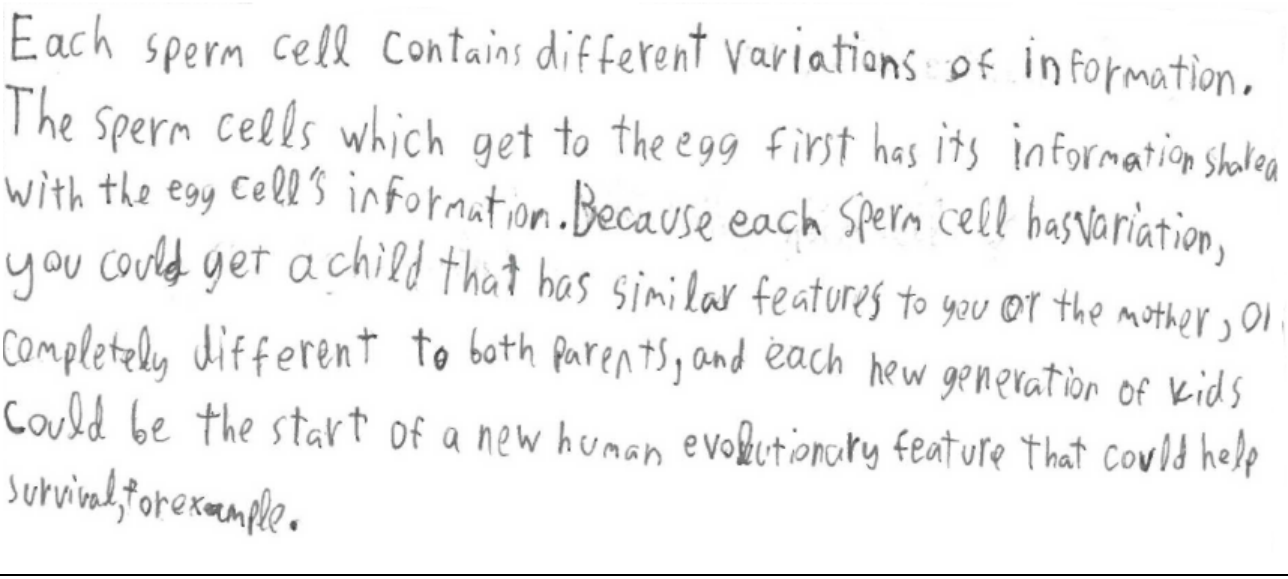
Meiosis – Subject 4 question 5: *What is the function of the reducing division? Why does meiosis include it, but mitosis not?*

Mark	Example answer	Justification
A	The reduction division is to reduce the number of ~~cromesomes~~ chromosomes in the gametes made by meiosis. They have to be haploid to form a normal diploid cell at fertilisation. Mitosis is for growth and repair and the cells need to be identical to the cell dividing.	Student shows an excellent understanding of the importance of the need to reduce the number of chromosomes in gametes for fertilisation. The answer also shows a clear understanding in the different roles of Meiosis and Mitosis through use of the relevant vocabulary. The answer addresses the key points of the question with a logical and clearly presented manner.
B	The reduction division splits the original diploid (2 pairs of chromosomes) cell up into two haploid cells (1 pair of chromosomes) This does not take place in mitosis because in mitosis the cell has to divide into two cells which are identical to the original cell. Meiosis is the type of cell division by which gametes (sex cells) are produced. Since gametes are haploid cells, reduction division must take place to reduce the original diploid cell into haploid cells. (Takes place at ~~e~~ the end of telophase I)	Student's answer demonstrates a very good understanding of mitosis and meiosis and the key differences in their functions. Good use of key vocabulary and the answer is well organised and presented.
C	[redacted] Meiosis includes it because during meiosis there are 2 divisions which form 4 cells, which are haploid. During meiosis the cells have only half of the chromosomes of the original cell. [redacted] In mitosis there is only 1 cell division.	Student's answer demonstrates a good understanding of mitosis and/or meiosis and the key differences in their functions. Good use of key vocabulary and the answer is well organised and presented.

D	THE FUNCTION OF REDUCTION DIVISION IS TOO TURN THE CELL FROM A DIPLOID CELL INTO A HAPLOID CELL. IT IS ALSO USED TO FURTHER, MIX UP AND CREATE MORE VARIATION SEEING AS THE CHROMATIDS ARE NEVER PAIRED WITH THEIR ORIGINAL CHROMOSOMES WHICH CREATES A LOT MOR VARIATION WITHIN THE GENES OF THE CELL. MEIOSIS INCLUDES IT BUT MITOSIS DOES NOT, BECAUSE DURING MEIOSIS THE CELL GETS DIVIDED AGAIN BUT (=> HAPLOID) WHERE AS DURING MITOSIS THIS DOES NOT OCCURE.	Student's answer demonstrates a reasonable understanding of mitosis and/or meiosis and the key differences in their functions. Some key vocabulary is used and the answer is organised with satisfactory presentation.
E	Because meiosis is for reproduction, while mitosis is only for growth and repair.	Student demonstrates some knowledge of mitosis and/or meiosis. The answer lacks clarity and structure and does not discuss gametes and/or fertilisation. Presentation is satisfactory.
F	It is used so that a second cell division can take place, which is also used to make sperm cells.	Student does not fully understand the question or has misinterpreted the question. Answer demonstrates a lack of knowledge of mitosis and meiosis and their functions.
FX	It's a replication of chromosomes, DNA replication in a cell. Meiosis is a division of ~~sex~~ cells and it's important to have DNA in it and mitosis is not a division of sex cells.	Student does not understand the question.

Meiosis – Subject 4 question 6: *The sperm cells created through spermatogenesis are not identical. Explain the importance of this fact for understanding evolution.*

Mark	Example answer	Justification
A	The four sperm cells created are not identical and this fact is really important for the evolution. Each cell is different, so there will be a greater variety in the organisms formed. This is important for the evolution because each organism will contain a different phenotype. So the new born organisms obtain some charactaristics which can be helpful in their every day life. Evolution helps the organism to survive in a different or to adapt to a changing environment. Natural selection is how the population of organisms change as the helpful characteristics become more common.	Student shows an excellent understanding of the importance of variation in populations and evolution. The answer demonstrates a clear understanding in the role of natural selection in the process of evolution through use of relevant vocabulary and concepts. The answer addresses the question in a logical and clearly presented manner.
B	The variety produced through meiosis and spermatogenesis is necessary for evolution to take place. This variety is helped by the crossing over of chromosomes during phrophase I of meiosis. This crossing over produces a wider variety of possible gene combinations. The most profitable combinations will be picked out through natural selection and speed up the process of evolution. If all the sperm cells created were identical then evolution could not take place since no profitable changes would occur and each generation of organisms would be the same.	Student's answer demonstrates a very good understanding of evolution and the importance of variation and natural selection. Good use of key vocabulary and the answer is well organised and presented.

C		Student's answer demonstrates a good understanding of evolution and the importance of variation and/or natural selection. Key vocabulary used appropriately and the answer is well organised and presented.
D		Student's answer demonstrates a reasonable understanding of evolution and the importance of variation and/or natural selection. Some key vocabulary is used. The answer is organised and the presentation is satisfactory.

E	PEOPLE AREN'T [redacted] MADE IDENTICAL, THE ONES WHO HAVE MORE USEFUL GENES [redacted] REPRODUCE MORE, AND PASS ON THEIR GOOD GENES, WHEREAS ONES WITH LESS USEFUL OR LESS ADAPTED GENES DON'T SURVIVE. THIS ELIMINATES THE PASSING OF GENES THAT [redacted] COULD LIMIT THE ANIMAL.	Student demonstrates a basic knowledge importance of variation and/or natural selection in evolution but answer lacks clarity and structure. Presentation and organisation of answer is acceptable.
F	The importance of this fact for evolution is that some of the sperm cells might have a better chance of "survival".	Student does not fully understand the question or has misinterpreted the question. Answer demonstrates a lack of knowledge of the importance of variation and natural selection in evolution.
FX	It is important so that not everyone is identical because if we were all identical, firstly it would be hard to recognise one from another and secondly we would all be good at the same things so it wouldn't be good for making/inventing new things	Student does not understand the question.

Example Economics

What will my test look like?

Example of a Test Matrix: Economics, B-test, S5

Task	**Competences**	**Objectives**	**Questions**		**Weight (%)**	**Weight (points)**
		The student is able to	Reproduction	Production		
Written series of question	Knowledge (20%)	…define the sectors of production	Q1		10%	5
		… define the factors of production	Q2a		10%	5
	Comprehension (20%)	… explain using examples how the factors of production are rewarded		Q2b	20%	10
	Application (30%)	… recognize the different sectors of production		Q3	10%	5
		… calculate the share of the different sectors in an economy and compare three different countries		Q4	20%	10
	Analysis and written communication (30%)	… name and discuss two advantages of specialisation and one disadvantage of specialisation		Q5	30%	15
					100%	50

How will I evaluate the student's performance?

Example of a rubric to evaluate a B-test, Economics S5

	A (9.0-10 Excellent)	**B** (8.0-8.9 – Very good)	**C** (7.0-7.9 – Good)	**D** (6.0-6.9 – Satisfactory)	**E** (5.0-5.9 - Sufficient)	**F** (3.0-4.9 – Failed/Weak)	**FX** (0-2.9 – Failed/Very weak)
Knowledge	Displays comprehensive knowledge of all aspects of the definitions of sectors resp. factors of production 5	Displays a broad knowledge of facts of sectors resp. factors of production 4.5	Displays a sound knowledge of sectors resp. factors of production 4	Displays an incomplete but satisfying knowledge of sectors resp. factors of production 3.5	Recalls only names of sectors resp. factors of production 3	Displays little recall of information on sectors resp. factors of production 2	Displays very little recall of information on sectors resp. factors of production 1
Comprehension	Displays an excellent comprehension and uses accurate examples of how the factors of production are rewarded 10	Displays a very good comprehension and uses clear examples of how the factors of production are rewarded 9	Displays a good comprehension and uses acceptable examples of how the factors of production are rewarded 8	Shows a general comprehension of how the factors of production are rewarded and uses examples seen in class 7	Understands only basic concept of comprehension and uses incomplete examples 6	Shows an insufficient understanding of how the factors of production are rewarded or gives examples only 4	Shows very little understanding of how the factors of production are rewarded and gives wrong/no examples 2

Application	Identifies all sectors of production 5	Identifies 5 out of 6 sectors of production 4,5	Identifies 4 out of 6 sectors of production 4	Identifies 3 out of 6 sectors of production 3	Identifies 2 out of 6 sectors of production 2	Identifies 1 out of 6 sectors of production 1	Identifies no sectors of production 0
	Calculates perfectly and compares in depth the countries mentioned 10	Calculates correctly and compares all aspects in detail 9	Calculates almost correctly and compares all aspects but not in detail 8	Calculates in general correctly and compares most aspects 6	Calculates in part correctly and compares basic aspects 4	Is not able to calculate correctly and gives minimum comparison 2	Does a wrong / no calculation and gives no meaningful / no comparison 0
Analysis and Written Communication	Is capable of discussing in depth the advantages and disadvantages of specialization and presents it in an excellent way 15	Is capable of discussing all aspects of the advantages and disadvantages mentioned and presents them in a very good way 13	Is capable of giving a good analysis of the advantages and disadvantages mentioned and presents them in a good way 11	Is capable of giving a basic analysis of the advantages and disadvantages mentioned and presents them in a satisfactory way 9	Is capable of naming the advantages and disadvantages and presents them in a superficial way 7	Is incapable of naming the required number of advantages and disadvantages and lacks presentation skills using poor vocabulary 5	Does not mention relevant advantages and disadvantages and shows very poor presentation skills 2
Total:	50	44,5	39	32	25	16	6

How will I report on performance?

Example of translation of Test Points into Grades and Marks

Points	Grades	Points	Marks
49-50	A (Excellent)	49-50	10 9,5 9
47-48,5		47-48,5	
45-46,5		45-46,5	
42-44,5	B (Very Good)	42-44,5	8,5 8
39,5-41,5		39,5-41,5	
36-39	C (Good)	36-39	7,5 7
32,5-35,5		32,5-35,5	
29-32	D (Satisfactory)	29-32	6,5 6
25,5-28,5		25,5-28,5	
21-25	E (Sufficient)	21-25	5,5 5
16,5-20,5		16,5-20,5	
6,5-16	F (Failed (Weak))	6,5-16	3,0 – 4,5
0-6	FX (Failed (Very Weak))	0-6	0,0 – 2,5

NAME:_____

European School Luxembourg I (Kirchberg) Course S5ecoenc

2nd Test Economics November 12 2017

Think carefully before you start to write. Make a short plan for what you are going to say in each paragraph.

1. Define the sectors of production. (5 p.)

2a. Define the factors of production. (5 p.)

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2b. Using examples, explain in detail how the factors of production are rewarded. (10 p.)

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3. Identify in the space provided underneath each picture, whether the activities shown in each picture are primary, secondary or tertiary. (5 p.)

(a)

(b)

…… ……

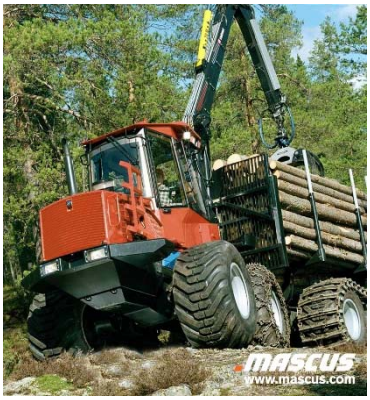
(c)

(d)

....

(e)

(f)



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4. Calculate the share of the different sectors in each economy using the data below. Compare the different countries.

Value of the different sectors (in Billion US-$)

Country	**Sector I**	**Sector II**	**Sector III**	**Total GDP**
Luxembourg	0,2	6,7	42,6	
Mali	6,5	2,5	5,5	

Russia	83,7	563,6	1.212,7	

5. Name and discuss two advantages of specialisation and one disadvantage of specialisation. (15 p.)

Total 50 points ***Good luck!*** (M. Reinhardt)

What will my test look like?

Example of a Test Matrix: Economics, B-test, S5

Task	Competences	Objectives	Questions		Weight (%)	Weight (points)
		The student is able to	Reproduction	Production		
Written series of question	Knowledge (24%)	…name and describe three methods of payment	Q1		12%	6
		… describe three functions of a central bank	Q2		12%	6
	Comprehension (16%)	… explain why money was created		Q3	16%	8
	Application (30%)	… identify and justify the functions of money in the following examples		Q4	20%	10
		… calculate the possible creation of money by the commercial banks		Q5	10%	5
	Analysis and written communication (30%)	… justify in detail if diamonds make a good form of money		Q6	30%	15
					100%	50

How will I evaluate the student's performance?

Example of a rubric to evaluate a B-test, Economics S5

	A (9.0-10 Excellent)	**B** (8.0-8.9 – Very good)	**C** (7.0-7.9 – Good)	**D** (6.0-6.9 – Satisfactory)	**E** (5.0-5.9 - Sufficient)	**F** (3.0-4.9 – Failed/Weak)	**FX** (0-2.9 – Failed/Very weak)
Knowledge	Displays comprehensive knowledge of all aspects of three methods of payment resp. functions of a central bank 6	Displays a broad knowledge of three methods of payment resp. functions of a central bank 5	Displays a sound knowledge of three methods of payment resp. functions of a central bank 4,5	Displays an incomplete but satisfying knowledge of three methods of payment resp. functions of a central bank 4	Recalls only names of three methods of payment resp. functions of a central bank 3,5	Displays little recall of information on methods of payment resp. functions of a central bank 2,5	Displays very little recall of information on methods of payment resp. functions of a central bank 1
Comprehension	Explains in an excellent way considering all relevant aspects why money was created 8	Explains in a very good way considering almost all relevant aspects why money was created 7	Explains in a good way considering most relevant aspects why money was created 6	Shows a general comprehension of why money was created referring to examples seen in class 5	Shows basic understanding of the creation of money giving incomplete explanations 4	Shows an insufficient understanding of why money was created 3	Shows very little understanding of why money was created and gives wrong/no examples 1

Application	Identifies and justifies the functions of money perfectly 10	Identifies all functions of money and justifies in a very good way 9	Identifies 4 out of 5 functions of money and justifies in a good way 8	Identifies 4 out of 5 functions of money and provides a weaker justification 7	Identifies 3 out of 5 functions of money and gives a sufficient justification or identifies all functions without giving a justification 6	Identifies less than 3 out of 5 functions of money and gives a poor justification 4	Identifies max. 1 function of money 2
	Shows the formula and calculates perfectly 5	Using the formula calculates correctly (one minor mistake) 4,5	Using the formula calculates almost correctly (some minor mistakes) 4	Uses the correct formula but calculates a wrong result 3	Gives the correct formula but calculates in a wrong way or gives the right result only 2	Is not able to calculate correctly and to give the right formula 1	Does a wrong / no calculation / uses a wrong formula 0
Analysis and Written Communication	Is capable of justifying in depth why diamonds make a good form of money using all the characteristics of good money 15	Is capable of discussing all aspects that make a good money referring to the example of diamonds 14	Is capable of giving a good analysis of what makes a good money considering at least 4 characteristics using the example of diamonds 12	Is capable of giving a basic analysis of what makes a good money considering at least 3 characteristics with reference to diamonds 10	Is capable of naming all characteristics without referring to diamonds or is capable of giving an analysis of two aspects only with reference to diamonds 8	Is incapable of naming the required characteristics of good money or uses one aspect only with reference to diamonds 6	Does not mention relevant characteristics of what makes a good money and does not make reference to diamonds 3

Total	50	44,5	39	33	27	19	8

How will I report on performance?

Example of translation of Test Points into Grades and Marks

Points	**Grades**	**Points**	**Marks**
49-50	**A (Excellent)**	49-50	10 9,5 9
47-48,5		47-48,5	
45-46,5		45-46,5	
42-44,5	**B (Very Good)**	42-44,5	8,5 8
39,5-41,5		39,5-41,5	
36-39	**C (Good)**	36-39	7,5 7
33,5-35,5		33,5-35,5	
31-33	**D (Satisfactory)**	31-33	6,5 6
27,5-30,5		27,5-30,5	
24-27	**E (Sufficient)**	24-27	5,5 5
19,5-23,5		19,5-23,5	
8,5-19	**F (Failed (Weak))**	8,5-19	3,0 – 4,5
0-8	**FX (Failed (Very Weak))**	0-8	0,0 – 2,5

Economics
Year 5 'B' Test
First Semester – November 2017

NAME: _____ total points: 50

Think carefully before you start to write. Make a short plan for what you are going to say in each paragraph.

1. Name and describe in detail three methods of payment. (6 p.)

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2. Describe in detail three functions of a central bank. (6 p.)

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3. Explain in depth why money was created. (8 p.)

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4. Identify if money is needed or not in the following examples. If yes, identify the function. Justify carefully all your answers. (10 p.)

a. For the holidays, Louis exchanges his apartment with Jane's flat in London.

Money needed (circle the correct answer) YES / NO

If yes, function fulfilled: ……

Justification:

……
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b. Lola is saving in her bank account for her future trip to Greece.

Money needed (circle the correct answer) YES / NO

If yes, function fulfilled: ……

Justification:

……

……

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c. Danone delivers yoghurt to Carrefour. They will be paid by the end of the month only.

dealerships.

Money needed (circle the correct answer) YES / NO

If yes, function fulfilled: ……

Justification:

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d. Kim does not know which car to choose. For this, she compares prices at different dealerships.

Money needed (circle the correct answer) YES / NO

If yes, function fulfilled: ……

Justification:

……

……

……

e. Jules, a student, works during his vacation. He has lodgings and receives a minimum wage out of which he pays for his lodgings.

Money needed (circle the correct answer) YES / NO

If yes, function fulfilled: ……

Justification:

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5. If a commercial bank takes a new deposit of Euro 1 million and the banking system maintains a reserve asset ratio of 8%, how much money could be created in new deposits? Show your working and the formulas used. (5 p.)

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6. Would diamonds represent a good form of money? Answer with respect to the characteristics which a good money should have. Justify in full. (15 p.)

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Example History

Example Test Matrix – Year 5 History Harmonised Examination

Task	Competences	Assessment Objectives (AO)	Questions (Q)	Weight in %	Weight in points
Source analysis	The first question will test understanding of a source or part of a source.	AO1. Knowledge and understanding • Recall and select relevant historical knowledge • Demonstrate understanding in an historical context	1	10	5
Source analysis	The second question will test analysis of sources through the comparison and contrast of two sources.	AO2. Application and interpretation • Compare and contrast sources as evidence about the past	2	20	10
Source analysis	The third question will test analysis of the utility of one or two sources with reference to their provenance and content.	AO3. Synthesis and evaluation • Evaluate the utility of various types of sources as evidence about the past	3	20	10
Structured Response	The fourth question will test factual recall through description and/or by definition, and explanation.	AO1. Knowledge and understanding • Deploy accurate, relevant and detailed knowledge of the past.	4	20	10
Structured Response	The fifth question will test factual recall, explanation and evaluation.	AO1. Knowledge and understanding • Deploy accurate, relevant and detailed knowledge of the past. AO2. Application and interpretation • Show awareness that events in the past have multiple explanations. AO3. Synthesis and evaluation • Evaluate the different approaches to, and interpretations of, historical issues and events. AO4. History methods and communication skills •Present balanced and focused historical explanations in written form.	5	30	15

See page 7 of the syllabus for a full list of the assessment objectives (AO)

Example Translation of Points to Grades

Score Points	Grades	Mark	Performance
45 – 50	A	9.0-10	Excellent
40 – 44.5	B	8.0-8.5	Very Good
35 – 39.5	C	7.0-7.5	Good
30 – 34.5	D	6.0-6.5	Satisfactory
25 – 29.5	E	5.0-5.5	Sufficient
13 – 24.5	F	3.0-4.5	Failed (Weak)
0 – 12.5	FX	0-2.5	Failed (Very weak)

The linking of score points to attainment descriptors can in practice not be carried out as an exact procedure, but some justification has to be provided of how score points relate to the different levels. For example, a student with strong source evaluation skills may demonstrate an excellent performance in assessment objectives 2 and 3, but struggle with structured writing for assessment objective 4 only achieving good performance.

As this is an example for the year 5 harmonised examination, all assessment objectives are assessed and therefore the test score points carry equal weighting to the mark and performance levels. The weighting of questions can vary in earlier tests in the cycle according to the development and acquisition of competences.

Please note that this is just an example test matrix. Due to the nature of the sources and questions selected for each harmonised exam, teachers will need to produce their own test matrix and rubric.

Example Year 5 Harmonised Exam Paper to Use with the Example Test Matrix

Section A – Source Analysis [25]

The following sources are concerned with the conditions of the working classes and their treatment by their employers in Europe in the 19th century.

Source A – The living conditions of workers in the Brussels region.

It is certain that the working population in the countryside generally eat better than the workers in the towns: …the labourer in the countryside, even though his wage seems relatively low, is able to eat meat once or twice a week… because the farm labourer is more sober, because drunkenness and debauchery [immoral behaviour] are not widespread.

The town workers… generally choose to live in narrow streets. … Usually, the worker only has one room, serving all household needs, which is too small for the size of the family. ...

Source: Doctor Dieudonné, "Enquiry into the condition of the working classes", 1844.

Source B – German industrialist Alfred Krupp addresses his workers.

'Social Democrats [German socialist party] … try to corrupt the minds of the most modest people through tempting speeches… I have had the courage to improve the workers' lot by building housing for them - 20,000 people have already found accommodation - to establish schools for them, and to set up facilities to allow them to purchase necessities at affordable prices.

To the workers I say, stay among your loved ones, your parents, your wife and children, and reflect on the household and education. That ought to be your policy. However, save yourself the upset of high state politics. Conducting higher politics requires more time and insight into conditions than the worker has been granted.'

Source: Alfred Krupp, address to his employees (February 11, 1877), in Wilhelm Berdow, ed., Alfred Krupps Briefe 1826-1887

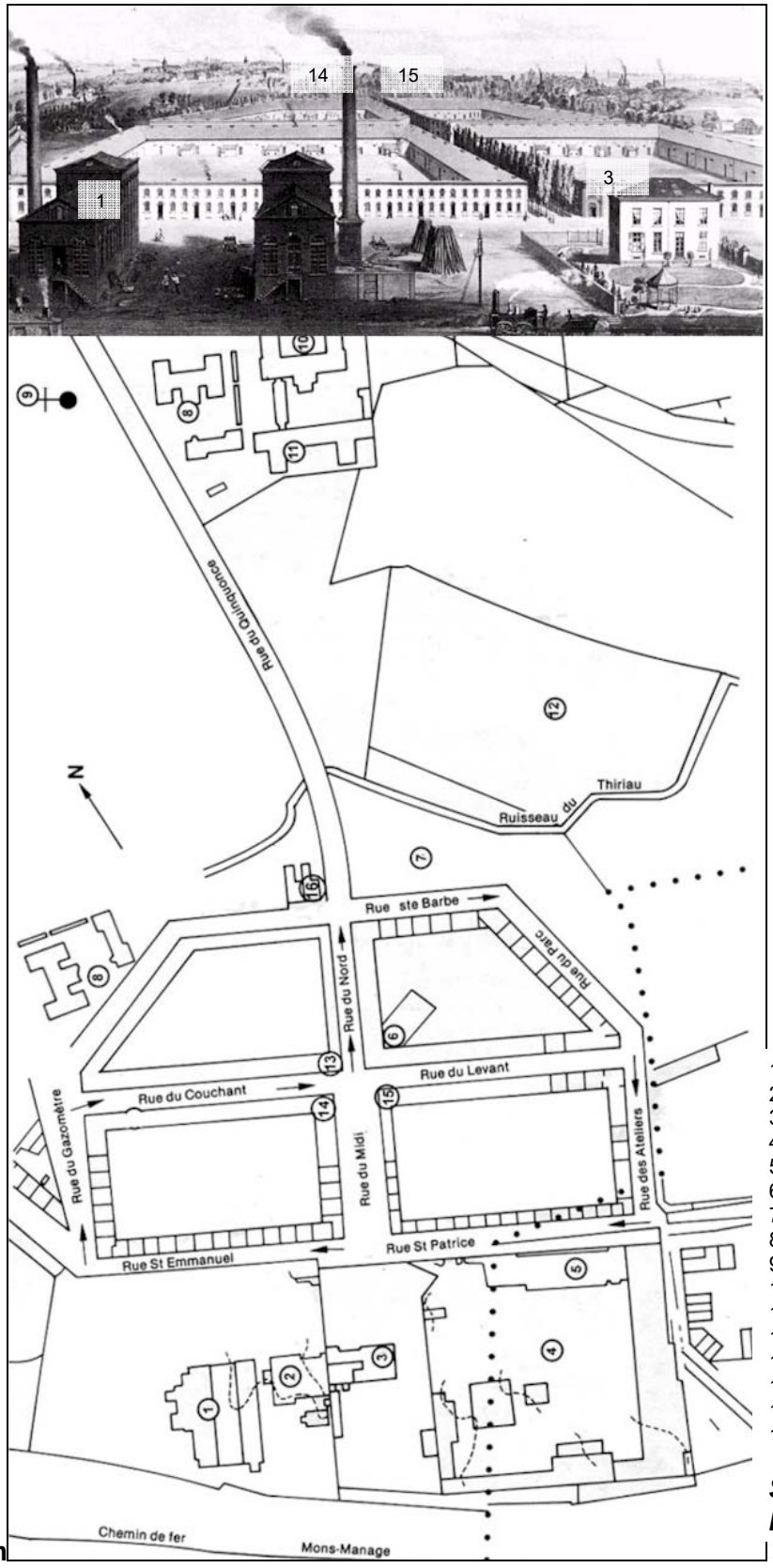
Source C – Online encyclopaedia *Wikipedia* explains Krupp's motivation.

'Krupp established the *Generalregulativ** as the firm's basic constitution… with strict control of workers. Krupp demanded a loyalty oath, required workers to obtain written permission from their foremen when they needed to use the toilet and issued proclamations telling his workers not to concern themselves with national politics. In return, Krupp provided social services that were unusually liberal for the era, including "colonies" with parks, schools and recreation grounds - while the widows' and orphans' and other benefit schemes insured the men and their families in case of illness or death... Krupp's strategy was adopted by Bismarck [German Chancellor] as government policy, as a means of limiting the support for Social Democratic Party.

Source: http://en.wikipedia.org/wiki/Krupp (accessed 25 May 2015)

**Generalregulativ – a set of rules for workers*

Source D- 1854 painting and plan of workers' housing in the model industrial mining town of Bois-du-Luc, à Houdeng-Gœgnies, Hainaut, Belgium



1. Mine,
2. Power station,
3. Director's house,
4. Workshop,
5. Big Office,
6. Festival hall,
7. Shop,
8. Schools,
9. Church,
10. Hospice,
11. Hospital,
12. Spoil tip,
13. Canteen,
14. Girls' school,
15. Fountain,
16. Butcher.

Source: Bois-du-Luc Museum,

Section A – Sources - Industrial Revolution

Questions

1. Identify **three** characteristics of working class housing conditions in industrial towns in 19th century Europe shown in **Source A**.

   [5 points]

2. Compare and contrast **Sources B and C**.

   How far do these sources agree about the way Krupp viewed and treated his workers?

   It is important that you identify both similarities and differences between the sources.

   [10 points]

3. How useful is **Source D** as evidence about how workers lived in 19th century Europe?

   Remember to include both the strengths and weaknesses of Source D as historical evidence.

   [10 points]

Section B – Structured Response [25]

Questions

4. Describe **one** political revolution you have studied in the period 1815-48.

   [10 points]

5. Explain why some nationalist movements in the 19th century were more successful than others.

   [15 points]

Marking Guidelines – based on the subject attainment descriptors

Section A – Source Analysis [25]

1. Identify three characteristics of working class housing conditions in industrial towns in 19th century Europe shown in Source A. [5 points]

Award 2 points for the first two characteristics extracted directly from the text; and 1 point for the third characteristic. E.g. 'narrow streets', overcrowded housing

2. Compare and contrast Sources B and C.

How far do these sources agree about the way Krupp viewed and treated his workers?
It is important that you identify both similarities and differences between the sources.
[10 points]

Award up to 4 points for each first legitimate point of similarity and difference and 2 points for additional point of similarity and difference. Max 8 if only similarity or difference identified.

Indicative Content:
Similarities – Both sources agree that Krupp provided social facilities for his workers and both refer to the fact that he provided schools: Source B includes Krupp's claim to have improved the 'workers' lot' and Source C says that 'Krupp provided social services that were unusually liberal for the era'. Both sources agree that Krupp warned his workers against getting involved in national politics: Source B 'save yourself the upset of high state politics' and in Source C Krupp 'issued proclamations telling his workers not to concern themselves with national politics'. His opposition to the SPD is clear in both: Source B 'Social Democrats [German socialist party] … try to corrupt the minds of the most modest people' and Source C speaks of 'Krupp's strategy was… a means of limiting the support for Social Democratic Party.

Differences – Source C provides a more balanced perspective on both Krupp's policies and motivations. Krupp's requirement of a loyalty oath and the requirement that workers require permission to go to the toilet are not mentioned in Source B. Source C also suggests that Krupp's motivation was less altruistic and more calculated to keep the workers happy and less likely to 'support the SPD'.

3. How useful is Source D as evidence about how workers lived in 19th century Europe? Remember to include both the strengths and weaknesses of Source D as historical evidence. [10 points]

Award up to 4 points for each first legitimate point of strength and weakness and 2 points for additional points. Max 8 if only strengths or weaknesses identified.

Possible strengths include relevance of subject matter and fact that it provides a detailed visual insight into worker's housing. There is a degree of corroboration with Sources B and C suggesting Bois-du-Luc was not unique. Generic comments about the value of visual sources and maps/plans can also be credited. This depends entirely on what you have taught.

Possible weaknesses are likely to be better documented. The very unrepresentative nature of the source (a particular time and place not the whole of '19th century Europe'), model towns were not typical and should be contrasted to their knowledge of more typical industrial towns outlined by the Pope in Source A. We know little about the provenance of the painting and the idealised nature of it suggests it was produced under the patronage of the mine owners. For who else might it have been produced?

Section B – Structured Response [25 points]

4. Describe one political revolution you have studied in the period 1815-48.

[10 points]

Characteristics of typical answers for the levels within assessment objective 1:
1-4 points. This answer is characterized by vague knowledge, little understanding, significant brevity, incoherence and factual inaccuracy.

5-6 points. This answer is characterized by some understanding and knowledge. The answer is likely to be brief with little factual support (names, places, dates etc.).

7 points. This answer is characterized by good understanding and knowledge. The answer is likely to be relatively brief with some factual support (names, places, dates etc.).

8-10 points. This answer is characterized by very good understanding and knowledge with precise factual support (names, places, dates etc.). The better answer in this range is likely to be more developed, coherent and historically accurate.

5. Explain why some nationalist movements in the 19th century were more successful than others. [15 points]

Characteristics of typical answers for the levels within assessment objectives 1,2,3 & 4:
0-7 points. This answer is characterized by vague knowledge, no factual support, significant brevity, incoherence and factual inaccuracy.

8-9 points. This answer provides a single explanatory factor that is explained or multiple factors that are not explained. This answer is characterized by some understanding, but little or no factual support (names, places, dates etc.); the answer is likely to lack coherence and accuracy.

10-12 points. This answer provides multiple explanatory factors each of which is explained. This answer is characterized by good understanding, and some precise factual support (names, places, dates etc.); the better answer in this range is likely to be more coherent and historically accurate, supported by examples and accurate knowledge.

13-15 points. This answer is well-structured covering a range of thematic factors. This answer is characterized by excellent understanding, and precise factual support (names, places, dates etc.).

Indicative Content:
To some extent the indicative content will depend on what has been taught and it is therefore difficult to provide a generic mark scheme.
Possible factors for success and failure include role of great powers, geography, outcome of war, industrial development, degree of popular nationalism.

Annexe: Example for S5 L1 (Dutch)

1 What do I want to assess?

- Competences
  - Reading
  - Interpretation
  - Subject competence
  - Writing
  - Arguing
  - Critical thinking
  - Linguistic competence
- Objectives
  - The student shows understanding of the content and characters of a written text from a fictional source (not dealt with in class);
    The student is able to analyse and interpret the content and (technical) features of a text;
    The student is able to use and apply subject specific concepts and terminology.
  - The student is able to write a coherent and structured text;
    The student is able to produce a text that is a proper response to the assignment;
    The students presents reasons and/or explanations for opinions and ideas;
    The student applies grammatical rules and spelling conventions;
    The student uses appropriate and varied vocabulary.
- Content
  Literary and non-literary texts/assignments are at the level of S5. Language conventions, subject specific concepts and terminology etcetera reflect what has been studied in class.

2 How will I assess?

- Summative test → end S5
- Holistic test (open questions/tasks)
- Teacher-assessment
- Written examination
- Long test

3 What will my test look like?[1]

Two examples of Test Matrixes: Language 1, S5, reading and writing

Example A

Task	Competence(s)	Objectives	Questions (Q)		Weight in %	Weight in points
		The student is able to…	Repro-duction	Pro-duction		
Literary text/extract, not dealt with in class, with a limited number of open questions	Reading	… show understanding of the content and characters of a literary text		Q1		16
	Interpretation	… analyse and interpret the content of a text		Q2		16
	Subject competence	…use and apply relevant concepts and terminology		Q3		16
					50%	48
Non-literary stimulus with a writing task.	Writing/ Linguistic competence	… write a coherent and structured text		Q4		12
		… produce a text that is a proper response to the assignment				12
		…apply grammatical rules and spelling conventions				6
		…use appropriate and varied vocabulary				6
	Arguing/ Reasoning/ Critical thinking	… present reasons and/or explanations for opinions and ideas with links to personal experience				12
					50%	48
					100%	96

[1] Check also *Harmonised Assessment at the end of Year 5* (Ref.: 2013-05-D-34-en-13), Annex I, Language 1 Written Examination Harmonised Assessment

Example B

Task	Competence(s)	Objectives	Questions (Q)		Weight in %	Weight in points
		The student is able to…	Repro-duction	Pro-duction		
Literary text/extract, not dealt with in class, with a limited number of open questions	Reading	… show understanding of the content and characters of a literary text		Q1		15
	Interpretation	… analyse and interpret the content of a text		Q2		18
	Subject competence	…use and apply relevant concepts and terminology		Q3		15
					50%	48
Non-literary stimulus with a writing task.	Writing/ Linguistic competence	… write a coherent and structured text		Q4		12
		… produce a text that is a proper response to the assignment				12
		…apply grammatical rules and spelling conventions				6
		…use appropriate and varied vocabulary				6
	Arguing/ Reasoning/ Critical thinking	… present reasons and/or explanations for opinions and ideas with links to personal experience				12
					50%	48
					100%	96

4 How will I evaluate the student's performance?

Examples of rubrics to evaluate the READING TASK[2]

Matrix A

Aspects for judgement	16-15 p	14-13 p	12-11 p	10-9 p	8-6 p	5-3 p	2-0 p
	Excellent	Very good	Good	Satisfactory	Sufficient	Weak	Very weak
Reading: Understanding of the content of the text by explaining the last, overarching paragraph of the text	Explanation of the last paragraph fully meet s the expectations Thorough explanation of: - Link to the 2nd World War - Jewish family - War experiences of the mother - the relation between these elements	Convincing explanation of the last paragraph Correct explanation of: - Link to the 2nd World War - Jewish family - War experiences of the mother - the relation between these elements	Explanation of the last paragraph meet s the expectations Correct explanation of: - Link to the 2nd World War - Jewish family - War experiences of the mother	Explanation meets the demands, but leaves room for improvement Correct explanation of at least two elements: - Link to the 2nd World War - Jewish family - War experiences of the mother	Explanation meets very basic demands, but leaves quite some room for improvement Predominantly correct and recognisable explanation of at least two elements: - Link to the 2nd World War - Jewish family - War experiences of the mother	Explanation does not meet very basic demands and needs improvement. At least one recognisable element. A lot of non-related and/or non-relevant content.	The answer is hardly recognisable as an explanation! Non-related and/or non-relevant content.
Interpretation: Analysis and interpretation of the text in relation to the theme of the text	Thorough and professional: - identification of two unanswered questions - choices are linked to the theme - explanation of choices - text references (correct)	Convincing and broad: - identification of two unanswered questions - choices are linked to the theme - explanation of choices - text references (correct)	Contains all elements, convincing choices have been made in respect of the theme, but there is no in-depth explanation/ analysis	Contains all elements, but not all choices are convincing. There is room for improvement in the explanation/ analysis.	Contains most elements, but not all choices are convincing. There is quite some room for improvement in the explanation/ analysis.	Contains some elements, but choices are not convincing. A lot of non-related and/or non-relevant content.	Contains hardly any relevant elements. A lot of non-related and/or non-relevant content.
Subject Competence: Technical analysis of the text with use of proper terminology	Thorough and professional analysis of: - characters (zoon, moeder, Flentrop) - perspective - time And: proper and extensive use of terminology	Convincing and broad analysis of: - characters (zoon, moeder, Flentrop) - perspective - time And: proper use of terminology	Contains all elements. The analysis is adequate, but not very profound. And: proper but incomplete use of terminology	Contains all elements, but the elaboration of separate elements deserves improvement. And: proper but incomplete use of terminology	Contains all elements, but one element is insufficiently elaborated. Overall the analysis is very basic. And: some use of correct terminology	Contains all elements, but at least two elements are insufficiently elaborated. Overall the analysis is very basic. And: insufficient (correct) use of terminology	Contains hardly any relevant elements. A lot of non-related and/or non-relevant content. And: hardly any use of (correct) terminology

[2] These rubrics are a tool for the teacher. They will never cover everything you might encounter. In those cases, take your own decision (and explain your choice).

Matrix B

Aspects for judgement	15-14 p	13-12 p	11-10 p	9-8 p	7-6 p	5-3 p	2-0 p
	Excellent	Very good	Good	Satisfactory	Sufficient	Weak	Very weak
Reading: Understanding of the content of the text by explaining the last, overarching paragraph of the text	Explanation of the last paragraph fully meet s the expectations Thorough explanation of: - Link to the 2nd World War - Jewish family - War experiences of the mother - the relation between these elements	Convincing explanation of the last paragraph Correct explanation of: - Link to the 2nd World War - Jewish family - War experiences of the mother - the relation between these elements	Explanation of the last paragraph meet s the expectations Correct explanation of: - Link to the 2nd World War - Jewish family - War experiences of the mother	Explanation meets the demands, but leaves room for improvement Correct explanation of at least two elements: - Link to the 2nd World War - Jewish family - War experiences of the mother	Explanation meets very basic demands, but leaves quite some room for improvement Predominantly correct and recognisable explanation of at least two elements: - Link to the 2nd World War - Jewish family - War experiences of the mother	Explanation does not meet very basic demands and needs improvement. At least one recognisable element. A lot of non-related and/or non-relevant content.	The answer is hardly recognisable as an explanation! Non-related and/or non-relevant content.
Subject Competence: Technical analysis of the text with use of proper terminology	Thorough and professional analysis of: - characters (zoon, moeder, Flentrop) - perspective - time And: proper and extensive use of terminology	Convincing and broad analysis of: - characters (zoon, moeder, Flentrop) - perspective - time And: proper use of terminology	Contains all elements. The analysis is adequate, but not very profound. And: proper but incomplete use of terminology	Contains all elements, but the elaboration of separate elements deserves improvement. And: proper but incomplete use of terminology	Contains all elements, but one element is insufficiently elaborated. Overall the analysis is very basic. And: some use of correct terminology	Contains all elements, but at least two elements are insufficiently elaborated. Overall the analysis is very basic. And: insufficient (correct) use of terminology	Contains hardly any relevant elements. A lot of non-related and/or non-relevant content. And: hardly any use of (correct) terminology
	18-17 p	**16-15 p**	**14-13 p**	**12-10 p**	**9-7 p**	**6-4 p**	**3-0 p**
Interpretation: Analysis and interpretation of the text in relation to the theme of the text	Thorough and professional: - identification of two unanswered questions - choices of questions are linked to the theme - explanation of choices - text references (correct)	Convincing and broad: - identification of two unanswered questions - choices of questions are linked to the theme - explanation of choices - text references (correct)	Contains all elements, convincing choices have been made in respect of the theme, but there is no in-depth explanation/ analysis	Contains all elements, but not all choices are convincing. There is room for improvement in the explanation/ analysis.	Contains most elements, but not all choices are convincing. There is quite some room for improvement in the explanation/ analysis.	Contains some elements, but choices are not convincing. A lot of non-related and/or non-relevant content.	Contains hardly any relevant elements. A lot of non-related and/or non-relevant content.

Example of a rubric to evaluate the WRITING TASK

Aspects for judgement	6 p	5 p	4 p	3 p	2 p	1 p	0 p
	Excellent	Very good	Good	Satisfactory	Sufficient	Weak	Very weak
Writing and linguistic competence: apply grammatical rules and spelling conventions	Excellent use of language. Very well-formulated sentences, excellent and correct use of grammar and spelling.	Very good use of language. Well-formulated sentences, very good use of grammar and spelling.	Good use of language. Good sentences, good use of grammar and spelling, only minor mistakes.	Satisfactory use of language. Sentences, grammar and spelling generally meet common standards; some, though few, obvious mistakes. There is room for improvement .	Sufficient use of language. Sentences, grammar and spelling only just meet common standards; the text contains obvious mistakes. Language skills need to be improved.	Language use is insufficient and mistakes in grammar and spelling undermine the message.	Language use is very weak and mistakes in grammar and spelling seriously undermine the message.
Writing and linguistic competence: use appropriate and varied vocabulary	Well-chosen and ambitious vocabulary in respect of the content of the assignment and of the target audience.	Carefully chosen and varied vocabulary in respect of the content of the assignment and of the target audience.	Standard but varied vocabulary in respect of the content of the assignment and of the target audience.	Use of everyday words with some variation, in respect of the content of the assignment and of the target audience.	Use of everyday words, hardly any variation, a lot of repetition. Basic vocabulary just about appropriate for assignment and target audience.	Vocabulary too limited and imprecise to express properly the content of the assignment, and take the target audience into account.	Unsuitable and very limited vocabulary.
	12-11 p	**10-9 p**	**8-7 p**	**6-5 p**	**4-3 p**	**2-1 p**	**0 p**
Writing and linguistic competence: write a coherent and structured text	The structure of the text fully meets the standards of an argumentative discourse!	The structure of the text fully meets the standards of an argumentative discourse.	The structure of the text meets the standards of an argumentative discourse.	The structure of the text generally meets the standards of an argumentative discourse, but there is room for improvement.	The structure of the text is just adequate for an argumentative discourse, but could be improved considerably.	The structure of the text insufficiently reflects an argumentative discourse.	Very weak structure of the text; does not reflect an argumentative discourse.
	Ambitious, catchy introduction and conclusion.	Convincing introduction and conclusion.	Self-evident, but solid introduction and conclusion.	Self-evident introduction and conclusion.	Just adequate introduction and conclusion. Either a self-evident introduction OR a self-evident conclusion	Insufficient introduction and/or conclusion.	Very weak introduction, very weak or no conclusion.
	Paragraphing and links between them (including the use of signal words) are applied in a professional way.	Paragraphing and links between them (including the use of signal words) are applied in a careful way.	Paragraphing and links between them (including the use of signal words) are applied in an obvious, but correct way.	Paragraphing and links between them (including the use of signal words) are generally correctly applied; some, though few could be called into question.	Paragraphing and links between them (including the use of signal words) partially could be called into question or even contain some mistakes.	No clear and/or unsuitable paragraphing or links between them (insufficient and/or wrong use of signal words). Obvious mistakes.	Very weak, unsuitable paragraphing or links between them (insufficient and wrong use of signal words). A lot of mistakes

	12-11 p	10-9 p	8-7 p	6-5 p	4-3 p	2-1 p	0 p
Writing and linguistic competence: produce a text that is a proper response to the assignment	The pupil has chosen a strong position either in favour or against the statement. The theme is properly and creatively addressed throughout the text (no irrelevant information/statements).	The pupil has chosen a strong position either in favour or against the statement. The theme is adequately addressed throughout the text (no irrelevant information/statements).	The pupil has chosen a clear position either in favour or against the statement. The theme is mostly adequately addressed throughout the text (hardly any irrelevant information/statements).	The pupil has chosen a position either in favour or against the statement. The theme is mostly well addressed but in a basic manner throughout the text (some information/statements are irrelevant).	The pupil has chosen a position either in favour or against the statement. The theme is addressed in a basic manner throughout the text (some information/ statements are irrelevant).	The pupil has not chosen a (clear) position either in favour or against the statement. The theme is only partially addressed throughout the text (a lot of information/ statements are irrelevant).	The pupil has not chosen a (clear) position either in favour or against the statement. The theme is not addressed throughout the text (most of the information/statements are irrelevant).
Arguing/reasoning/ critical thinking: present reasons and or explanations for opinion and ideas with links to personal experiences	Excellent reasoning. Very strong and varied arguments, presented in an excellent way. Highly relevant and creative arguments with substantiation and links to personal experiences. Clear and convincing refutation of important, well-chosen potential counter arguments.	Very good reasoning. Strong and varied arguments, presented in a very good way. Highly relevant arguments with substantiation and links to personal experiences. Convincing refutation of important potential counter arguments.	Coherent reasoning. Solid, varied, but obvious arguments, presented in a good way. Relevant arguments with substantiation, and links to personal experiences. Convincing refutation of potential counter arguments.	Satisfactory reasoning, but room for improvement in variation, strength and/or presentation of the arguments. Relevant arguments, with some substantiation, linked to personal experiences. Refutation of potential counter arguments.	Reasoning meets very basic demands, but leaves quite some room for improvement. Most arguments are relevant, with some substantiation. Some links to personal experiences. Refutation of potential counter arguments not very convincing or too vague / chosen counter arguments of minor importance.	Reasoning does not meet very basic demands and needs to be improved. Most arguments are irrelevant / not linked to the claim. Hardly any supporting details and/or links to personal experiences. Refutation of potential counter arguments missing or too vague.	Reasoning is very weak and incoherent. Arguments are irrelevant / not linked to the claim. Refutation of potential counter arguments missing, irrelevant or too vague.

OVERALL EXAM PART I (reading task) +PART II (writing task)

Points	Grades		Mark
90-96	A Excellent	95-96	10
		93-94	9.5
		90-92	9.0
76-89	B Very good	83-89	8.5
		76-82	8.0
62-75	C Good	69-75	7.5
		62-68	7.0
47-61	D Satisfactory	55-61	6.5
		47-54	6.0
32-46	E Sufficient	40-46	5.5
		32-39	5.0
15-31	F Weak		3.0-4.5
00-14	Fx Very weak		0.0-2.5

PART 1 READING

48/96 punten

Lees het verhaal en beantwoord de vragen.
Read the story and answer the questions.

HET SCHOOLREISJE

Ruim een maand voor de grote vakantie in mijn derde jaar van het secundair zouden we ons eerste schoolreisje gaan maken. Elke leerling had ruim een jaar maandelijks een gulden in de vakantiepot gestort.
Flentrop had gevraagd wie van ons een suggestie had waarheen te gaan. Iedereen begon spontaan te roepen: 'Utrecht! De duinen bij Bloemendaal! Maastricht!'
Soms haatte ik Flentrop, niet alleen vanwege zijn slechte adem. Daar kan een maaglijder niets aan doen, had moeder me gezegd. Flentrop was driftig, kon flink slaan, je oor gemeen omdraaien. Hij was dermate streng dat velen uit angst hun lessen er verbeten instampten. Ik beschouwde hem als twee personen in één lichaam.
Als hij in een vrij uur een verhaal voorlas, dan deed hij dat fantastisch; ik sloot de ogen en zag de mensen over wie hij vertelde. Zelfs de intonatie van de verschillende personen was perfect.
Als ik mijn Frans niet voldoende had geleerd, hoopte ik dat het boze oog - of erger- hem op de proefwerkdag zou treffen.
Ik haatte hem en had tegelijk een zwak voor hem.
Het was nu stil in de klas.
'Maastricht is te ver voor één dag. Degene die dat riep moet eens nakijken hoeveel kilometer die stad van Amsterdam verwijderd is en meer aandacht aan de aardrijkskundelessen besteden.'
Hij wees naar mij. 'Frans, heb jij een suggestie?'
'Heemstede, het Groenendaalse bos, het kleine dierenpark en de volière met tropische vogels. Het oude koetshuis is verbouwd, nu kun je daar zitten en iets gebruiken.'
Flentrop dacht even na en knikte toen. Hij vond het, ook gezien de korte reisduur, een goed idee.

'Hoe kun je zoiets doen…' Moeder schudde haar hoofd en keek me verwijtend aan. Het noemen van dat dorp gold voor haar al als zware *treife*[1].
'Het kwam zomaar in me op, ik dacht er nauwelijks bij na.'
'Dat is het juist, dat laatste.'
Zij zal daar nooit meer een voet zetten.
Op tien minuten afstand van het Groenendaalse bos lag onze kleine woning waar tot 1941 zovelen van onze familie hadden gelogeerd. Tante Jet, tante Lies met de tweeling, tante Martha en oom Salomon, hun twee zoons, opa en oma. Ik bedacht dat zeil, vloerkleden, gordijnen en enkele meubelstukken van ons misschien nog in het huis aanwezig waren. Een goed gesitueerde *gojse* mevrouw had het huis in 1942 gekocht. Wie wil er nu op zo'n ongeluksbodem wonen?
Op slinkse wijze zou ik de wandeling van de klas naar het bos zo leiden, dat ze zonder het te weten langs mijn huis en tuin zouden komen.
'Wat ben ik moe,' gaapte ik, 'ik ga maar naar bed.'
'En de bloedsomloop van de kikker dan? Dat proefwerk krijg je morgenmiddag, je moet het ook nog uit je hoofd kunnen tekenen,' zei moeder.
Ik antwoordde niet, begon me uit te kleden terwijl ik zachtjes zong: 'In Holland staat een huis, in Holland staat een huis, in Holland staat een huis jaja, van je singela singela hopsasa..'
Ik schrok toen een forse mep mijn hoofd trof; de eerste fysieke afstraffing die ze me na de oorlog gaf. Met mijn eigen schoolagenda nog wel.
Ze verweet me dat ik wel de tijd had in een schoolschrift allerlei nonsens over auto's op te schrijven.

Onverbiddelijk eiste ze van mij dat alles wat ik ondernam op de toekomst was gericht. We dachten dus ongeveer hetzelfde. Die plakboeken bevatten mijn nabije toekomst; steeds futuristischer gemodelleerd reden auto's de tijd in.
Moeders foto-album echter was statisch, geënt op dood en verleden.
Ze merkte op dat ik me niet kon permitteren nog eens te blijven zitten.

'Het staat dus vast. Volgende week maandag gaan we met de hele klas naar het Groenendaalse bos.'
Moeder zweeg. Dagenlang bleef er een verwijtende blik in haar ogen; ze negeerde me nog meer dan ik gewoon was.
Het is toch *mesjogge*[2] dat ze me wil verbieden een plaats te bezoeken die voor haar taboe is geworden? dacht ik.
'U hoeft niet zo te kijken, het gaat toch door,' zei ik koppig tijdens de avondmaaltijd.
Ze schoof haar bord, waarvan ze nog bijna niets had gegeten, van zich af, stond op en ging naar de keuken.

Die maandag schijnt in Heemstede de zon. Kwetterend lopen we over de Binnenweg waaraan heel oude huisjes liggen.
We passeren het huis van de timmerman die gedurende de oorlog onze gehavende, vervloekte en gezegende oude piano heeft bewaard. Het is me niet gelukt langs mijn oude huis te komen; dat zou een rare omweg zijn geworden. Flentrop had het zeker gemerkt.

We naderen automobielbedrijf Gebroeders Smit & Co. aan het eind van de Binnenweg, vlak bij het kleine kasteelachtige gemeentehuis. Bij de ingang van de garage staan wat mensen samengedromd. Nieuwsgierig blijven we staan. Ik ben de eerste die de garage in loopt.
Er staat daar een wel heel bijzondere auto, ik zal dat niet weten, ik met mijn plakboeken vol uitgeknipte automodellen! Het is een Maybach Zeppelin, in zijn tijd alleen te vergelijken met een Rolls Royce.
Even later dringen vooral de jongens uit de klas zich er opgewonden omheen, de meisjes komen aarzelend de garage binnen, maar tonen weinig interesse in het pronkstuk. Flentrop kijkt verbaasd.
De caramelkleurige wagen heeft grote koplampen met lichtgeel glas die aan weerszijden van de imponerende radiateur-grille naast de spatborden zijn gemonteerd. Wat een auto. Ik draai en draai er dromerig omheen. Een meneer in een grijs kostuum komt naar ons toe.
'Schoolreisje zeker?' Flentrop knikt.
'Deze wagen is op een geheimzinnige manier door de Duitsers hier achtergelaten,' hoor ik hem tegen Flentrop zeggen, 'vermoedelijk is hij van Rauter geweest.'
In een flits zie ik dezelfde wagen, rijdend. Er zitten verwaand kijkende Duitse officieren in die naar een haag van opgewonden mensen zwaaien van wie een deel de Hitlergroet brengt.
Het maakt me *galliesj*[3], ik wijk achteruit, waardoor ik tegen Flentrop en de vreemde meneer aanbots.
Dan sta ik buiten en adem diep in. De wind draagt de zoete geuren van het grote bloemperk voor het gemeentehuis naar me toe.
Die auto heeft mijn verdere dag *versjteerd*[4].

Ik zie mezelf thuiskomen. Niets zal ze vragen. Ze zal haar oorlog op de mijne blijven stapelen. In haar gezicht zal ik, dag in dag uit, die bevroren vuistslag blijven zien.

Uit: Frans Pointl, *De aanraking,* uitgeverij Nijgh en Van Ditmar, 1990
1.036 words

Woordverklaring:
[1] treife = verboden, taboe
[2] mesjogge = gek
[3] galliesj = misselijk
[4] versjteerd = bedorven, verknoeid

Vragen bij *Het schoolreisje*
Questions at the text

1 Leg de laatste alinea van het verhaal in je eigen woorden uit.
Explain the last paragraph of the story in your own words.
(Matrix A: 16 points or Matrix B: 15 points)

2 In het verhaal blijven enkele vragen die samenhangen met het thema, onbeantwoord. Noem twee van deze vragen. Licht je keuze toe. Refereer aan relevante tekstpassages.
In the story, some questions related to the theme, remain unanswered. Distinguish two of these questions. Explain your choices. Refer to the relevant parts in the text.
(Matrix A: 16 points or Matrix B 18 points)

3 Maak een technische analyse van het verhaal. Besteed in je analyse aandacht aan: **personages**, **perspectief** en **tijd**. Gebruik adequate terminologie.
Make a technical analysis of the story. Discuss: **characters**, **perspective** and **time**. Use adequate terminology.
(Matrix A: 16 points or Matrix B: 15 points)

PART 2 WRITING **48**/96 punten

Voor het vak Ethics (moraal) moet je, ter voorbereiding op een discussie over de stelling ‘de ouders van tegenwoordig beschermen hun kinderen te sterk’, een **betoog** schrijven. Ben je het eens of oneens met het standpunt?

- Lengte tekst: 450 woorden (10% afwijken mag).
- Zet het aantal woorden onder je tekst.
- Je kunt naar behoefte gebruik maken van de bijgevoegde documentatie. Uiteraard niet overschrijven!
- Lees je tekst goed na op spel- en zinsbouwfouten voor je hem inlevert.

As a preparation for a debate in an Ethics lesson, you have to write an argumentative discourse about the statement: ‘Todays parents are too protective for their children’. Do you agree or disagree with the statement?

- Length: 450 words (10% more or less is permitted).
- Write the number of words underneath your text.
- You are allowed to make use of the attached information/documentation. No copying!
- Check your text on grammar and spelling.

Zijn de ouders van nu te beschermend?

De pampergeneratie, zo worden de jongeren van dit moment genoemd. Hun ouders prijzen ze de hemel in en bedienen ze op al hun wenken. Worden jongeren echt afgeschermd van alle negatieve ervaringen of is er nog een andere kant?

“Rousseau en Kant zeiden al dat het belangrijk is dat een kind builen en schrammen oploopt in zijn jeugd. Want als kinderen geen teleurstellingen mogen meemaken, dan ontwikkelen ze geen coping skills. Dan leren ze niet omgaan met tegenslag, frustratie, boosheid, verlies, liefdesverdriet. Dat zijn allemaal dingen die bij het leven horen en waar je kinderen op moet voorbereiden. Er is tegenwoordig een groep ouders die hun kinderen niet opvoedt tot weerbaarheid.”

(72 woorden)

J. Derksen, hoogleraar psychodiagnostiek aan de Vrije Universiteit Brussel

“We leven sinds een kwarteeuw met de ideologie dat succes een keuze is en mislukking dus ook. Nogal wat ouders passen die gedachte toe op hun eigen leven en stellen dus hoge eisen aan zichzelf. […] Dergelijke ouders zijn stimulerend maar ook heel streng. Ze voeden op met het principe van ‘je kunt als je maar wilt’. Dat houdt in dat wie iets niet kan, het kennelijk onvoldoende heeft gewild. Dat leidt tot zelfverwijten. Maar een mens kan en krijgt lang niet alles wat hij wil, want er is wel zoiets als domme pech.”

(94 woorden)

T. Dehue, hoogleraar wetenschapstheorie en -geschiedenis

Teil 1	Kompetenzen	Lernziele	Aufgaben (A)	Punkteverteilung
Leseverständnis: Text mit geschlossenen und (halb)offenen Aufgaben	Lesen (siehe Leistungs-deskriptoren Sprache III)	Schüler sind in der Lage Alltagstexte und literarische Texte zu lesen und …		
		…die Hauptaussagen des Textes zu erfassen (global).	A 1	4
			A 2	8
		…relevante Details des Textes zu erfassen (detailliert).	A 3	10
			A 4	10
			A 5	8
			Gesamt Teil 1:	40
Teil 2	**Kompetenzen**	**Lernziele**	**Bewertungskategorien**	**Punkteverteilung**
Textproduktion: Blogeintrag schreiben (vgl. Papier „Übersicht Charakteristika Textsorten“)	Schreiben (siehe Leistungs-deskriptoren Sprache III)	Schüler sind in der Lage persönliche Briefe und einfache zusammenhängende Mitteilungen zu Themen des alltäglichen Lebens, zu Erfahrungen und Eindrücken zu schreiben.	Inhalt	12
			Textgestaltung	12
			Sprachrichtigkeit	12
			Ausdrucksvermögen	4
			Gesamt Teil 2:	40
			Gesamt Teil 1 + 2:	**80**

Punke	alphabetische Note	Punkte	Note
74 - 80	A (ausgezeichnet)	78 - 80	10
		76 - 77	9.5
		74 - 75	9.0
68 - 73	B (sehr gut)	71 - 73	8.5
		68 - 70	8.0
61 - 67	C (gut)	65 - 67	7.5
		61 - 64	7.0
54 - 60	D (befriedigend)	58 - 60	6.5
		54 - 57	6.0
46 - 53	E (ausreichend)	50 - 53	5.5
		46 - 49	5.0
30 - 45	F (mangelhaft)		3.0 - 4.5
0 - 29	FX (ungenügend)		0.0 - 2.5

S5

Name der Schule

Schuljahr	
Datum	
Prüfungsdauer	**90 Minuten**
Start	
Ende	
Gesamtpunkte	**80**

Deutsch L3

Zulässige Hilfsmittel: **einsprachiges Wörterbuch**

Anweisungen : Bearbeiten Sie bitte **beide Teile.**

Teil 1: Leseverständnis: Bearbeiten Sie die Aufgaben **1 bis 5**.

Teil 2: Textproduktion: Bearbeiten Sie die Aufgabe.

Lehrer/in: **Schüleranzahl:**

Teil 1 – Leseverständnis
(40 Punkte)

Lesen Sie den folgenden Text und beantworten Sie im Anschluss die Aufgaben 1 - 5.

Reisen, die Welt entdecken, andere Kulturen und Menschen kennenlernen – davon träumen viele. Doch meistens ist es nicht die Reise selbst, sondern die Unterkunft, die sehr viel kostet. Die Lösung heißt „CouchSurfing“. Auf der internationalen Internetplattform bietet man fremden Menschen kostenlos einen Schlafplatz bei sich an. Dafür kann man selbst in einem fremden Zuhause übernachten. **----------A----------** Casey Fenton gründete 2004 das Netzwerk zusammen mit drei Freunden, nachdem er auf einer Reise durch Island selbst kostenlos bei Studenten übernachtet hatte.

1

Heute sind bei „CouchSurfing“ rund 1,7 Millionen Mitglieder aus über 230 Ländern registriert. Die Mehrheit der Mitglieder ist zwischen 18 und 24 Jahren alt. In Deutschland gibt es über 160.000 „CouchSurfer“, davon allein 23.500 in Berlin. In großen deutschen Städten wie zum Beispiel Hamburg, Köln oder Stuttgart gibt es oft mehrere Hundert Schlafplätze. Selbst in kleinen Dörfern mit wenigen Einwohnern kann man „CouchSurfing“ machen. Um bei „CouchSurfing“ mitzumachen, muss man sich auf der Internetseite registrieren und ein Profil anlegen. In dem Profil stellt man sich und seine Interessen vor. **----------B----------**. Wenn man eine Reise plant, kann man auf der Internetseite andere Mitglieder suchen, die in der Nähe des Reiseziels wohnen. Diese fragt man nach einem freien Schlafplatz und mit etwas Glück antworten sie positiv.

2

Natürlich ist es nicht ungefährlich, bei fremden Menschen zu Hause zu übernachten oder fremde Menschen bei sich übernachten zu lassen. Couchsurfing beruht auf Gegenseitigkeit und Vertrauen. **----------C----------.** Hier findet man auch Bewertungen, in denen andere Couchsurfer über ihre Erfahrungen mit der Person erzählen. Das Profil hilft zu entscheiden, ob eine Person als Gastgeber oder Gast in Frage kommt. Profile mit wenigen Informationen und ohne Fotos schaffen wenig Vertrauen. Je mehr man schreibt, desto höher die Chance, viele Gäste zu bekommen oder oft eingeladen zu werden. Couchsurfing beruht zwar auf Gegenseitigkeit. Aber es ist auch möglich, nur Gastgeber oder nur Gast zu sein.

3

Couchsurfing ist nicht nur gut für den Geldbeutel, sondern eine neue Art des Reisens. Die Philosophie von Couchsurfing ist: „Hilf mit, eine bessere Welt zu erschaffen – Couch für Couch.“ Die Idee verbindet Menschen auf der ganzen Welt miteinander und fördert Werte wie Gastfreundschaft und Toleranz. Wer Couchsurfing macht, hat die einzigartige Möglichkeit, das Reiseziel aus der Perspektive der Einheimischen kennenzulernen. **----------D----------.** Selbst wenn man keinen Schlafplatz anbieten kann oder möchte, kann man sich für ein Treffen verabreden. Dann zeigt man dem Couchsurfer die Sehenswürdigkeiten der Stadt oder man geht zusammen aus. Oft entwickeln sich aus diesen neuen Bekanntschaften richtige Freundschaften.

4

Quelle: Sylvia Behrendt, Irina Hahn, Zeitschrift vitamin de, www.vitaminde.de, leicht adaptiert [http://www.pasch-net.de/de/pas/cls/sch/jus/kul/3325018.html] (417 Wörter)

Bearbeiten Sie die folgenden Aufgaben zu Teil 1:

1. **Welche zwei Überschriften passen am besten zum Text? Setzen Sie zwei Kreuze. ☒**

   a) ☐ CouchSurfing – Gefahren und Herausforderungen
   b) ☐ CouchSurfing – zu Gast auf fremden Sofas
   c) ☐ CouchSurfing – billige Schlafplätze in Dörfern
   d) ☐ CouchSurfing – die beliebteste Möglichkeit zu übernachten
   e) ☐ CouchSurfing – eine globale Internetidee

___/4 P

2. **Lesen Sie die Teilüberschriften a) - d) und ordnen Sie sie den Textabschnitten 1 - 4 passend zu. Schreiben Sie die richtige Nummer in die rechte Spalte.**

	Teilüberschriften	Textabschnitte
a)	Schlafplätze auf der ganzen Welt	
b)	Durch Reisen die Welt verändern	
c)	Eine tolle Idee im digitalen Zeitalter	
d)	Profil als Entscheidungshilfe	

___/8 P

3. **Lesen Sie die Aussagen a) – e) und kreuzen Sie bei jeder Aussage an: richtig oder falsch? Geben Sie die Zeile(n) an, wo die Information im Text steht.**

	Aussagen	richtig	falsch	Zeile(n)
0	**CouchSurfing wird weltweit gemacht.**	**x**		**Z. 8**
a)	Couchsurfen kann man nur im Alter von 18 – 24 Jahren.			
b)	Wenn man Gast oder Gastgeber werden möchte, braucht man einen Internetzugang.			
c)	Menschen mit detailliertem Profil haben bessere Chancen.			
d)	Um bei anderen zu übernachten, muss man auch seine eigene Couch anbieten.			
e)	Nur der Gastgeber kann mit dem Couchsurfer Kontakt aufnehmen.			

___/10 P

4. Im Text fehlen vier Sätze. Bitte wählen Sie aus der Tabelle die vier passenden Sätze aus und tragen Sie die Buchstaben A – D in die rechte Spalte ein. Ein Satz passt nicht. Tragen Sie hier ein "X" ein.

Sätze	Textstelle (Buchstabe)
Die Idee zu „CouchSurfing" hatte ein Amerikaner.	
Auch Freunde können bei jemandem auf der Couch schlafen.	
So sieht man viel mehr als der normale Tourist.	
Wichtig ist, sich das Profil des Gastgebers oder des Gasts genau anzuschauen.	
Auch Fotos kann man veröffentlichen.	

___/10 P

5. Beantworten Sie die folgenden Fragen.

a) Welchen finanziellen Vorteil hat das CouchSurfing? (1 P)

_____

b) Was hatte Casey Fenton inspiriert, das CouchSurfing-Netzwerk zu gründen? (2 P)

_____

_____

c) Welche zwei Dinge muss man tun, um Couchsurfer zu werden? (2 P)

_____

_____

d) Welchen Nachteil hat das Couchsurfen? (1 P)

_____

e) Welche zwei positiven Eigenschaften werden beim Couchsurfen unterstützt? (2 P)

_____

_____

___/8 P

Teil 2 – Textproduktion
(40 Punkte)

Sie haben vor kurzem im Fernsehen eine Sendung bzw. im Kino einen Spielfilm gesehen und verfassen nun einen Eintrag in Ihrem **Blog „Filmfreek“**. Beachten Sie dabei die im Unterricht gelernten Regeln zum Verfassen eines Blogeintrags.

Sagen Sie in Ihrem **Blogeintrag** etwas darüber,

- was für ein Typ von Sendung bzw. was für ein Film es war (z.B. Krimi, Show, Serie,…),
- wovon die Sendung bzw. der Film handelte,
- wie Ihnen die Sendung bzw. der Film gefallen hat und warum und
- wem Sie diese Sendung bzw. diesen Film empfehlen würden.

Schreiben Sie 150 - 180 Wörter.

Lösungen

Teil 1 – Leseverständnis
(40 Punkte)

1. **Welche <u>zwei</u> Überschriften passen am besten zum Text? Setzen Sie zwei Kreuze. ☒**

   a) ☐ CouchSurfing - Gefahren und Herausforderungen
   b) ☒ CouchSurfing – zu Gast auf fremden Sofas
   c) ☐ CouchSurfing – billige Schlafplätze in Dörfern
   d) ☐ CouchSurfing – die beliebteste Möglichkeit zu übernachten
   e) ☒ CouchSurfing – eine globale Internetidee

__/4 P

2. **Lesen Sie die Teilüberschriften a) - d) und ordnen Sie sie den Textabschnitten 1 - 4 passend zu. Schreiben Sie die richtige Nummer in die rechte Spalte.**

	Teilüberschriften	Textabschnitte
a)	Schlafplätze auf der ganzen Welt	**2**
b)	Durch Reisen die Welt verändern	**4**
c)	Eine tolle Idee im digitalen Zeitalter	**1**
d)	Profil als Entscheidungshilfe	**3**

__/8 P

3. **Lesen Sie die Aussagen a) – e) und kreuzen Sie bei jeder Aussage an: richtig oder falsch? Geben Sie die Zeile(n) an, wo die Information im Text steht.**

	Aussagen	richtig	falsch	Zeile(n)
0	**CouchSurfing wird weltweit gemacht.**	**x**		**Z. 8**
a)	Couchsurfen kann man nur im Alter von 18 – 24 Jahren.		**x**	**Z. 8-9**
b)	Wenn man Gast oder Gastgeber werden möchte, braucht man einen Internetzugang.	**x**		**Z. 12-13**
c)	Menschen mit detailliertem Profil haben bessere Chancen.	**x**		**Z. 22-23**
d)	Um bei anderen zu übernachten, muss man auch seine eigene Couch anbieten.		**x**	**Z. 24**
e)	Nur der Gastgeber kann mit dem Couchsurfer Kontakt aufnehmen.		**x**	**Z. 29-30**

__/10 P

4. Im Text fehlen vier Sätze. Bitte wählen Sie aus der Tabelle die vier passenden Sätze aus und tragen Sie die Buchstaben A – D in die rechte Spalte ein. Ein Satz passt nicht. Tragen Sie hier ein "X" ein.

Sätze	Textstelle (Buchstabe)
Die Idee zu „CouchSurfing" hatte ein Amerikaner.	**A**
Auch Freunde können bei jemandem auf der Couch schlafen.	**X**
So sieht man viel mehr als der normale Tourist.	**D**
Wichtig ist, sich das Profil des Gastgebers oder des Gasts genau anzuschauen.	**C**
Auch Fotos kann man veröffentlichen.	**B**

__/10 P

5. Beantworten Sie die folgenden Fragen.

a) Welchen finanziellen Vorteil hat das Couchsurfing? (1 P)

Es ist kostenlos.

b) Was hatte Casey Fenton inspiriert, das Couchsurfing-Netzwerk zu gründen? (2 P)

Reise nach Island mit Freunden und dort kostenloses Übernachten bei Studenten auf dem Sofa

c) Welche zwei Dinge muss man tun, um Couchsurfer zu werden? (2 P)

Man muss sich auf der Internetseite "CouchSurfing" registrieren und ein Profil anlegen.

d) Welchen Nachteil hat das Couchsurfen? (1 P)

Es kann gefährlich sein, Menschen bei sich übernachten zu lassen, die man nicht kennt.

e) Welche zwei positiven Eigenschaften werden beim Couchsurfen unterstützt? (2 P)

Couchsurfing fördert Gastfreundschaft und Toleranz.

__/8 P

Teil 2 – Textproduktion
(40 Punkte)

Sie haben vor kurzem im Fernsehen eine Sendung bzw. im Kino einen Spielfilm gesehen und verfassen nun einen Eintrag in Ihrem **Blog „Filmfreek“**. Beachten Sie dabei die im Unterricht gelernten Regeln zum Verfassen eines Blogeintrags.

Sagen Sie in Ihrem **Blogeintrag** etwas darüber,

- was für ein Typ von Sendung bzw. was für ein Film es war (z.B. Krimi, Show, Serie,…),
- wovon die Sendung bzw. der Film handelte,
- wie Ihnen die Sendung bzw. der Film gefallen hat und warum und
- wem Sie diese Sendung bzw. diesen Film empfehlen würden.

Schreiben Sie 150 - 180 Wörter.

1. Inhalt (1-12 Punkte)

- **Erfüllung der Aufgabenstellung (Textsorte erkennbar, alle Inhaltspunkte in angemessenem Umfang berücksichtigt)**
- **Kohärenz/Entwicklung von Gedanken/Ideen**

2. Textgestaltung (1-12 Punkte)

- **Aufbau (Einleitung-Hauptteil-Schluss)**
- **Kohäsion zw. Sätzen und Absätzen**
- **Anwendung der textsorten-spezifischen Merkmale (vgl. Dokument “Textsorten”)**

3. Sprachrichtigkeit (1-12 Punkte)

- **Wortschatz**
- **Rechtschreibung**
- **Grammatik/Syntax**

4. Ausdrucksvermögen (1-4 Punkte)

- **Vielfalt in Wortwahl und Syntax**
- **flüssige Darstellung**

NMS: Use of attainment descriptors in the S5 harmonised exam – Mathematics.

Two pilot exams were written for each level: 4-hour (Annex A) and 6-hour (Annex B); one to be taken without and one with the calculator. A grid or ***assessment matrix*** was developed at the time of preparing the exams, to show the ***competences*** being evaluated by each question or part-question. Care was taken to ensure that all the competences were evaluated in line with the new ***attainment descriptors***. For the purpose of marking the exams, a detailed ***mark scheme*** was also produced.

In December 2017 the exams were taken by some students in Frankfurt, Strasbourg and Brussels 4. Teachers corrected them and assigned grades. The exams were then re-marked by the working group following the detailed mark scheme. Tables were drawn up to show how the marks for each student could be assigned to each competence being assessed (see Annex C). In February the working group reconvened to compare the results and evaluate the outcome of the project. Actual students' exam papers were compared, and the results by question and by competence were analysed. We present the following conclusions.

Competences and the design of the exam

The most important conclusion reached by the working group is that consideration of competences must be done *at the time of preparing the exam*. The first stage of preparation of an exam is to build an assessment matrix. A well-thought out matrix will ensure that the full range of competences is assessed, and appropriate weightings are given to each competence.

Example: Matrix for 6-period exam, showing marks given for each competence in each question:

Paper A									
Question	**Knowledge**	**Comprehension**	**Processes**	**Problem solving**	**Interpretation**	**Communication**	**Linking**	**TOTAL**	
Q1	2	1	7					10	
Q2	2	2		1		3		8	
Q3	2		2					4	
Q4	2		3					5	
Q5	2	1	2		2	3	1	11	
Q6	5	3						8	
	15	7	14	1	2	6	1	46	
Paper B									
Question	**Knowledge**	**Comprehension**	**Processes**	**Problem solving**	**Interpretation**	**Communication**	**Linking**	**TOTAL**	**Technology**
Q1	3		5	2				10	2
Q2			4	2	4	3		13	6
Q3	1		2	1		1		5	1
Q4		4	6					10	
Q5			3	4	1	1		9	2
Q6					4		3	7	1
Q7	3			1	1	3		8	2
	7	4	20	10	10	8	3	62	14
TOTALS:	22	11	34	11	12	14	4	108	14
%	20	10	31	10	11	13	4		13

A matrix can be adjusted as the questions are being written. The percentages in the bottom row show the weighting given to each of the competences, which can also be changed as needed.

The mark scheme

The second stage is to produce a careful, detailed mark scheme. This should avoid big discrepancies in marking and improve harmonisation, according to the expectations of the document: *Harmonised assessment at the end of year 5 and written examinations leading to B marks in year 5* (ref. 2018-01-D-19-en-2).

Example of mark scheme: 6-period exam part B

Partie B - Exercice 3 (9 points)

On considère un triangle ABC tel que AB = 7 cm, AC = 5 cm et $\widehat{\mathrm{ACB}} = 110°$.

Dans cet exercice, les réponses seront données avec une précision d'une décimale.

a) Déterminer les amplitudes des angles $\widehat{\mathrm{ABC}}$ et $\widehat{\mathrm{BAC}}$ puis la longueur BC.

Solution

Dans le triangle ABC, $\dfrac{\sin\widehat{\mathrm{A}}}{\mathrm{BC}} = \dfrac{\sin\widehat{\mathrm{B}}}{\mathrm{AC}} = \dfrac{\sin\widehat{\mathrm{C}}}{\mathrm{AB}}$

soit $\dfrac{\sin\widehat{\mathrm{A}}}{\mathrm{BC}} = \dfrac{\sin\widehat{\mathrm{B}}}{5} = \dfrac{\sin 110}{7}$ ***(Connaissance : 1 point)***

On en déduit $\sin\widehat{\mathrm{B}} = \dfrac{5\sin 110}{7}$ ***(Méthodes : 1 point)***

soit $\sin\widehat{\mathrm{B}} \cong 0{,}671$ et $\widehat{\mathrm{B}} = \sin^{-1}(0{,}671) \cong 42{,}2°$ ***(Technologie (dont arrondi) : 0,5 point)*** : l'angle $\widehat{\mathrm{B}}$ est nécessairement aigu puisque le triangle ABC admet déjà un angle obtus ***(Communication : 0,5 point)***

Puisque $\widehat{\mathrm{A}} + \widehat{\mathrm{B}} + \widehat{\mathrm{C}} = 180°$ ***(Connaissance : 0,5 point)***

on a $\widehat{\mathrm{A}} = 180 - (110 + 42{,}2) = 27{,}8°$ ***(Méthodes : 0,5 point)***

Enfin, puisque $\dfrac{\sin 27{,}8}{\mathrm{BC}} = \dfrac{\sin 110}{7}$ ***(Connaissance : 1 point))***

on a $\mathrm{BC} = \dfrac{7\sin 27{,}8}{\sin 110}$ ***(Méthodes : 0,5 point)***

donc $\mathrm{BC} \cong 3{,}5$ cm (***Technologie (dont arrondi) : 0,5 point)***

Variante

Dans le triangle ABC, $\mathrm{BC}^2 = \mathrm{BA}^2 + \mathrm{CA}^2 - 2 \times \mathrm{BA} \times \mathrm{CA} \times \cos\widehat{\mathrm{A}}$ ***(Connaissance : 1 point)***

soit $\mathrm{BC}^2 = 7^2 + 5^2 - 2 \times 7 \times 5 \times \cos 27{,}8$ ***(Méthodes : 0,5 point)***

donc $\mathrm{BC} \cong 3{,}5$ cm ***(Technologie (dont arrondi) : 0,5 point)***

b) Soit M le milieu de [AB]. Déterminer CM.

Solution

Dans le triangle ACM (par exemple),

$\mathrm{CM}^2 = \mathrm{CA}^2 + \mathrm{MA}^2 - 2 \times \mathrm{CA} \times \mathrm{MA} \times \cos\widehat{\mathrm{A}}$ ***(Connaissance : 1 point)***

D'où $\mathrm{CM}^2 = 5^2 + 3{,}5^2 - 2 \times 5 \times 3{,}5 \times \cos 27{,}8$ ***(Méthodes : 1 point)***

d'où $\mathrm{CM} \cong 2{,}5$ cm ***(Technologie (dont arrondi) : 0,5 point)***

CM désignant une distance, CM est un nombre positif ***(Communication : 0,5 point)***

When designing the mark scheme it is essential to consult the matrix and assign marks to different competences. For example, in part (a) above, *knowledge* of the equation for the sine rule gains one point, correct substitution of values (*process*) gains one point, the final answer from the calculator gains a half point and there is a half point for good *communication*.

There are often alternative approaches to solving a problem, and these should be considered where possible and included in the mark scheme. Teachers may still have to adapt the mark scheme to a different method used by a student, but should recognise how the marks have been assigned to different competences and attempt to retain this distribution. It must be recognised that no mark scheme, however well written, can hope to cover all possible methods or types of response the

students may attempt. Some may use a strategy that was not planned for, and to which the mark scheme cannot be easily adapted. Similarly, a non-response by a student carries the same penalty as an error, which could create a wrong bias for a student who works more slowly than the others and does not complete the test. These may all affect the distribution of marks for the different competences, but having analysed the results of this exercise, the working party feel these consequences are minimal. Most important is to have a good mark scheme.

Significantly, if a good exam is constructed, with appropriately weighted competences and a clear mark scheme, then teachers can mark the exams without needing to refer to the original assessment matrix (see Annex D). The different competences will be assessed as a consequence of the way the exam was built.

In summary, when preparing an important exam such as at the end of S5 (but not necessary for every classroom test), the steps are

- consult the table of competences and attainment descriptors
- build a matrix to show the structure of the exam and the weighting of competences, and adjust this as necessary as questions are being written
- produce a detailed mark scheme, defining how each mark should be assigned

Grades and weighting of competences

For any particular exam the teacher or team of teachers is free to determine where the pass mark should be, based on how students have demonstrated competence. It is the level of competences, not the number of right answers, that is important. In the attainment descriptors it is specified what levels of competence correspond to a 5, which is the minimum passing grade. This means that in theory a 5 could be given for 30% on one test, and for 70% on a different, more difficult test.

However, we have to recognise that the students and their parents will expect that 50% equals a 5, which is the new minimum passing grade. In an ideal world we would like to get away from defining 60% in the exam as a 6, 70% as a 7 and so on. However, it will be very hard to explain this to a parent of a student who, for example, is given 6 when he had 80% of the marks!

For an important (harmonised) exam we recommend that the exam is designed so that the numerical score obtained matches the corresponding competence levels. This is why it is essential to produce such a detailed matrix.

Consider a student in S5 who achieves the minimum level. The new attainment descriptors describe him as follows: (see document “Attainment descriptors - Mathematics 4P and 6P - S4 - S5” (ref. 2016-09-D-44-en-3))

Demonstrates satisfactory knowledge of most areas of the syllabus; understands the meaning of straightforward mathematical terms, symbols, processes and principles, but misses the deeper concepts; attempts to carry out mathematical processes in straightforward contexts; translates routine problems into mathematical symbols and attempts to reason to a result; attempts to draw conclusions from information and shows limited understanding of the reasonableness of results; generally presents reasoning and results adequately using some mathematical terminology and notation; applies basic concepts in familiar situations; uses technology satisfactorily in straightforward situations.

This student has basic knowledge but little ability to apply it, except in routine ways already practiced in the classroom. Thus, ideally an exam should have enough straightforward content that s/he has a good chance of passing, but not of achieving high marks. With a minimum passing grade of 5, this means assigning 50% of the marks to work that demonstrates the knowledge, comprehension and processes required to pass the course, with problems that are strictly routine and familiar, having been practiced in the classroom.

The rest of the exam will graduate in difficulty and require students to demonstrate skills of solving different and increasingly complex problems, so that only those who can, in increasing measure, apply their knowledge to new situations (problem solving), draw meaning from a result (interpretation), discuss or explain the meaning of their answers (communication) and make connections across different subject areas (linking) will achieve the higher grades.

It should be recognised that there will always be a degree of subjectivity in assigning grades and interpreting the descriptors. We noted differences in interpretation even amongst the team running the pilot. It is a good idea to have a colleague who has not seen the exam work through it and comment on what s/he would expect an average / good / excellent student to be able to achieve.

In summary, a good *important (harmonised)* exam

- will test the full range of competences. We suggest each should weight 10-20% of the exam, except for linking, which will usually be less, particularly for the weaker (4 period course in S5, 3 period course in S6-S7) classes
- will assign roughly 50% of the marks to work which is accessible to all students with sufficient competences to pass the course. The other 50% will be assigned to work of increasing complexity
- should ideally be checked, for the content and the translation if there is one, by a colleague who is not part of the team

Use of the matrix and attainment descriptors

We recognise that it is far too arduous to produce such a detailed matrix (see Annex C) on a regular basis for classroom assignments and short tests, especially if further refinement is expected in order to distinguish the cases of 'reproduction', 'production' and 'transfer' (see Annex E).

The attainment descriptors are firstly a tool in the forward planning process. As teachers design tasks to develop the skills they describe, they will naturally find ways of assessing them. The descriptors will provide a reference for teachers throughout the year when they are designing an assessment task. They can also be a useful tool for self-assessment by the students. Each of the competences should be assessed at least once per semester, and the levels achieved communicated to the students so that they know their individual strengths and weaknesses. This does not always have to be in the context of an exam. Some competences, for example the use of technology, are difficult to assess on a traditional exam, and it may be more appropriate to assess these through other means, such as a written report or oral presentation of an individual or group exploration.

Systematic use of the competence matrix in every test is clearly impossible, but for important exams such as the harmonised exam at the end of S5, the full procedure involving a matrix and a mark scheme is strongly recommended.

A valuable experience during training is for teams of teachers work together across language sections to write an assignment with a competence-based matrix. After marking students' work they should meet again to discuss how well the test assessed the competences it was intended to. This will give teachers a 'feel' for the kind of assessment they need to write in any instance. For example, they will recognise if they have not been used to assessing communication, or if they typically avoid non-routine problems, and will be encouraged to include them in future.

Naturally the descriptors will never perfectly describe every situation. Many descriptors include the words 'consistently', 'sometimes', 'in most areas of the syllabus', and obviously these can only fully apply over a range of questions and over an extended time period. The hope is that over the year or in a complete exam it will be possible to see if a student is performing consistently at a given level.

A concern, frequently expressed by parents and teachers, is about how the new grades will be interpreted. In order not to compromise standards, a 'new 5' should mean the same as an 'old 6'. If the move from content-based to competence-based teaching and assessment is successful, then the 'new 5' will in fact mean something quite different from the 'old 6', and similarly for the other grades. The new marking scheme requires teachers to assess a broader range of skills. One of the pilot studies showed a significant drop in grades when the new system was applied (see Annex F) and so care must be taken to phase in the new examining along with a new approach to preparing the students in the classroom.

Annex A: Maths 4 (Group 1 and 2)

The S5 Maths 4 exam (here in French) used, at least partly, in the German, English and French sections of the schools of Frankfurt and Strasbourg.

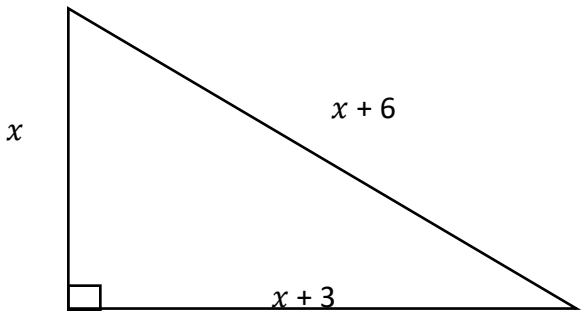
Partie A - Exercice 1 (11 points)

a) Compléter les égalités suivantes. **1)** $144 = \ldots\ldots^2$ **2)** $(-1)^{2017} = \ldots$ **3)** $2018^0 = \ldots$ **4)** $36^{1/2} = \ldots$ **5)** $3 - 3^{-1} = \ldots$	…/5
b) Simplifier l'expression $\dfrac{(ab)^3 \times (a^5)^3}{a^{-4} \times b^9}$.	…/4
c) La masse de la Terre est estimée à 5 972 200 000 000 000 000 000 000 kg. Ecrire ce nombre sous forme scientifique : …	…/2

Partie A - Exercice 2 (6 points)

On considère les fonctions f et g définies par $f(x) = 4x^2 - 7x + 11$ et $g(x) = -7x + 23$. Déterminer les coordonnées des points d'intersection des courbes représentatives des fonctions f et g.	…/6

Partie A - Exercice 3 (8 points)

Un triangle rectangle a pour dimensions x, $x + 3$ et $x + 6$:  *Attention : la figure n'est pas à l'échelle* **a)** Justifier que x est solution de l'équation $x^2 - 6x - 27 = 0$. **b)** En déduire la valeur de l'hypoténuse du triangle.	…/4 …/4

Partie A - Exercice 4 (6 points)

On donne les tableaux de valeurs suivants :

I	n	0	1	2	3	4
	$A(n)$	29	25	21	17	13

II	n	0	1	2	3	4
	$B(n)$	0	30	60	120	180

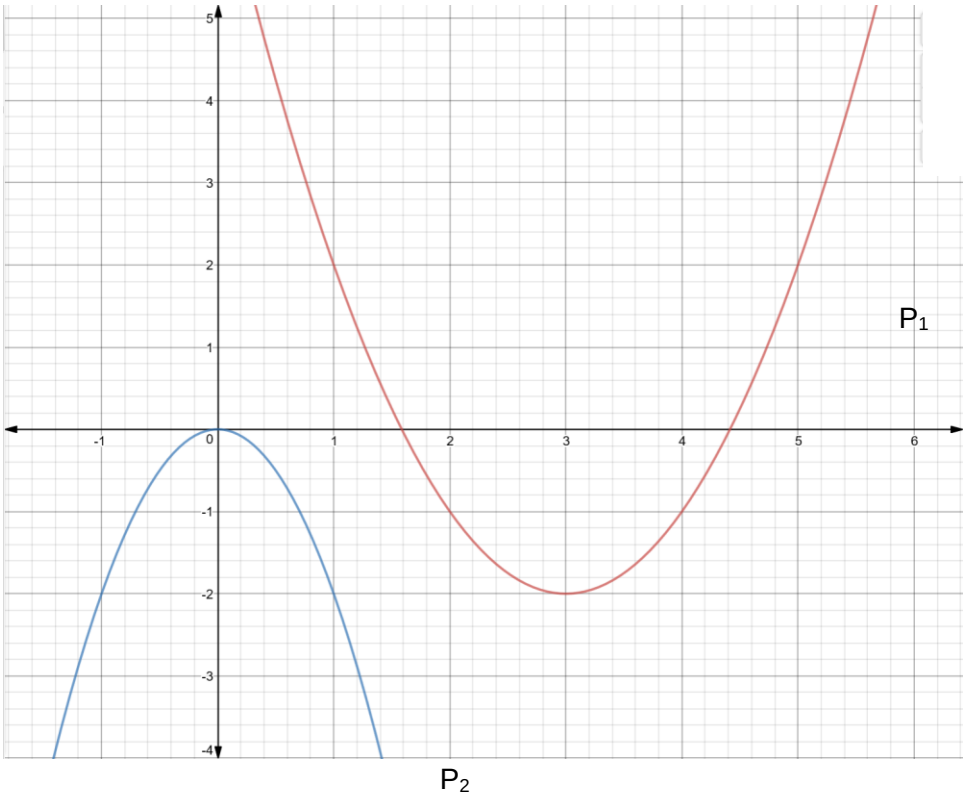
III	n	0	1	2	3	4
	$C(n)$	3	12	48	192	768

Indiquer, en justifiant la réponse, si les grandeurs A, B et C suivent une croissance linéaire, exponentielle ou ni l'une, ni l'autre.

…/6

Partie A - Exercice 5 (4 points)

Donner la forme $y = a(x - b)^2 + c$ de l'équation correspondant à chacune des paraboles P_1 et P_2 ci-dessous.



P_1 : …

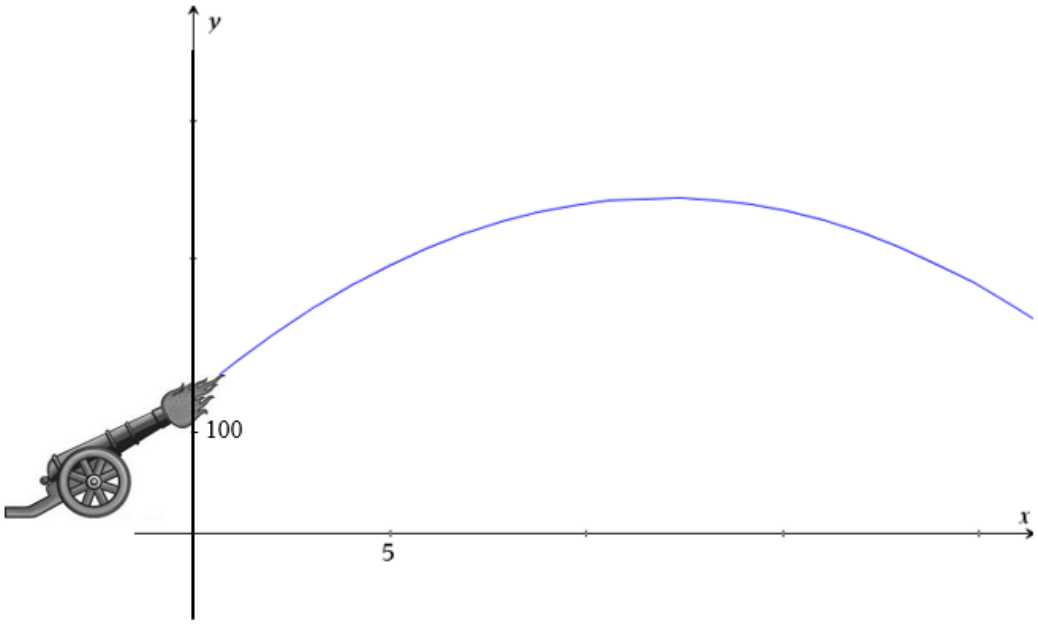
P_2 : …

…/4

Partie B - Exercice 1 (20 points)

Un canon est mis en place sur un terrain plat à 100 mètres au-dessus du sol (voir figure (les distance sont donnés en mètres)). Il lance des projectiles vers la droite. La résistance de l´air étant négligée, un calcul physique établit que la trajectoire de chacun de ses projectiles est donnée par une fonction du type

$$f(x) = ax^2 + bx + c.$$



a) On suppose que le canon lance un projectile avec une trajectoire définie par $f(x) = -(x - 12)^2 + 244$.

1) Le point de coordonnées (7 ; 220) appartient-il à la courbe représentative de f ? Justifier la réponse. .../2

2) En détaillant vos calculs, déterminer la forme $ax^2 + bx + c$ de la fonction f. .../2

3) Quelle est la hauteur maximale atteinte par le projectile ? .../2

4) A quelle distance du canon le projectile retombe-t-il sur le sol ? (Arrondir au mètre près). .../4

b) On suppose maintenant que le canon lance un projectile avec une trajectoire définie par $f(x) = ax^2 + bx + c$.

1) Expliquer pourquoi on a obligatoirement $c = 100$. .../2

2) Que pouvez-vous dire du signe de a ? .../2

3) Que pouvez-vous dire du signe du discriminant de $ax^2 + bx + c$? .../2

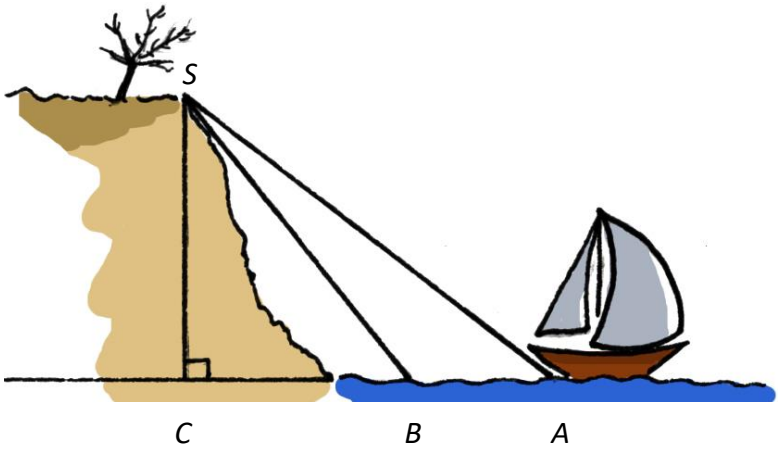
4) Si $a = -2$ et $c = 100$, quelle doit être la valeur de b pour que le projectile tombe au sol au point de coordonnés $A(40 ; 0)$? .../4

Partie B - Exercice 2 (8 points)

Charlotte fait de la voile à proximité d'une falaise. Pour des raisons de sécurité, elle ne peut pas approcher cette falaise et doit rester en mer au-delà du point *B*. Elle jette donc l'ancre au point *A*.

On sait que :

- la falaise a une hauteur de 100 mètres ;
- l'angle $\widehat{CAS}$ mesure 62° ;
- l'angle $\widehat{CBS}$ mesure 71°.



a) Calculer la distance *BC*. (Arrondir la distance au dixième de mètre près.) …/4

b) Déterminer la distance séparant le bateau du point *B*. …/4

Partie B - Exercice 3 (8 points)

Le jour $j = 0$, on introduit 500 bactéries dans une boîte de Pétri.
On suppose que le nombre de bactéries, après n jours, est égal à $500 \times 1{,}8^n$.

a) Quel est le pourcentage d'augmentation par jour du nombre de bactéries ? …/2

b) Compléter le tableau suivant à l'aide de votre calculatrice.

n jours	0	1	2	3	4	5
nombre de bactéries (arrondir à l'entier le plus proche)						

…/3

c) Quel sera le nombre de bactéries le $10^{ème}$ jour ? (Arrondir à l'entier le plus proche). …/1

d) Au cours de quelle journée le nombre de bactéries aura-t-il été multiplié par 25 ? …/2

Partie B - Exercice 4 (9 points)

On admet que : • la lumière émise par le Soleil met 8 minutes pour atteindre la Terre ; • la vitesse de la lumière dans le vide est égale à 300 000 km/s.	
a) Indiquer sous forme scientifique la vitesse de la lumière en m/s.	…/2
b) Déterminer la distance, exprimée en mètres et sous forme scientifique, séparant le Soleil de la Terre.	…/5
c) En réalité, le temps mis par la lumière émise par le Soleil pour atteindre la Terre est légèrement supérieur à 8 minutes. Que peut-on en déduire relativement à la distance réelle séparant le Soleil de la Terre par rapport à la distance indiquée à la question **b)** ?	…/2

Annex B: Maths 6 (Group 3)

The S5 Maths 6 exam (here in French) used, at least partly, in the German, English and French sections of the schools of Frankfurt and Strasbourg.

Partie A - Exercice 1 (8 points)

a) Simplifier les nombres suivants.	
1) 2^{-5} =	…/1
2) $\sqrt[3]{64}$ =	…/1
3) $16^{\frac{1}{2}}$ =	…/1
4) $16^{-\frac{3}{2}}$ =	…/1
b) Simplifier chaque expression sous la forme kx^n où k et n désignent deux nombres.	
1) $\dfrac{4x^5 \times 3x^{-3}}{2x^3}$	…/2
2) $(-2x)^3 \times 5x^{\frac{1}{2}}$	…/2

Partie A - Exercice 2 (9 points)

a) Calculer le nombre $\lvert 2+8\rvert - \lvert -7\rvert$. $\lvert 2+8\rvert - \lvert -7\rvert$ =	…/1
b) Résoudre l'inéquation $\lvert 7-2x\rvert - 9 < 0$ et représenter les solutions sur la droite réelle ci-dessous fournie.	…/5

Partie A - Exercice 3 (8 points)

a) Résoudre l'équation $\dfrac{2x^2+9x-1}{x+2}=x-3$ et donner les solutions sous la forme $a+b\sqrt{c}$.	…/4
b) Résoudre l'inéquation $x^2-x-2\leq 0$.	…/4

Partie A - Exercice 4 (4 points)

a) Convertir en radians les mesures en degrés des angles suivants. 15° = rad 120° = rad	…/2
b) Convertir en degrés les mesures en radians des angles suivants. $\dfrac{\pi}{4}$ rad = ° $\dfrac{7\pi}{6}$ rad = °	…/2

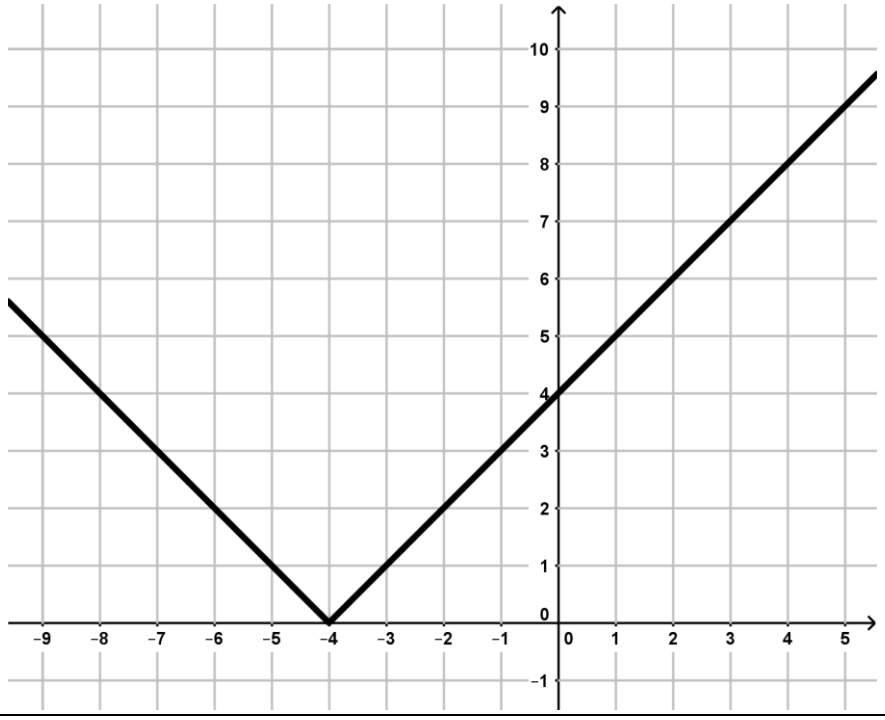
Partie A - Exercice 5 (4 points)

Résoudre les équations trigonométriques suivantes pour $0\leq x\leq 2\pi$. **a)** $\sin x=\dfrac{\sqrt{3}}{2}$	…/2
b) $\tan x=\dfrac{\sqrt{3}}{3}$	…/2

Partie A - Exercice 6 (2 points)

Indiquer laquelle des fonctions proposées correspond au tracé fourni :

$f(x)=|x-4|$ $g(x)=|x|+4$ $h(x)=|x+4|$ $k(x)=|2x-4|$



…/2

Partie A - Exercice 7 (5 points)

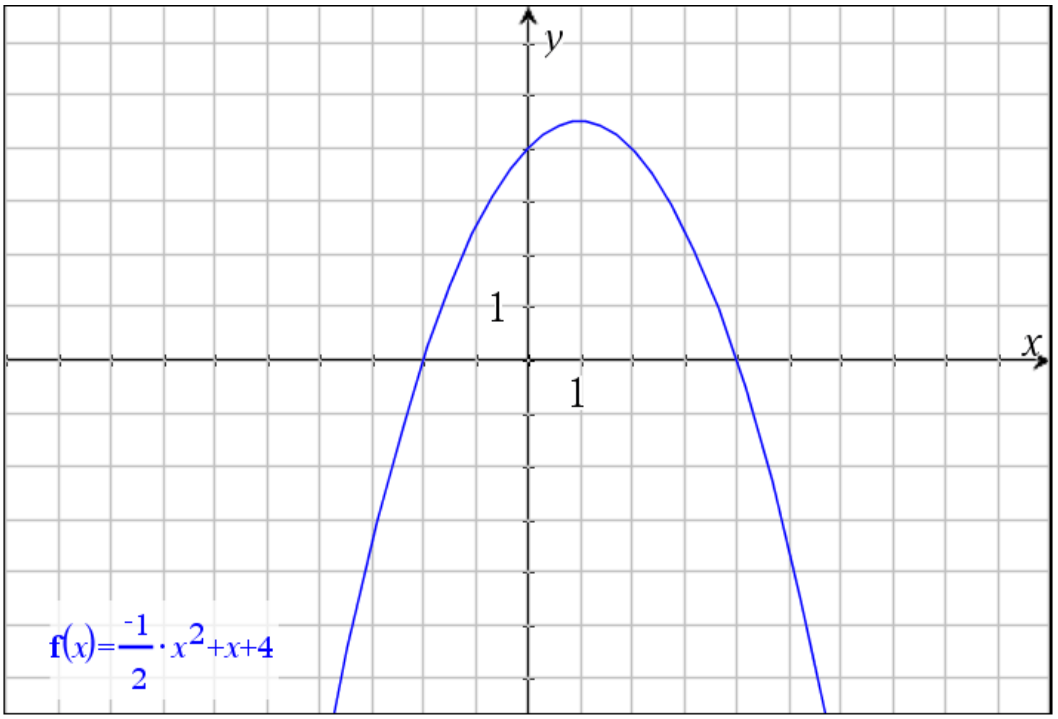
Résoudre l'équation $x^4 - 2x^2 - 8 = 0$.	…/5

Partie B - Exercice 1 (12 points)

On considère les fonctions f et g définies par :

$$f(x) = -\frac{1}{2}x^2 + x + 4 \quad \text{et} \quad g(x) = \frac{1}{2}|x-2| + 2\,.$$

a) On donne ci-dessous la parabole représentative P de la fonction f.



Lire sur le graphique :

1) les coordonnées du sommet de P : …/1

2) une équation de l'axe de symétrie de P : …/1

3) les zéros de la fonction f : …/1

4) les coordonnées du point d'intersection de P avec l'axe des ordonnées : …/1

b) Exprimer g sans valeur absolue en complétant le « schéma » suivant.

$$g(x) = \begin{cases} \text{si} \quad x \\ \\ \text{si} \quad x \end{cases}$$ …/2

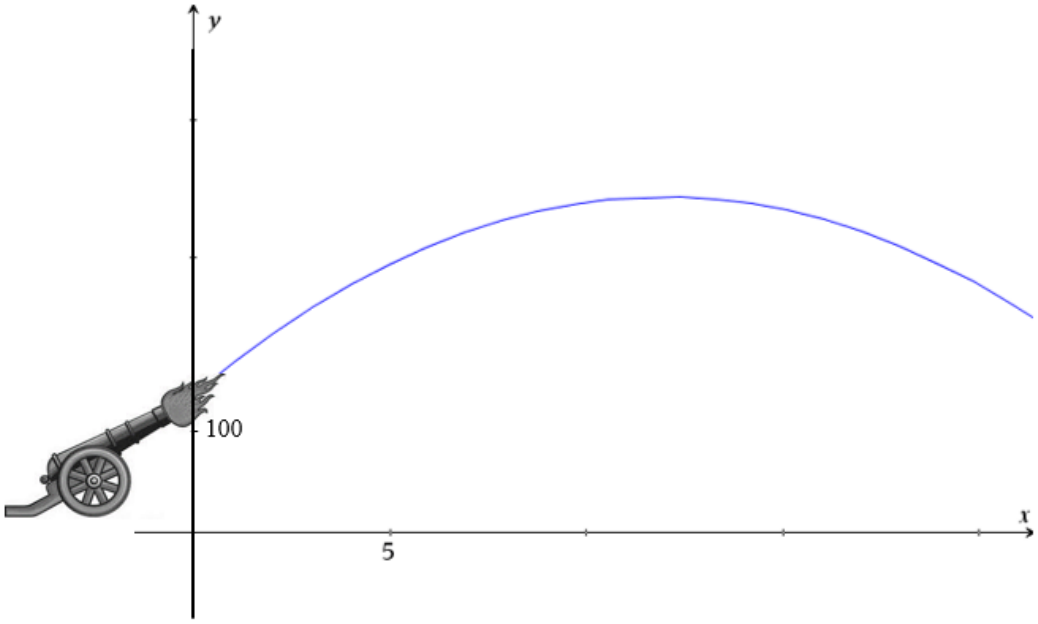
c) Compléter le tracé ci-contre par celui de la courbe représentative de la fonction g. …/2

d) Déterminer avec la calculatrice les coordonnées exactes des points d'intersection des deux courbes. …/2

e) En déduire l'ensemble des solutions de l'inéquation $f(x) \leq g(x)$. …/2

Partie B - Exercice 2 (14 points)

Un canon lance des projectiles depuis une falaise située à 100 mètres au-dessus du sol (voir figure − les distances sont données en mètres). La résistance de l´air étant négligée, un calcul physique établit que la trajectoire de chacun de ses projectiles est donnée par une fonction du type $f(x) = ax^2 + bx + c$.



a) On suppose que le canon lance un projectile avec une trajectoire définie par $f(x) = -x^2 + 24x + 100$.

1) Déterminer la forme canonique de la fonction f. …/2

2) Quelle est la hauteur maximale atteinte par le projectile ? …/2

3) A quelle distance du pied de la falaise le projectile retombe-t-il sur le sol ? (Arrondir au mètre près). …/2

b) On suppose maintenant que le canon lance un projectile avec une trajectoire définie par $f(x) = ax^2 + bx + c$.

1) Expliquer pourquoi on a obligatoirement $c = 100$. …/2

2) Que pouvez-vous dire du signe de a ? Justifier votre réponse. …/2

3) Que pouvez-vous dire du signe du discriminant de $ax^2 + bx + c$? Justifier votre réponse. …/2

4) Si $a = -2$ et $c = 100$, quelle doit être la valeur de b pour que le projectile tombe au sol au point de coordonnés $A(40 ; 0)$? …/2

Partie B - Exercice 3 (9 points)

On considère un triangle ABC tel que $AB = 7$ cm, $AC = 5$ cm et $\widehat{ACB} = 110°$.

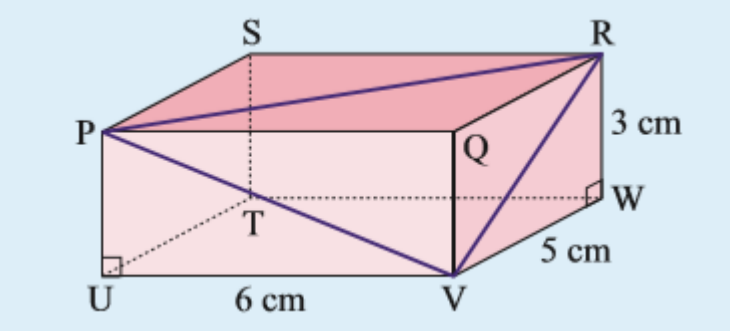
Dans cet exercice, les réponses seront données avec une précision d'une décimale.

5) Déterminer les amplitudes des angles $\widehat{ABC}$ et $\widehat{BAC}$ puis la longueur BC. …/6

6) Soit M le milieu de $[AB]$. Déterminer CM. …/3

Partie B - Exercice 4 (10 points)

On considère le pave droit ci-dessous représenté en perspective cavalière :



On admet que $RV = \sqrt{34}$ cm.

a) Etablir, en justifiant votre raisonnement, que $PV = 3\sqrt{5}$ cm. …/2

b) Calculer la valeur exacte de la longueur *PR*. …/2

c) Le triangle *PRV* est-il rectangle en *V* ? Justifier la réponse. …/2

d) Déterminer la mesure de l'angle $\widehat{RPV}$ (donner la valeur approchée à 0,1° près). …/2

e) Déterminer l'aire du triangle *PRV* (donner sa valeur approchée au mm^2 près). …/2

Partie B - Exercice 5 (10 points)

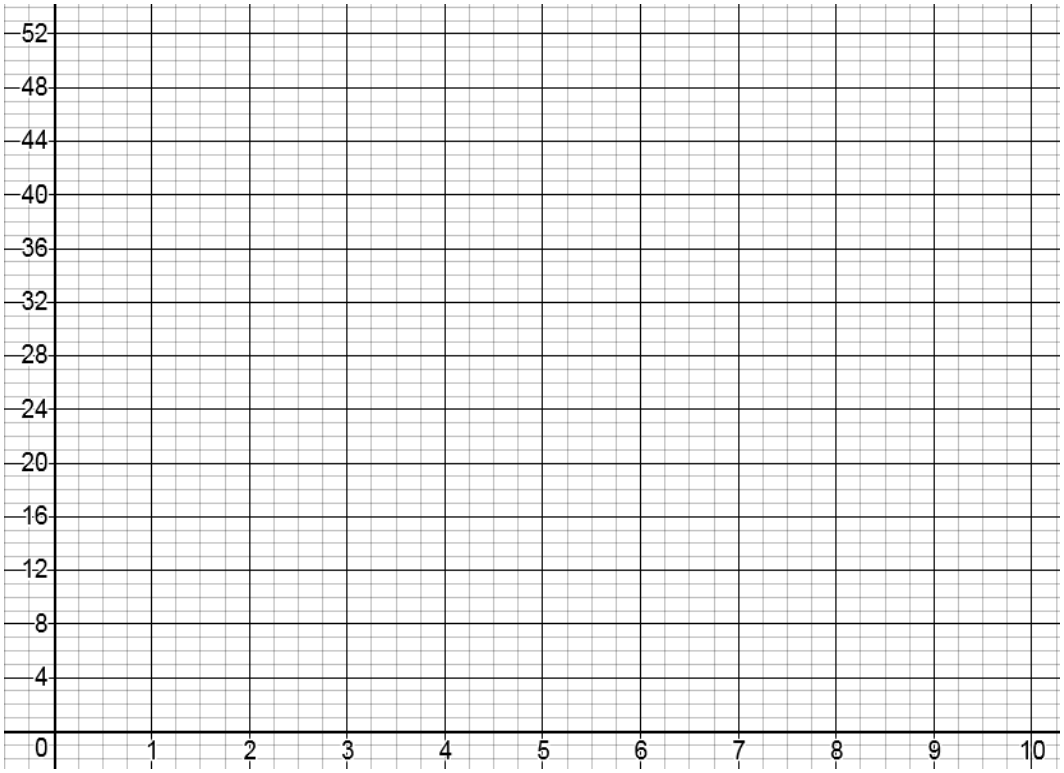
A des fins de préservation et de protection d'une espèce de tigre en voie de disparition, on introduit en 2015 quatre couples de tigres dans une réserve naturelle. Les conditions étant très favorables, on espère une croissance de la population de 20% par année.
On note $T(n)$ la population de tigres au bout de n années.

a) Préciser le nombre de tigres introduits dans la réserve naturelle. …/1

b) Indiquer la formule permettant de calculer $T(n)$ en fonction de n. …/2

c) Calculer la population de tigres au bout de 5 années (arrondir à l'entier le plus proche). …/1

d) Représenter $T(n)$ au cours des dix premières années (arrondir chaque valeur à l'entier le plus proche).



…/3

e) Calculer la population de tigres en 2030 (arrondir à l'entier le plus proche). …/1

f) Au cours de quelle année la population atteindra-t-elle 250 individus ? …/2

Partie B - Exercice 6 (5 points)

Un rectangle a pour aire 2000 cm^2 et pour périmètre 180 cm.
Déterminer la longueur et la largeur de ce rectangle. …/5

Annex C: Maths 4 (Group 1 and 2)

Groupe 1	Total des points des questions retenues pour la comparaison	1ère correction **avec** grille détaillée de correction, notes…		2ème correction **avec** grille détaillée de correction, notes…		Différence des notes des 2ème et 1ère corrections		
		en points	en poucentages des points de l'examen	en points	en poucentages des points de l'examen	en points	en poucentages des points de l'examen	en poucentages des points attribués
Elève n°1	80	49	61,3%	48,5	60,6%	-0,5	-0,6%	-1,0%
Elève n°2	80	62,5	78,1%	61,5	76,9%	-1	-1,3%	-1,6%
Elève n°3	80	27,5	34,4%	25,5	31,9%	-2	-2,5%	-7,3%
Elève n°4	80	72	90,0%	69,5	86,9%	-2,5	-3,1%	-3,5%
Elève n°5	80	36	45,0%	32	40,0%	-4	-5,0%	-11,1%
Elève n°6	80	41	51,3%	36,5	45,6%	-4,5	-5,6%	-11,0%

Groupe 2	Total des points des questions retenues pour la comparaison	1ère correction **sans** grille détaillée de correction, notes…		2ème correction **avec** grille détaillée de correction, notes…		Différence des notes des 2ème et 1ère corrections		
		en points	en poucentages des points de l'examen	en points	en poucentages des points de l'examen	en points	en poucentages des points de l'examen	en poucentages des points attribués
Elève n°7	39	31,5	80,8%	34	87,2%	2,5	6,4%	7,9%
Elève n°8	39	20,5	52,6%	21,5	55,1%	1	2,6%	4,9%
Elève n°9	39	25	64,1%	23,5	60,3%	-1,5	-3,8%	-6,0%
Elève n°10	39	22	56,4%	21	53,8%	-1	-2,6%	-4,5%
Elève n°11	39	18,5	47,4%	14,5	37,2%	-4	-10,3%	-21,6%
Elève n°12	39	28	71,8%	21	53,8%	-7	-17,9%	-25,0%

Annex D: Maths 4 Group 1

Examples of students' work (Part B - Question 1), short analysis of their answers and corresponding detailed competences based marking grids used by the teachers of one school and by the pilot group to re-mark the students' work.

Elève DE – Teil B – Aufgabe 1

a) Es wird angenommen, dass diese Geschossbahn durch die folgende Funktionsgleichung beschrieben werden kann : $f(x) = -(x-12)^2 + 244$.

1) Liegt der Punkt P(7 |220) auf der Kurve, die durch die Funktion f beschrieben wird ? Begründe Deine Antwort.

Einsetzen: $y = -(7-12)^2 + 244 = 219$ TR

Nein, tut es nicht, da die y-Koordinate die zu der x-Koordinate 7 gehört 219 und nicht 220 ist. ✓

2) Gebe die Funktion f in der folgenden Form $ax^2 + bx + c$ an.

$y = -(x-12)^2 + 244$

$= -x^2 + 24x - 144 + 244$

$= -x^2 + 24x + 388$ 100

3) Welche maximale Höhe wird durch das Geschoss erreicht ?

→ Scheitelform Aufgabe a)

Scheitelpunkt (12|244) ✓

4) Wann erreicht das Geschoss den Boden ? (Auf Meter genau runden).

→ abc-Formel (TR)

$(x_1 = -35)$ $x_2 = 11,1$ ✓

b) Es wird nun angenommen, dass diese Geschossbahn mit folgende allgemeine Funktionsgleichung beschrieben werden kann : $f(x) = ax^2 + bx + c$.

1) Begründe, warum $c = 100$ sein muss.

Weil das der Schnittpunkt der Parabel mit der y-Achse ist. ✗

(ist komisch weil $(-12)^2 = +144$ und nicht -144. Wenn man das mit 244 addiert kommt 388 raus. Da verstehe ich etwas nicht.) FT

2) Welche Aussage kannst Du über den Parameter a machen ?

Er ist -1 also gibt es der Parabel ihren Wert. Hier ist sie nach unten geöffnet und in der Normalform.

3) Was kannst Du über den Diskriminanten von $ax^2 + bx + c$ sagen?

Er ist positiv da es 2 Lösungen gibt. (Bei Anwendung der abc-Formel)

4) Angenommen die Parameter a und c seien $a = -2$ und $c = 100$. Welchen Wert muss b annehmen, damit das Geschoss den Boden im Punkt A (40|0) trifft ?

$b^2 - 4 \cdot (-2) \cdot 100 \mid -b^2$ Ansatz nicht richtig

$b^2 = (-4) \cdot (-2) \cdot 100 = 800 \Rightarrow b = \sqrt{800} = 28,28$

a) 1) Bonne compréhension de la problématique et bonne utilisation de la calculatrice.

2) Mauvais développement mais la réduction est cohérente avec l'étape intermédiaire proposée.

3) Interprétation correcte.

4) La référence à l'abc-Formel laisse à penser que le problème est bien analysé. Par contre les valeurs annoncées sont inexplicables (erreur de saisie à la calculatrice ? non utilisation de la fonction « solve » ?)

b) 1) Bonne analyse de l'élève qui observe bien qu'il y a souci avec les valeurs obtenues dans une question précédente.

2) Bonne analyse quant au signe mais l'annonce d'une valeur précise est hors sujet.

3) Réponse correcte.

4) Mauvaise traduction du problème en termes mathématiques.

Examen S5MA4	Elève n°2 (DE)	Compétences																2nde correction avec grille de descripteurs		
	Question	Connaissance		Compréhension		Méthodes		Résolution de problèmes		Interprétation		Communication		Liens		Technologie		Elève	Sujet	% (*)
Sans calculatrice	1a)	3	3	1	2													4	5	6%
	1b)			2	2	2	2											4	4	5%
	1c)			2	2													2	2	3%
	2	0	2			2	4											2	6	8%
	3a)					0	2	0	2									0	4	5%
	3b)					2	2			1	1			1	1			4	4	5%
	4									3	3	3	3					6	6	8%
	5	2	2	1	2													3	4	5%
Avec calculatrice	1a)1)			1	1											1	1	2	2	3%
	1a)2)					1	2											1	2	3%
	1a)3)									2	2							2	2	3%
	1a)4)							1	2	1	1					0	1	2	4	5%
	1b)1)									0	1	1	1					1	2	3%
	1b)2)	1	1									1	1					2	2	3%
	1b)3)	1	1									1	1					2	2	3%
	1b)4)					0	3									0	1	0	4	5%
	2a)	1	1					2	2							1	1	4	4	5%
	2b)	1	1					2	2							1	1	4	4	5%
	3a)	2	2															2	2	3%
	3b)															2,5	3	2,5	3	4%
	3c)															1	1	1	1	1%
	3d)									1	1					1	1	2	2	3%
	4a)			2	2													2	2	3%
	4b)	2	2	1	1	1	1									1	1	5	5	6%
	4c)									1	1	1	1					2	2	3%
	Totaux	13	15	10	12	8	16	5	8	9	10	7	7	1	1	8,5	11	61,5	80	100%
	% (**)/(***)	87%	19%	83%	15%	50%	20%	63%	10%	90%	13%	100%	9%	100%	1%	77%	14%	77%	100%	

(*) : de la question par rapport à l'ensemble des questions

(**) : pourcentage par rapport au descripteur

(***) : pourcentage de l'évaluation

Elève EN – Part B – Exercise 1

a) Assuming that the cannon fires a projectile with a trajectory defined by $f(x) = -(x-12)^2 + 244$ answer the following questions.

1) Does the point with coordinates (7; 220) belong to the curve of the function f? Justify your answer.

$220 \neq -(7-12)^2 + 244$

Yes the point with the coordinates 7; 220 belongs to the curve ✓

2) Write the function f in the form of $f(x) = ax^2 + bx + c$.

$f(x) = -x^2 - 24x + 144 + 244$ ✓

$f(x) = -x^2 - 24x + 388$

3) What is the maximum height reached by the projectile?

the maximum height would be 244 according to the calculator ✓

graph + sketch graph - Analyse graph - maximum

4) How far from the cannon does the projectile fall to the ground? (Round to the nearest meter.)

the projectile would fall 28m from the cannon. ✓

graph - sketch - Analyse graph - zeros

b) It is now assumed that the cannon fires a projectile with a trajectory defined by $f(x) = ax^2 + bx + c$.

1) Explain why it is necessary that $c = 100$.

it is necessary for c to be because it is the inicial starting point. because it also is the point were the parabola crosses the y-axis so (0, c) is the y-intercept ✓

2) What can you say about the sign of a?

a has to be negative because the projectile is going to fall somewhere in the x axis. So the shape as to be ∩. ✓

3) What can you say about the sign of the discriminant of $ax^2 + bx + c$?

as the projectile started on the x-axis and as to land somewhere in the x-axis as I said before, the discriminant cannot be negative because that would mean that there is no real solution or equal to zero because that would mean only on solution.

4) If $a = -2$ and $c = 100$, what should be the value of b so that the projectile hits the ground at the point $A(40\ ;\ 0)$?

$0 = -2 \cdot 40 + b \cdot 40 + 100$ $b = -0.5$ ✓

for the projectile to hit the ground at the point A, b would have to be -0.5.

a) 1) Réponse erronée mais cohérente avec le calcul (l'égalité) présenté.

2) Mauvais développement mais la réduction est cohérente avec l'étape intermédiaire proposée.

3) La réponse s'écarte de celle attendue lors de la conception du sujet. Mais s'agissant d'une question de la partie avec support technologique, elle est validée. (Les indications sur les fonctions utilisées ne sont pas une preuve en soi.)

4) La formulation de la question étant telle qu'on ne demande pas de justification de la réponse, celle proposée est jugée recevable. (Le même commentaire que précédemment s'applique ici.)

b) 1) Réponse correcte.

2) Réponse correcte.

3) Réponse correcte.

4) Un oubli du carré conduit à une réponse erronée mais la situation est bien analysée et la méthode employée correcte. Aucune information sur la résolution de l'équation obtenue. Le point prévu pour l'utilisation de la technologie est attribué sans savoir véritablement si l'élève y a recouru.

Examen S5MA4	Elève n°4 (EN)	Compétences																2nde correction avec grille de descripteurs		
	Question	Connaissance		Compréhension		Méthodes		Résolution de problèmes		Interprétation		Communication		Liens		Technologie		Elève	Sujet	% (*)
Sans calculatrice	1a)	3	3	2	2													5	5	6%
	1b)			2	2	2	2											4	4	5%
	1c)			2	2													2	2	3%
	2	1	2			2	4											3	6	8%
	3a)					2	2	2	2									4	4	5%
	3b)					2	2			1	1			1	1			4	4	5%
	4									3	3	2,5	3					5,5	6	8%
	5	2	2	1,5	2													3,5	4	5%
Avec calculatrice	1a)1)			1	1											0	1	1	2	3%
	1a)2)					1	2											1	2	3%
	1a)3)									2	2							2	2	3%
	1a)4)							2	2	1	1					1	1	4	4	5%
	1b)1)									1	1	1	1					2	2	3%
	1b)2)	1	1									1	1					2	2	3%
	1b)3)	1	1									1	1					2	2	3%
	1b)4)					2	3									1	1	3	4	5%
	2a)	1	1					2	2							1	1	4	4	5%
	2b)	1	1					2	2							1	1	4	4	5%
	3a)	0	2															0	2	3%
	3b)															2,5	3	2,5	3	4%
	3c)															1	1	1	1	1%
	3d)									1	1					1	1	2	2	3%
	4a)			2	2													2	2	3%
	4b)	2	2	1	1	1	1										1	4	5	6%
	4c)									1	1	1	1					2	2	3%
	Totaux	12	15	11,5	12	12	16	8	8	10	10	6,5	7	1	1	8,5	11	69,5	80	100%
	% (**)/(***)	80%	19%	96%	15%	75%	20%	100%	10%	100%	13%	93%	9%	100%	1%	77%	14%	87%	100%	

(*) : de la question par rapport à l'ensemble des questions

(**) : pourcentage par rapport au descripteur

(***) : pourcentage de l'évaluation

Elève FR – Partie B – Exercice 1

a) On suppose que le canon lance un projectile avec une trajectoire définie par :

$$f(x) = -(x-12)^2 + 244$$

1) Le point de coordonnées (7 ; 220) appartient-il à la courbe représentative de f ? Justifier la réponse.

Oui le point de ~~coordonnées~~ données (7; 220) est sur la courbe de f.

2) En détaillant vos calculs, déterminer la forme $ax^2 + bx + c$ de la fonction f.

$F(x) = -(x-12)^2 + 244$
$= -x^2 - 24x - 12^2 + 244$
$= -x^2 - 24x - 144 + 244$
$= -x^2 - 24x + 100$
$=$

3) Quelle est la hauteur maximale atteinte par le projectile ?

S(12; 244) car b et c sont les coordonnée du sommet.
b = 12 et c = 244.

4) A quelle distance du canon le projectile retombe-t-il sur le sol ? (Arrondir au mètre près).

Il retombe au bout de ~~30~~ mètre

b) On suppose maintenant que le canon lance un projectile avec une trajectoire définie par $f(x) = ax^2 + bx + c$.

1) Expliquer pourquoi on a obligatoirement $c = 100$.

c est egal à 100 car c est le ~~nombre~~ coordonné de l'axe y. Pour en deduire le sommet de la parabole.

2) Que pouvez-vous dire du signe de a ?

a est le coordonné de l'axe x. Pour en déduire le sommet de la parabole

3) Que pouvez-vous dire du signe du discriminant de $ax^2 + bx + c$? Justifier.

Le discriminant de ax^2+bx+c est a. Car "a" nous dit si la courbe est normale x^2 ou plus large ou plus mince.

4) Si $a = -2$ et $c = 100$, quelle doit être la valeur de b pour que le projectile tombe au sol au point de coordonnés $A(40\ ;\ 0)$?

$= -2x^2 + bx + 100$

$= -2x^2 + 1x + 100$

$b = 1$

a) 1) Réponse erronée et aucune explication.

2) Une erreur de signe dans le développement.

3) Bonne interprétation de la question. On aurait pu souhaiter une réponse plus explicite mais dans la mesure où la communication n'était pas évaluée la réponse est validée.

4) Le résultat est semble-t-il estimé sur la seule base du graphique fourni. L'interprétation est correcte mais l'élève n'éprouve pas le besoin de recourir au calcul pour répondre à la question.

b) 1) Une partie de la justification est hors sujet. La formulation n'est pas totalement satisfaisante.

2) Réponse hors-sujet pour une formulation confuse.

3) Réponse hors-sujet pour une formulation confuse.

4) Mauvaise traduction du problème en termes mathématiques.

Examen S5MA4	Elève n°6 (FR)	Compétences																2nde correction avec grille de descripteurs		
	Question	Connaissance		Compréhension		Méthodes		Résolution de problèmes		Interprétation		Communication		Liens		Technologie		Elève	Sujet	% (*)
Sans calculatrice	1a)	2	3	0	2													2	5	6%
	1b)			2	2	2	2											4	4	5%
	1c)			0	2													0	2	3%
	2	2	2			1,5	4											3,5	6	8%
	3a)					0	2	0	2									0	4	5%
	3b)					0	2			0	1			0	1			0	4	5%
	4									2	3	1	3					3	6	8%
	5	1,5	2	2	2													3,5	4	5%
Avec calculatrice	1a)1)			0	1											0	1	0	2	3%
	1a)2)					1,5	2											1,5	2	3%
	1a)3)									2	2							2	2	3%
	1a)4)							0	2	1	1					0	1	1	4	5%
	1b)1)									1	1	0,5	1					1,5	2	3%
	1b)2)	0	1									0	1					0	2	3%
	1b)3)	0	1									0	1					0	2	3%
	1b)4)					0	3									0	1	0	4	5%
	2a)	1	1					2	2							1	1	4	4	5%
	2b)	1	1					2	2							1	1	4	4	5%
	3a)	0	2															0	2	3%
	3b)															2,5	3	2,5	3	4%
	3c)															1	1	1	1	1%
	3d)									0	1					0	1	0	2	3%
	4a)			0	2													0	2	3%
	4b)	2	2	0	1	0	1									0	1	2	5	6%
	4c)									0	1	1	1					1	2	3%
	Totaux	9,5	15	4	12	5	16	4	8	6	10	2,5	7	0	1	5,5	11	36,5	80	100%
	% (**)/(***)	63%	19%	33%	15%	31%	20%	50%	10%	60%	13%	36%	9%	0%	1%	50%	14%	46%	100%	

(*) : de la question par rapport à l'ensemble des questions

(**) : pourcentage par rapport au descripteur

(***) : pourcentage de l'évaluation

Annex E: Maths 6 (Group 3)

Example of detailed but too time-consuming mark scheme grid!

Tâches				BVE						
				Reproduction		Production		Transfert		Points
Exercice 1 : puissances et racines	S1a)	Compréhension	* Appliquer la définition des puissances	3	4					3
	S1b)1)	Compréhension	* Regrouper coefficients et exposants			0	1			0
	S1b)1)	Méthodes	* Simplifier coefficients et exposants			0	1			
	S1b)2)	Méthodes	* Développer la puissance d'un produit			0,5	0,5			0,5
	S1b)2)	Compréhension	* Regrouper coefficients et exposants			0	0,5			
	S1b)2)	Méthodes	* Simplifier coefficients et exposants			0	1			
Exercice 2 : valeur absolue	S2a)	Compréhension	* Calculer une expression contenant des valeurs absolues	1	1					1
	S2b)	Compréhension	* Transformer une équation avec une valeur absolue en deux équations sans valeur absolue			0,5	0,5			3
	S2b)	Méthodes	* Résoudre deux équations du premier degré			2	2			
	S2b)	Communication	* Ecrire convenablement l'ensemble des solutions	0,5	0,5					
	S2c)	Compréhension	* Transformer une inéquation avec une valeur absolue en deux inéquations sans valeur absolue			1	1			5
	S2c)	Méthodes	* Résoudre deux inéquations du premier degré			3	3			
	S2c)	Communication	* Ecrire et représenter convenablement l'ensemble des solutions	1	1					
Exercice 3 : équations et inéquations quadratiques	S3a)	Méthodes	* Transformer une équation avec une fraction ratinnelle en une équation polynomiale			0,5	0,5			1,25
	S3a)	Méthodes	* Développer, réduire et ordonner un polynôme			0,75	1			
	S3a)	Connaissance	* Restituer les formules permettant de calculer discriminant et racines d'une équation du second degré		1					
	S3a)	Méthodes	* Calculer sans erreur discriminant et racines (forme simplifiée demandée) d'une équation du second degré				1			
	S3a)	Communication	* Ecrire convenablement l'ensemble des solutions		0,5					
	S3b)	Connaissance	* Restituer les formules permettant de calculer discriminant et racines d'une équation du second degré	0	1					0
	S3b)	Méthodes	* Calculer sans erreur discriminant et racines (forme simplifiée demandée) d'une équation du second degré			0	1			
	S3b)	Connaissance	* Préciser le signe d'une expression du second degré			0	1			
	S3b)	Communication	* Ecrire convenablement l'ensemble des solutions	0	1					
Exercice 4 : angles orientés	S4a)	Connaissance	* Convertir une mesure (de degrés en radians)	1	2					1
	S4b)	Connaissance	* Convertir une mesure (de radians en degrés)	1	2					1
Exercice 5 : rapports trigonométriques	S5a)	Compréhension	* Résoudre dans IR une équation trigonométrique contenant un sinus	1	1,5					1,25
	S5a)	Compréhension	* Retenir les solutions vérifiant certaines conditions	0,25	0,5					
	S5b)	Compréhension	* Résoudre dans IR une équation trigonométrique contenant une tangente	0,5	1,5					0,5
	S5b)	Compréhension	* Retenir les solutions vérifiant certaines conditions	0	0,5					
Exercice 6 : valeur absolue	S6	Compréhension	* Reconnaître la courbe représentative d'une fonction contenant une valeur absolue	2	2					2
Exercice 7 : équations et inéquations quadratiques	S7	Méthodes	* Réaliser un changement de variable	1	1					5
	S7	Méthodes	* Restituer les formules permettant de calculer discriminant et racines d'une équation du second degré	1	1					
	S7	Méthodes	* Calculer sans erreur discriminant et racines (forme simplifiée demandée) d'une équation du second degré			1	1			
	S7	Méthodes	* Résoudre des équations du type $x^2 = a$			1,5	1,5			
	S7	Communication	* Ecrire convenablement l'ensemble des solutions	0,5	0,5					
Exercice 1 : fonctions réelles	A1a)	Connaissance	* Lire les coordonnées du sommet d'une parabole, une équation de son axe de symétrie, ses zéros, les coordonnées de l'intersection avec l'axe des ordonnées	2,5	4					2,5
	A1b)	Compréhension	* Exprimer une expression comportant une valeur absolue sans recourir à la notation valeur absolue			1	2			1
	A1c)	Compréhension	* Tracer la courbe représentative d'une fonction faisant intervenir une valeur absolue			2	2			2
	A1d)	Technologie	* Déterminer les coordonnées exactes des points d'intersection de deux courbes représentatives de fonctions			0,5	1,5			1
	A1d)	Communication	* Ecrire le résultat sous la forme appropriée	0,5	0,5					
	A1e)	Interprétation	* Résoudre graphiquement une inéquation			1	1			2
	A1e)	Communication	* Ecrire convenablement l'ensemble des solutions	1	1					
	A2a)1)	Méthodes	* Déterminer la forme canonique d'une fonction du second degré depuis sa forme développée (avec ou sans outil technologique)	2	2					2
	A2a)2)	Interprétation	* Déterminer la valeur maximale d'une fonction du second degré (depuis sa forme développée ou sa forme canonique)			1	1			2
	A2a)2)	Communication	* Formuler une réponse de façon claire	1	1					

Exercice 2 : fonctions réelles	A2a)3)	Résolution de problèmes	* Traduire un problème non routinier en symboles mathématiques et raisonner pour atteindre un résultat correct			0	0,5			0,5
	A2a)3)	Méthodes	* Résoudre une équation du second degré (avec ou sans outil technologique)			0	1			
	A2a)3)	Communication	* Formuler une réponse de façon claire	0,5	0,5					
	A2b)1)	Interprétation	* Etablir un lien entre expression algébrique et courbe représentative correspondante			0	1,5			0
	A2b)1)	Communication	* Formuler une réponse de façon claire	0	0,5					
	A2b)2)	Interprétation	* Etablir un lien entre expression algébrique et courbe représentative correspondante			1,5	1,5			1,75
	A2b)2)	Communication	* Formuler une réponse de façon claire	0,25	0,5					
	A2b)3)	Interprétation	* Etablir un lien entre expression algébrique et courbe représentative correspondante			1	1,5			1,5
	A2b)3)	Communication	* Formuler une réponse de façon claire	0,5	0,5					
	A2b)4)	Résolution de problèmes	* Traduire un problème non routinier en symboles mathématiques et raisonner pour atteindre un résultat correct			0	1			0
	A2b)4)	Méthodes	* Résoudre une équation du premier degré			0	1			
Exercice 3 : triangles	A3a)	Connaissance	*Restituer la formule des sinus	1	1					5,75
	A3a)	Méthodes	* Appliquer cette formule pour calculer un angle			1,25	1,5			
	A3a)	Technologie	* Calculer une expression	0,5	0,5					
	A3a)	Connaissance	* Connaître la formule relative à la somme des mesures des angles d'un triangle	0,5	0,5					
	A3a)	Méthodes	* Appliquer cette formule pour calculer un angle			0,5	0,5			
	A3a)	Méthodes	* Appliquer la formule des sinus ou d'Al-Kashi pour calculer une longueur			1,5	1,5			
	A3a)	Technologie	* Calculer une expression	0,5	0,5					
	A3b)	Connaissance	* Restituer la formule d'Al-Kashi appliquée au cas étudié			1	1			3
	A3b)	Méthodes	* Appliquer la formule pour calculer une longueur			1	1			
	A3b)	Technologie	* Calculer une expression	1	1					
Exercice 4 : triangles	A4a)	Connaissance	* Mettre en œuvre le théorème de Pythagore en rappelant les hypothèses			1	1			1,75
	A4a)	Méthodes	* Substituer des valeurs dans une formule			0,5	0,5			
	A4a)	Communication	* Présenter son raisonnement et ses résultats de façon claire et efficace	0,25	0,5					
	A4b)	Connaissance	* Mettre en œuvre le théorème de Pythagore			1	1			2
	A4b)	Méthodes	* Substituer des valeurs dans une formule			0,5	0,5			
	A4b)	Communication	* Présenter son raisonnement et ses résultats de façon claire et efficace	0,5	0,5					
	A4c)	Connaissance	* Vérifier qu'un triangle n'est pas rectangle (via le théorème de Pythagore ou la trigonométrie)			0	1			0
	A4c)	Méthodes	* Substituer des valeurs dans une formule			0	0,5			
	A4c)	Communication	* Présenter son raisonnement et ses résultats de façon claire et efficace	0	0,5					
	A4d)	Connaissance	* Restituer la formule du cosinus déduite de la formule d'Al-Kashi appliquée au cas étudié			1	1			2
	A4d)	Méthodes	* Substituer des valeurs dans une formule			0,5	0,5			
	A4d)	Technologie	* Calculer une expression			0,5	0,5			
	A4e)	Connaissance	* Restituer la formule permettant de calculer l'aire d'un triangle appliquée au cas étudié			0	1			0
	A4e)	Méthodes	* Substituer des valeurs dans une formule			0	0,5			
	A4e)	Technologie	* Calculer une expression			0	0,5			
Exercice 5 : puissances et racines	A5a)	Interprétation	* Interpréter un énoncé simple	1	1					1
	A5b)	Compréhension	* Convertir un taux d'accroissement en facteur multiplicatif	1	2					1
	A5c)	Technologie	* Utiliser l'outil technologique pour calculer une expression	1	1					1
	A5d)	Compréhension	* Représenter graphiquement un nuage de points			3	3			3
	A5e)	Technologie	* Utiliser l'outil technologique pour calculer une expression	1	1					1
	A5f)	Technologie	* Utiliser une feuille de calcul ou la fonction de résolution d'équation pour résoudre un problème de croissance exponentielle			1	1			1,5
	A5f)	Résolution de problèmes	* Traduire un problème non routinier en symboles mathématiques et raisonner pour atteindre un résultat correct			0,5	1			
Exercice 6 : équations et inéquations quadratiques	A6	Résolution de problèmes	* Traduire un problème non routinier en symboles mathématiques et raisonner pour atteindre un résultat correct					3,5	4	4,5
	A6	Communication	* Présenter son raisonnement et ses résultats de façon claire et efficace					1	1	
			Total A	**13,75**	**22,5**	**10,75**	**17,5**	**0**	**0**	**24,5**
			Total B	**16,5**	**20,5**	**22,75**	**34,5**	**4,5**	**5**	**43,75**
			Total A&B	**30,25**	**43**	**33,5**	**52**	**4,5**	**5**	**68,25**

	0	**0**	**0**	**% descripteur**
Connaissance	6	4	0	**54%**
Compréhension	8,75	7,5	0	**71%**
Méthodes	4	15	0	**72%**
Résolution de problèmes	0	0,5	3,5	**62%**
Interprétation	1	4,5	0	**73%**
Communication	6,5	0	1	**71%**
Liens	0	0	0	
Technologie	4	2	0	**80%**
TOTAL	**30,25**	**33,5**	**4,5**	

Annex F: Maths 6 (Group 4)

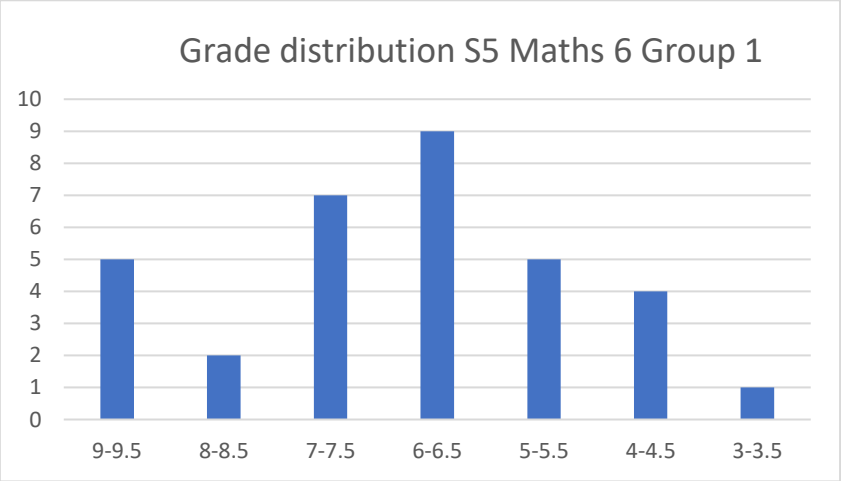
The competence matrix below shows the weightings for this group.

Paper A									
Question	**Knowledge**	**Comprehension**	**Processes**	**Problem solving**	**Interpretation**	**Communication**	**Linking**	**TOTAL**	
Q1	2	1	7					10	
Q2	2	2		1		3		8	
Q3	2		2					4	
Q4	2		3					5	
Q5	2	1	2		2	3	1	11	
Q6	5	3						8	
	15	7	14	1	2	6	1	46	
Paper B									
Question	**Knowledge**	**Comprehension**	**Processes**	**Problem solving**	**Interpretation**	**Communication**	**Linking**	**TOTAL**	**Technology**
Q1	3		5	2				10	2
Q2			4	2	4	3		13	6
Q3	1		2	1		1		5	1
Q4		4	6					10	
Q5			3	4	1	1		9	2
Q6					4		3	7	1
Q7	3			1	1	3		8	2
	7	4	20	10	10	8	3	62	14
TOTALS:	22	11	34	11	12	14	4	108	14
%	20	10	31	10	11	13	4		13

The final mark was out of 108. The percentage of the marks assigned to each competence is given in the bottom row in blue. Note that knowledge, comprehension and processes cover 60% of the exam. Considering the present 'pass' mark is a 6, this is appropriate.

Paper A was the non-calculator paper. Students could use the calculator in paper B, but use of this tool was not assessed directly, since in many cases the students could choose to do a problem analytically or using the calculator, or they could use it to check a result, but they often do not indicate where they have used it. The marks that relate to processes where the tool could be used are given in the far right hand column as an indicator of its potential use, but are not included in the total.

This group of students had an average of 66%, with an overall spread of final marks awarded out of 10 as follows:



Question 6 in paper B is given as an example of a non-standard problem requiring recognition of patterns, linking ideas of sequences and indices to algebraic expressions, and then using these to solve a problem. The students had not practiced anything like it in class.

Student 1

Question 6 : (7 marks)

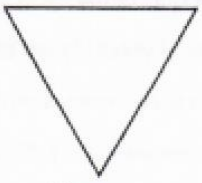


Diagram 1

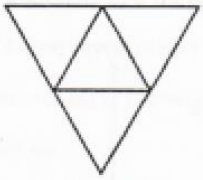


Diagram 2

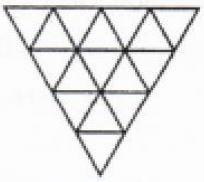


Diagram 3

The first three diagrams in a sequence are shown above.
Diagram 1 shows an equilateral triangle with sides of length 1 unit.
In Diagram 2, there are 4 triangles with sides of length $\frac{1}{2}$ unit.
In Diagram 3, there are 16 triangles with sides of length $\frac{1}{4}$ unit.

(a) Complete this table for Diagrams 4, 5, 6 and n.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram n
Length of side	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{n}$
Length of side as a power of 2	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-n}

1../2

(b) **(i)** Complete this table for the number of the smallest triangles in Diagrams 4, 5 and 6.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6
Number of smallest triangles	1	4	16	64	256	1024
Number of smallest triangles as a power of 2	2^0	2^2	2^4	2^6	2^8	2^{10}

(ii) Find the number of the smallest triangles in Diagram n, giving your answer as a power of 2.

2../3

Z

(c) Calculate the number of the smallest triangles in the diagram where the smallest triangles have sides of length $\frac{1}{128}$ unit.

0../2

Z

Student 2

Question 6 : (7 marks)

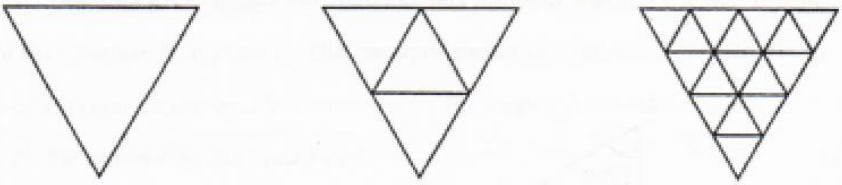


Diagram 1 Diagram 2 Diagram 3

The first three diagrams in a sequence are shown above.
Diagram 1 shows an equilateral triangle with sides of length 1 unit.

In Diagram 2, there are 4 triangles with sides of length $\frac{1}{2}$ unit.

In Diagram 3, there are 16 triangles with sides of length $\frac{1}{4}$ unit.

(a) Complete this table for Diagrams 4, 5, 6 and n.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram n
Length of side	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{2^{n-1}}$
Length of side as a power of 2	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	$2^{-(n-1)}$

1.5/2

(b) **(i)** Complete this table for the number of the smallest triangles in Diagrams 4, 5 and 6.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6
Number of smallest triangles	1	4	16	64	256	1024
Number of smallest triangles as a power of 2	2^0	2^2	2^4	2^6	2^8	2^{10}

(ii) Find the number of the smallest triangles in Diagram n, giving your answer as a power of 2.

2/3

2

(c) Calculate the number of the smallest triangles in the diagram where the smallest triangles have sides of length $\frac{1}{128}$ unit.

0/2

$\sqrt{128} = 11.3$

11-12 triangles

Student 3

Question 6 : (7 marks)

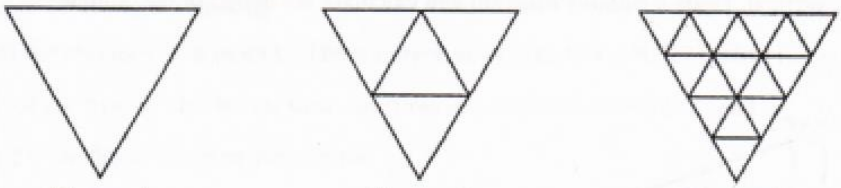


Diagram 1 Diagram 2 Diagram 3

The first three diagrams in a sequence are shown above.
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(a) Complete this table for Diagrams 4, 5, 6 and n.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram n
Length of side	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{2^{(n-1)}}$
Length of side as a power of 2	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	$2^{-(n-1)}$

.../2

(b) **(i)** Complete this table for the number of the smallest triangles in Diagrams 4, 5 and 6.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6
Number of smallest triangles	1	4	16	64	256	1024
Number of smallest triangles as a power of 2	2^0	2^2	2^4	2^6	2^8	2^{10}

(ii) Find the number of the smallest triangles in Diagram n, giving your answer as a power of 2.

.../3

$2^{(2n-2)}$

(c) Calculate the number of the smallest triangles in the diagram where the smallest triangles have sides of length $\frac{1}{128}$ unit.

.../2

length of side $\frac{1}{128}$ = Diagram 8 $\quad \frac{1}{2^{(8-1)}} = \frac{1}{2^7} = \frac{1}{128}$

Diagram 8 → nb. of the smallest triangles = $2^{(2\times 8-2)}$

$= 2^{14}$

$= 16384$ triangles

The 3 examples show typical responses. In the first, the student recognises the pattern and, after an initial false start, is able to complete the preliminary numerical work, but is unable to translate the problem into an algebraic expression. He cannot deal with the more abstract work in part bii), nor extrapolate backwards in part c). He gets 3 marks out of 7. He has not achieved the minimum in either problem solving or linking.

The second student spots the pattern, translates it into algebra but unfortunately makes an error. He is also unable to apply it. If he had not made the error, he would have 4 out of 7. He could be said to fulfil the descriptor: '*Attempts to apply concepts to unfamiliar situations*'.

The third student shows excellent reasoning and communication skills, and achieves 7/7. The relevant attainment descriptors are '*Translates non-routine problems into mathematical symbols and reasons to a correct result*' (Problem Solving A/B) and '*Makes and uses connections between different parts of the syllabus and applies concepts to unfamiliar situations*' (Linking, grade A).

Amongst the 34 students who took the exam, the average grade for this question was 3.8 out of 7. Three students got 7/7, and they represent the top 10% of the class. 18 achieved 4/7 or above, and had therefore got some way to linking the pattern to the expression. The rest effectively failed this task.

Note to this example

This example shows how the working group attempted to prepare exams that tested a range of competences in December 2017. The exam was designed to a 60% pass mark, as this is the current situation in the schools. The average for this group was 66%, which is considerably lower than is typical for these classes. It was felt that this reflected the new style of the exam, and that it indicated a need for more time to be given to problems of a type that are non-standard, and require the students to draw on prior knowledge or link ideas from different domains. Our content-heavy syllabi make it difficult to let the students investigate, explore ideas, make mistakes, reflect on their work and evaluate a wrong direction they have taken. These are skills vital for the students' future.

The new attainment descriptors make these skills explicit, and imply the need for a re-evaluation of the way the syllabus is constructed and the nature of teaching and learning in the classroom.

S5 SCRÚDÚ GAEILGE (TEN)

Freagair Ceist 1 & Ceist 2

Ceist 1:

Léigh na píosaí seo a leanas agus freagair na ceisteanna a ghabhann leo:

1 (a) LIOSPÓIN

Cuairt chultúrtha ar chathair aoibhinn

Tá áiteanna ann a bhfuil draíocht ag baint leo, agus tá Liospóin ina measc. Bhí Séamus Ó Murchú i bpríomhchathair na Portaingéile le déanaí agus molann sé go hárd í.

Tá sráideanna lár na cathrach plódaithe le turasóirí ach tá cúis mhaith ann go bhfuil oiread acu ag tabhairt cuairte ar phríomhchathair na Portaingéile – tá an chathair phléisiúrtha, in ann freastal ar riachtanais na dturasóirí agus tá ceantair shuimiúla ann freisin.

An chéad rud a rinne Séamus ná cuairt a thabhairt ar an Alfama, ceantar atá suite idir caisleán na cathrach, Castelo de São Jorge (Caisleán Naomh Seoirse), agus an abhainn, an Tejo. Is í an Tejo an abhainn is faide ar leithinis na hIbéire agus í chomh leathan sin in aice le Liospóin gur cosúil le farraige í.

Chomh maith leis sin, is é an Alfama an ceantar is mó atá nasctha le ceol is suaithinsí na Portaingéile, an ‘fado’. Seans go bhfuil an ceol seo cloiste agat ar shaoire éigin san Algarve, ach dáiríre is le Liospóin is mó a cheanglaítear an ceol seo.

Os cionn cheantar an Alfama atá ceann eile de mhórspriocanna na dturasóirí, an ‘Castelo’. Tá an caisleán tógtha ar an gcnoc is airde de naseacht gcnoc atá le fáil i Liospóin, ach fothrach a bhí ann a bheag nó a mhór do dtí gur atógadh é sna 1940í.

Má tá fonn siúil ort, is féidir siúl ón gceantar seo an bealach ar fad go Belém, gan dul rófhada ó bhruach an Tejo. Turas 6 nó 7 gciliméadar atá i gceist, agus mura bhfuil fonn ort siúl chomh fada ansin, is féidir tram a thabhairt díreach ó Praça do Comércio.

Cén fáth a rachfá go Belém? Mar is ansin atá cuid de sheoda turasóireachta mhórcheantar Liospóin, go háirithe an mhainistir ar a dtugtar Mosteiro dos Jerónimos, a tógadh ag tús an 16ú déag agus ina bhfuil tuama le cuid de na scríbhneoirí is mó le rá ón bPortaingéil le fáil, chomh maith le tuama an taiscéalaíthe, Vasco da Gama.

Agus má tá tú ag iarraidh athrú a fháil ó fhoirgnimh ársa, agus spéis agat i rudaí milse, ba cheart duit cuairt a thabhairt ar Pastéis de Belém, cúpla nóiméad siúil ón mainistir i dtreo lár na cathrach. Is é atá ann ná caifé ollmhór atá cáiliúil ar fud na Portaingéile as a chuid ‘pastéis de nata’ – tá siad á ndéanamh agus á ndíol acu ó 1837 ann – nó toirtíní custaird a bhfuil dúil mhór ag na Portaingéalaigh iontu.

Téigh ann, iarr ‘pastel de nata’, bíodh cupán láidir caife agat in éineacht leis agus beidh tú sna Flaithis. Áit bhreá atá ann le do scíth a ligint i ndiaidh duit sráideanna – agus cnoic – Liospóin a shiúl.

Sliocht athchóirithe as nos.ie; 9 Lúnusa 2017 456 focal

Gluais:

l.6. riachtanas: rud is gá a bheith agat

l.12 suaithinsí: speisialta

l.21 seod: fáinne nó bráisléad luachmhar, mar shampla

l.29 dúil: suim

l.31 Flaitheas: an áit a chreidtear go dtéann na daoine maithe tar éis dóibh bás a fháil

Freagair na ceisteanna seo a leanas: (40 marc)

1. (a) Cén chathair ar thug Séamus Ó Murchú cuairt uirthi? (2)
   What city did Séamus Ó Murchú visit?
   (b) Cén tír ina bhfuil an chathair sin? (2)
   In what country is that city?

2. (a) Cad a deir an scríbhneoir faoin Tejo? (6)
   What does the writer say about the Tejo?
   (b) Conas is féidir taisteal sa chathair dar leis an scríbhneoir? (6)
   How can one travel in the city, according to the writer?

3. Luaigh **trí rud** a deir an scríbhneoir linn faoin gcaisleán. (6)
   Mention **three things** the writer says about the city.

4. Conas atá fhios againn, ón alt, gur cathair stairiúil í Liospóin? (6)
   How do we know, from the article, that Lisbon is an historical city?

5. Faigh nath/nathanna san alt a chiallaíonn:
   Find an expression/expressions in the article which mean:
   (a) dubh le daoine; (b)is mó le rá; (c) sos a thogáil (6)

   Find an expression/expressions in the article which mean:

6. Cén fáth, dar leis an scríbhneoir, gur fiú/ceart cuairt a thabhairt ar Liospóin? Luaigh **trí chúis** (6)
   Why, according to the writer, is it worth visiting Lisbon? Give **three reasons**.

1 (b) TEILIFÍS

le GABRIEL ROSENSTOCK

Ar a cúig a chlog ar maidin
Theastaigh an teilifís uaithi.
An féidir argóint le beainín
Dhá bhliain go leith?
Síos linn le chéile,
Níos bhacas fiú le gléasadh
Is bhí an seomra préachta
Gan solas fós sa spéir.
Stánamar le hiontas ar scáileán bán.
Anois! Sásta?
Ach chonaic sise sneachta
Is sioraf tríd an sneachta
Is ulchabhán Artach
Ag faoileáil
Os a cionn.

64 focal

Gluais:

scáileán: aghaidh na teilifíse

ulchabhán: éan oíche

Freagair na ceisteanna seo a leanas: (20 marc)

1. Cén aois atá ag an leanbh seo? (5)
   What age is this child?

2. Luaigh **trí phointe** maidir le hatmaisféar na hoíche. (7)
   Mention **three points** about the atmosphere of the night.

3. Cén fáth go raibh an leanbh sásta ag deireadh an dáin?
   Luaigh **dhá phointe**. (8)
   Why is the child happy at the end of the poem? Give **two points**.

Ceist 2
Freagair (a) nó (b) –
(Tuairim is 200 focal: 40 marc)

(a) Thug tú cuairt ar chathair éigin i rith na laethanta saoire. Scríobh ríomhphost chuig do chara ag cur síos ar an áit agus na rudaí a rinne tú ann.
You visited a city during the holidays. Send an email to your friend describing the place and the things you did there.

(b) Is brea leis an gcailín óg bheith ag féachaint ar an teilifís. Cad is maith leat féin a dhéanamh nuair a bhíonn am saor agat?
This young girl likes watching television. What do you like to do in your free time?

ONL S5 Gaeilge

Scéim Mharcála/Marking Scheme

1a : Liospóin Lisbon (2)
1b : An Phortaingéil *Portugal* (2)

2a : Is í an Tejo an abhainn is faide ar leithinis na hIbéire /+ agus í chomh leathan sin in aice le Liospóin gur cosúil le farraige í / is féidir siúl go ceantar Belém in aice le bruach an Tejo.
The Tejo is the longest river in the Iberian Peninsula / + and it is so wide near Lisbon that it resembles the sea / One can walk on the river bank to the Belém area.

6 : (2X3)

2b : Ag siúl ; ar thram *walking; by tram* 6 : (2X3)

3 : An "Castelo" a thugtar air ; Tá an caisleán os cionn an Alfama ;Tá an caisleán ar cheann de mhórspriocanna na dturasóirí sa chathair ; Tá sé tógtha ar an gcnoc is airde de na seacht gcnoc i Liospóin ; Fothrach a bhí ann /+ atógadh an caisleán sna 1940í
It is known as the "Castelo"; the castle is situated above the Alfama district; the castle is one of the favourite places for tourists to the city to visit; it is built on the highest of the seven hills in the city; the castle was in ruins /+ it was rebuilt in the 1940s.

6 : (3X2)

4 : Tá mainistir sa chathair /+ a tógadh sa 16ú déag ; Tá tuama an taiscéalaithe Vasco de Gama ann agus tuama le cuid de na scríbhneoirí is mó le rá ón bPortaingéil; Tá na toirtíní custaird á ndéanamh agus á ndíol ón mbliain 1837
There's a monastery in the city /+ which was built in the 16th century; the monastery contains the tomb of the explorer Vasco da Gama as well as the tombs of some of the most celebrated Portuguese writers; custard tarts are being made and sold in Lisbon since 1837

6 : 3X2

5 : dubh le daoine = plódaithe; is mó le rá = is cáiliúla; sos a thógáil = scíth a ligint

6:3X2

6 : Is cathair aoibhinn í ; Is cathair stairiúil í ; Tá áiteanna i Liospóin á bhfuil draíocht ag baint leo ;Tá foirgnimh ársa i Liospóin; in ann freastal ar riachtanais na dturasóirí agus tá ceantair shuimiúla ann freisin.
It is a beautiful city; it is a historic city; there are places in Lisbon that are magical; there are ancient buildings in Lisbon; the city is able to meet tourists' needs; there are interesting araes there also.

6:3X2

1 (b)

1. Bhí dhá bhliain go leith aici.
   She was 2 and half years old. (5)
2. Bhí sé an-luath ar fad ; bhí sé an-fhuar ; bhí sé an-dorcha (7 : 3+2+2))
   It was really very early; it was very cold; it was very dark.
3. Bhí sí an-sásta mar chonaic sí sneachta ag titim agus sioraf ann freisin agus ulchabhán ag eitilt os a cionn. Bhí draíocht ag baint leis an bpictiúr a chonaic sí.
   The child was very happy as she saw snow falling and a giraffe through the snow and an owl flying overhead. There was something magical about the picture she saw.

8: (3+3+2)

Bain úsáid as an tábla seo a leanas chun nasc a dhéanamh idir an scála agus na pointí atá bronnta don Léamhthuiscint. Use the following table to link points awarded for Reading Comprehension to the scale.

A Sár-mhaith Excellent	B An-mhaith Very Good	C Maith Good	D Sásúil Satisfactory	E Dóthanach Sufficient	F Teip(Lag) Failed (Weak)	FX Teip (An-lag) Failed (Very Weak)
56-60	50-55	43-49	37-42	31-36	16-30	0-15

2 : Bain úsáid as na **Tuairiscíní Gnóthachtála (timthriall 2)** don scríbhneoireacht agus na critéir seo i ngach cás :

- Tasc comhlíonta/ábhar oiriúnach ;
- Struchtúr - conas atá na smaointe leagtha amach agus eagraithe ;
- Teanga − foclóir, liofacht agus cruinneas

2: To mark the writing use the **Attainment Descriptors (Cycle 2)** together with the quality indicators listed:

- Task is fulfilled / content;
- Structure – how the ideas are set out and organised;
- Language – vocabulary; fluency and accuracy

Bain úsáid as an tábla seo a leanas chun pointí ar an scála a bhaint as na Tuairiscíní Gnóthachtála. Use the following table to derive points on the scale from the Attainment Descriptors.

A Sár-mhaith Excellent	B An-mhaith Very Good	C Maith Good	D Sásúil Satisfactory	E Dóthanach Sufficient	F Teip (Lag) Failed (Weak)	FX Teip (An- Lag) Failed (Very Weak)
37-40	33-36	29-32	25-28	21-24	11-20	0-10

NB:

Tabharfaidh tú faoi deara, sa chás seo, gurb é tairseach an ghráid dhóthanaigh ná 50% de mhóriomlán na bpointí atá ar fáil don léamh agus don scríobh araon. Socraíodh an tairseach ag an bpointe áirithe seo ar an mbun go raibh an scrúdú deacair agus éilitheach a dhóthain, rud a chinntigh an tairseach ag an bpointe seo gan an caighdeán a ísliú. I scrúduithe eile d'fhéadfadh tairseach an ghráid dhóthanaigh bheith socraithe ag pointe níos airde. You will see that, in this instance, the threshold for sufficient is in fact 50% of the total available points for both reading and writing. The determination of the threshold at this point is based on the assumption that the test was sufficiently difficult and demanding to allow the threshold at this point without in fact lowering the standard. In another test, the threshold for sufficient might in fact be set higher.

Maitrís agus Aistriú na bPointí go Gráid agus Marcanna
Matrix and Translation of Test Points into Grades and Marks

Cumas Teanga **Language Competence**	**Cuspóirí Foghlama** **Learning Objectives**	**Tasc** **Task**	**Fochumais** **Sub-competence**	**Ceisteanna** **Questions**	**Luacháil** **Weighting** **(per question)**	**Pointí** **Points**
Léitheoireacht Reading 60 points	Téacsanna, arb é a mbíonn iontu ná gnáthchaint an lae, a léamh agus a thuiscint agus bheith ábalta eolas sonrach a phiocadh amach i dtéacsanna gearra liteartha agus neamhliteartha Read and understand texts consisting of everyday language and be able to pick out specific information from short literary and non-literary texts	C1 Question 1 C2 Question 2	Eolas a aimsiú Information Retrieval Anailís a dhéanamh Analysis Tuiscint a léiriú Interpretation/Demonstration of understanding Eolas a aimsiú Information Retrieval Anailís a dhéanamh Analysis Tuiscint a thaispeáint/ léiriú Interpretation/Demonstration of understanding	Ceist: 1 (a), 1(b); 2(a); 4 Ceist: 5 Ceist: 2(b); 3; 6 Ceist:1 Ceist: 2 Ceist: 3	40% 15% 45% 25% 35% 40%	16 phointe/points 6 phointe/points 18 phointe/points 5 phointe/points 7 bpointe/points 8 bpointe/points
Scríbhneoireacht Writing 40 points	Téacsanna simplí, comhtháite a scríobh ar thopaicí atá bainteach le himeachtaí, taithí agus tuairimí an ghnáthlae. Write simple, coherent texts on topics concerning everyday matters, experiences and opinions	1/1 1/1	Tasc comhlíonta/ábhar Requirements of task fulfillied/content Struchtúr Structure Teanga– foclóir; líofacht; cruinneas Language – vocabulary; fluency; accuracy	*** Le do thoil, tabhair faoi deara nach dtugtar aon luacháil anseo mar is marcáil iomlánach a bheidh i gceist. Please note: no weighting given for this question as marking is to be done holistically. Led thoil, feic an Scéim Mharcála do threoracha maidir le méid pointí a bhaint as an tuairiscín gnóthachtála ábhartha; tá i gceist leis seo go dtiocfar ar mhóriomlán deireanach na bpointí do gach script. Please see the Marking Scheme for instructions as to how to derive a number of points from the relevant attainment descriptor; this is in order to get a final total of points per script.		

*** Ná déan dearmad: bain usáid as na Tuairisciní Gnothachtála (timthriall 2) don scríbhneoireacht agus na critéir (fochumais) thuas luaite i d' aigne chun 'holistic marking' nó marcáil iomlánaíoch a dhéanamh. *** Don't forget to use the Attainment Descriptors for Writing (Cycle 2) and the quality indicators mentioned above (under sub-competence) to mark holistically. Feic an Scéim Mharcála do threoracha maidir le méid pointí a bhaint as an tuairiscín gnóthachtála ábhartha. Follow the instructions on the Marking Scheme to derive a number of points from the relevant attainment descriptor.

Maitrís agus Aistriú na bPointí go Gráid agus Marcanna
Matrix and Translation of Test Points into Grades and Marks

POINTÍ Points	GRÁD AGUS TUAIRISCÍN GNÓTHACHTÁLA Grade & Descriptor	POINTÍ Points	MARCANNA (Marc Uimhriúil Mark S5) Marks (Numerical Marks S5)
90-100	A Sár-mhaith Excellent	95-100	10.0
		92-94	9.5
		90-92	9.0
80-89	B An-mhaith Very Good	85-89	8.5
		80-84	8.0
70-79	C Maith Good	75-79	7.5
		70-74	7.0
60-69	D Sásúil Satisfactory	65-69	6.5
		60-64	6.0
50-59	E Dóthanach Sufficient	55-59	5.5
		50-54	5.0
26-49	F Teip (Lag) Failed (Weak)	26-49	3.0-4.5
0-25	FX Teip (An- Lag) Failed (Very Weak)	0-25	0-2.5

NB:

Tabharfaidh tú faoi deara, sa chás seo, gurb é tairseach an ghráid dhóthanaigh ná 50% de mhóriomlán na bpointí atá ar fáil. Socraíodh an tairseach ag an bpointe áirithe seo ar an mbun go raibh an scrúdú deacair agus éilitheach a dhóthain, rud a chinntigh an tairseach ag an bpointe seo gan an caighdeán a ísliú. I scrúduithe eile d'fhéadfadh tairseach an ghráid dhóthanaigh bheith socraithe ag pointe níos airde.

You will see that, in this instance, the threshold for sufficient is in fact 50% of the total available points. The determination of the threshold at this point is based on the assumption that the test was sufficiently difficult and demanding to allow the threshold at this point without in fact lowering the standard. In another test, the threshold for sufficient might in fact be set higher.

Scoláire A

Ceist 1: 50
Ceist 2: 37.
87 = 8.5 B an-mhaith.

1) a) Thug Séamus Ó Murchú cuairt ar Liospóin (2)

b) Is í Liospóin príomhchathair na Portaingéile. (2)

2) a) Duairt an scríbhneoir gur is í an Tejo an abhainn is faide ar leithinis na hIbéire agus í chomh leathan sin in aice le Liospóin gur cosúil le farraige í. (6)

b) Is féidir taisteal i dtram nó siúl sa chathair. (6)

3) Duairt an scríbhneoir go bhfuil an caisleán suite os cionn cheantar an Alfama, go bhfuil sé tógtha ar an gnoc is airde de naseacht gnoc atá le fáil i Liospóin agus go ní raibh ach fothrach a bhí ann go dtí gur atógadh é sna 1940í. (6)

4) Tá fhios againn gur cathair stairiúil í Liospóin mar ~~bion~~ bhí an scríbhneoir ag labhairt a lán faoi na foirgneamh a bhí tógtha fadó ó shin, mar shampla an Mosteiro dos Jéronimos a tógadh ag tús an 16ú déag. (3)

5) a) plódaithe le turasóirí
b) sean go bhfuil (4)
c) scith a ligint

6) Ba ceart le gach duine cuairt a thabhairt ar Liospóin mar tá ceantair suimiúla ann, tá a lán rudaí le feiceáil ann mar shampla an Castelo São Jorge, agus áit bhreá atá ann le do scíth a ligint agus le 'pastel de nata' a ithe. (6)

(35)

Scoláire A

1) Tá an leanbh dhá bliana d'aois. (0)

Bhí cuig a chlog ar maidin a bhí ann nuair a d'eirigh sí
2) ~~Bhí sé cuig a chlog ar maidin agus ní raibh~~ gan solas fós sa (7)
spéir agus bhí an seomra préachta agus chonaic siad
ulchabhán.

(8)

3) Bhí an leanbh sásta ag deireadh an dáin mar thainig
sí sa seomra chun féicint ar an teilifís agus ansin
chonaic sí an sneachta ag bibin agus chonaic sí
ulchabhán.

(10)

Ceist 2

a) A Sheáin, a chara,

Conas atá an musneach? Tá mé ar ais sa Bhruiséil
anois tar eis cuairt a thabhairt le faigh dhá
seachtain ar Venice, san Iodáil. Bhí an turas go
hiontach! Bhainn mé a lán taitneamh as a bheith i mo
dturasóir sa chaithair aláinn sin. Bhí muintir na
háite an cáirdiúil ar fad agus bhí an bia go halainn
freisin. D'fhreastal mé ar a lán músaem agus thug
mé chuairt ar eaglais suimiúl freisin.
D'fhán mé in óstán i lar na caithrach agus chuaigh
mé go dtí bialann nua gach óiche. Is breá liom bia
iodálach. Ar an triú lá chuaigh mé ar turas ar bhád
agus caith mé lá amhain ar an trá in aice leis an
cathair.
Bhí mé ag siopadóireacht ann freisin agus cheannaigh
mé a lán éadaí tradisiunta don réigiún. Tá súil agam
go mbeig mé in ann dul ar áis go dtí an cathair iontach
sin lá amhain. Nuair a bhí mé ag teacht ar ais

(37)

bhí orm éirigh ag a trí a chlog ar maidin, ní raibh sé sin go deas. Ach bá sé sin an t-aon rud go d'athruigh mé má téim ar ais.

Slán go fóill,
[redacted]. Scoláire A.

Ceist 1: 51. Scoláire B.
Ceist 2: 27.
78 = 7.5. C Marks.

Z

38

(1a) Thug Séamus Ó Murchú cuairt ar Liospóin, ~~ar pháirtíocht~~ (2)

(1b) Tá Liospóin sa Phortaingéil. (2).

(2a) Deir an scríbhneoir go bhfuil an Tejo, an abhainn is faide ar Leithinis na hIbéire agus is é an chomh leathan sin in aice le Liospóin gur cosúil le farraige í.

(2b) Is féidir taisteal sa chathair, mar ag siúl nó an tram a thabhairt má tuirse ort, dar leis an scríbhneoir. (6)

(3) Deir an scríobhneoir go bhfuil an caisleán tógtha ar an gnoc is airde de na seacht gnoc atá le fáil i Liospóin, é suite in aice leis an ceantar Alfama agus fothrach a bheag nó a mhór do dtí gur atógadh é sna 1940idí. (6).

(4) Tá fhios againn ón alt gur cathair stairiúil í Liospóin mar tugtar Mosteiro dos Jerónimos mainistir cáiliúil sa 16ú déag ~~agus~~, ina bhfuil tuam le cuid de na scríobhneoirí is mó le rá ón bPortaingéil le fáil, chomh maith le tuama an taiscéalaithe Vasco da Gama agus rugadh an cáiliúil pastéis de nata i Liospóin sa 19ú déag. (6)

(5a) dubh le daoine = plódaithe le turasóirí
(b) is mó le rá = is mó a cheanglaítear (4)
(c) sos a thogail = scíth a ligint

Dar leis an scríbhneoir, fiú cuairt a thabhairt ar Liospóin mór, tá an chathair phléisiúrtha, tá ceantair shuimiúla agus in ann freastal riachtanais na dturasóirí.

(6)

Z Freagair na ceisteanna seo a leanas

(1) Tá an leanbh dhá mbliana d'aois. ✗

(2) ~~Tá ... phointe maidir le hatmaisféar oíche~~;
Tá; "Ar a chuig a chloigar maidin", "Gan solas fós sa spéir" agus "Is ulchabhán Artach" ✗ trí (5)
phointe maidir le hatmaisféar oíche.

(3) Bhí an leanbh sásta ag deireadh an dáin (8)
mar chonaic sí "siorraf tríd an sneachta" (13/20)
sa teilifís agus "ulcabhán Artach ag faoileáil"

Ceist 2

a) A George, A cara

Conas atá tu, an raibh an Phortaingéil go maith? Cá bhfuil tú anois?
~~Ar~~ an am seo tá a lán ~~~~ comórtais lúthcleasaíochta agam, gach Sathairn agus Domhnach! Agus téim chuig mo traenála gach oíche, ~~~~ ach níl mé sásta mar chaill mé i ngach comórtais, tá an caighdéan ro-airde, agus gan mo lúthcleasaíoch níl aon rud a cead agam ag dhéanamh, ~~tá~~ mo shaol ar an nóiméad seo ana-leadránac
Gach maidin, éirím ar naoi a chlog, ithim mo bricfeasta agus tar éis é ~~~~ léam. Ar a haon a chlog ithim mo lóin agus ansin feicim teilifís, ar a sé a chlog téim chuig mo traenáil agus nuair a ~~théim~~ tarraim mé arís abhaile ith mé mo dinnéar agus ansin codlaím.
Déanaim ~~~~ sin arís agus arís agus arís.
Níl aon rud nua ón lá go lá! Níl cead agam aon rud nua a dhéanamh mar ~~~~ níl mo cairde eile sa Bhellg. Is rud uafáiseach é mo shaol. ~~Agus tá an eile rud is gránna an~~
Agus tá an aimsir an rud is gránna, tá sé ag stealladh báistí gach lá.
Cathain a ~~thagaig~~ tarraing tú arís i Bhruséil mar leadrán an domhan orm?

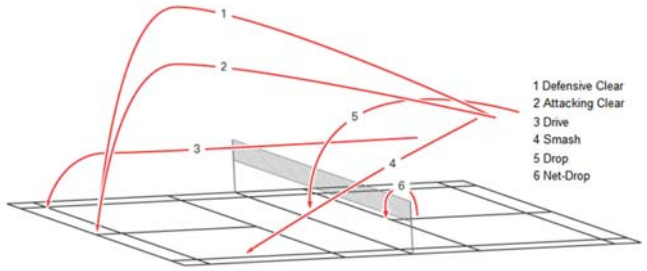
Do chara, ~~~~

Más é do thoil é!!!

27

Example of a test Matrix: Physical education, Badminton, practical test, S5

Tasks	Competence	Objectives : The student is able to	Assessment activities	Weight in %	Weight in points
Technical, tactical, and game skills in Badminton	**Motor skills**	… combine skills and perform them with consistent precision, control and fluency	T1: Service	15 %	3
			T2: Clear	15 %	3
			T3: Drop shot / smash	10 %	2
			T4: Net play	10 %	2
			T5: Body position and movements on the court	10 %	2
			Total for Basic motor skills:	**60** %	**12**
	Playing competence	…demonstrate an understanding of the concept of the game including basic tactical skills	T6: Construction of the point / Tactical analysis	20 %	4
	Competitive competence	…show performance, participation and behavior	T7 : Understanding the elementary concepts of the game	10 %	2
	Social and civic competence	…show an ability to co-operate and to take responsibility for themselves, others and equipment	T8 : Respect of the rules, partners and opponents	10 %	2
			Total for Competences:	**40%**	**8**
			Final total:	**100%**	**20**

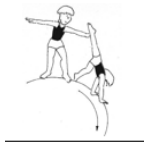
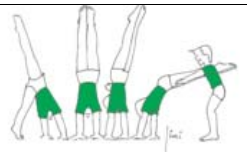
Tasks	Assessment activities	Assessment Criteria	Points	Total Points
T1. Service forehand	Long and high serve	The student shows : 1. long or high serve 2. long and high serve 3. long and high serve, left and right	1 Point 2 Points 3 Points	3
T2. Clear	Long and high stroke	The student shows : 1. clear stroke from a short position on the court 2. clear stroke from different positions on the court 3. clear stroke from all positions on the court	1 Point 2 Points 3 Points	3
T3. Smash / Drop	Smash or drop shot	The students shows : 1. smash or drop shot from a middle-court position 2. smash and drop shot from different positions	1 Point 2 Points	2
T4. Net play	Short and low stroke at the net area	The student shows : 1. net play, short or low 2. net play, short and low	1 Point 2 Points	2
T5. Body position and movements on the court	Footwork and movement	The student is : - passive on the court (and only reacts to the opponent) - active on the court and uses the footwork efficiently		2
		TOTAL:	**TOTAL:**	**12**
T6. Construction of the point / Tactical analysis	Games	The student is: - using different and appropriate techniques in game situations - understanding the elementary concepts of the game 		4
T7 : Understanding the elementary concepts of the game				2
T8. Respect of the rules, partners and opponents		The student: - knows the basic rules - plays with fair-play		2
		TOTAL:	**TOTAL:**	**8**
		FINAL TOTAL:	**FINAL TOTAL:**	**20**
		Half points are permitted		

Points	Grades / Denominators	Points achieved	Marks
19 - 20	A. Excellent	20	10.0
		19.5	9.5
		19	9.0
17 - 18	B. Very good	18 - 18.5	8.5
		17 - 17.5	8.0
15 - 16	C. Good	16 - 16.5	7.5
		15 - 15.5	7.0
13 - 14	D. Satisfactory	14 - 14.5	6.5
		13 - 13.5	6.0
11 - 12	E. Sufficient	12 - 12.5	5.5
		11 - 11.5	5.0
8 - 10	F. Weak	8 – 10.5	3.0 – 4.5
0 – 7	Fx. Very weak	0 – 7.	0.0 – 2.5

Example of a Test Matrix: Physical Education, Gymnastic/Floor work, practical test, s5

Tasks	Competence	Objectives Student is able to	Assessment activities	Weight in %	Weight in points
The student performs a combination of: ➢ forward roll ➢ backward roll ➢ handstand ➢ cartwheel	**Motor skills**	… combine skills and perform them with consistent precision, control and fluency	T1: forward roll	10%	3
			T2: backward roll	10%	3
			T3: handstand	20%	6
			T4: cartwheel	20%	6
			Total for Motor skills:	**60%**	**18**
	Competitive competence	… show performance, participation and behaviour	T5: gymnastics floor routine	30%	9
	Social and civic competence	… show an ability to co-operate and to take responsibility for themselves, others and equipment	T6: respect the safety rules and partners, help / secure	10%	3
			Total for competences:	**40%**	**12**
			Final total:	**100%**	**30**

Tasks	Assessment activities	Assessment criteria	Points	Total points
T1: forward roll	dive forward roll	The student shows : 1. forward roll – tucked 2. forward roll to straddle stand 3. dive forward roll 	1 2 3	3
T2: backward roll	backward roll with straight legs to pike stand	The student shows : 1. tucked backward roll 2. backward roll to straddle stand 3. backward roll with straight legs to pike stand 	1 2 3	3
T3: handstand	handstand forward roll	The students shows : 1. handstand against the wall 2. handstand 3. handstand to forward roll 	2 4 6	6
T4: cartwheel	half cartwheel-handstand	The student shows : 1. cartwheel half circle 2. cartwheel 3. half cartwheel-handstand	2 4 6	6

		  		
			TOTAL:	**18**
T5: presentation of a routine	gymnastics floor routine	The student performs a gymnastics floor routine with : - rhythm - esthetics - fluency - utilization of the space - dynamism		9
T6: respect the safety rules and partners, help/secure	gymnastic floor routine	The student : - follows and masters skill progression - participates and performs gymnastics with safety measures - knows the basic safety rules		3
			TOTAL:	**12**
			FINAL TOTAL:	**30**

Points	Grades / Denominators	Points achieved	Marks
28 - 30	A. Excellent	30	10.0
		29 - 29.5	9.5
		28 – 28.5	9.0
25 – 27.5	B. Very good	26.5 – 27.5	8.5
		25 - 26	8.0
22 – 24.5	C. Good	23.5 - 24.5	7.5
		22 - 23	7.0
19 – 21.5	D. Satisfactory	20.5 – 21.5	6.5
		19 - 20	6.0
16 – 18.5	E. Sufficient	17.5 – 18.5	5.5
		16 - 17	5.0
10 – 15.5	F. Weak	10– 15.5	3.0 – 4.5
0 – 9.5	Fx. Very weak	0 – 9.5	0.0 – 2.5

S5 Harmonised Exam and Application of the New Marking Scheme

The following document outlines a guide for how to use a harmonised exam to assess students' abilities in Geography with respect to the NMS. The structure of this document is shown below.

Objectives and structure of S5 Harmonised Exam

The S4 and S5 Geography syllabus refers to the following objectives:

- ...demonstrate a sense of location at different scales
- ...demonstrate the necessary terminology in their L2.
- ...demonstrate an understanding of physical Geography
- ...demonstrate an understanding of human Geography
- ...demonstrate an understanding of the interaction between physical and human Geography
- ...apply geographical knowledge in new situations
- ...use geographical skills in new situations

These were used to create a framework for a harmonised S5 semester test that would assess the full range of objectives through a variety of different means.

At the time of writing the attainment descriptors in Geography are under review. For this reason the syllabus and its objectives were analysed to draw out key competencies and attainment targets that could then be assessed. These are shown below. Future revisions of the Geography attainment descriptors should be used when available.

Task	Objectives	Theme	Points	Weight in %	Time (mins)
	The pupil is able to...				
1		Dynamic Landscapes	**10**	**17**	**15**
a	...demonstrate the necessary terminology in their L2.	Overview	2		
b	...demonstrate the necessary terminology in their L2.	Overview	4		
c	...demonstrate an understanding of physical Geography	Overview	2		
d	...demonstrate an understanding of physical Geography	Overview	2		
2		Dynamic Landscapes	**20**	**33**	**30**
a	...use geographical skills in new situations	Coasts	6		
b	...apply geographical knowledge in new situations	Coasts	9		
c	...demonstrate an understanding of the interaction between physical and human Geography	Coasts	5		
3		Feeding The World	**18**	**30**	**25**
a	...demonstrate the necessary terminology in their L2.	Production and farming	3		
b	...demonstrate the necessary terminology in their L2.	Production and farming	1		
c	...demonstrate a sense of location at different scales AND use geographical skills in new situations	Production and farming	6		
d	...demonstrate an understanding of human Geography AND demonstrate an understanding of the interaction between physical and human Geography	Production and farming	8		
4		Dynamic Landscapes	**12**	**20**	**20**
	...demonstrate the necessary terminology in their L2 AND demonstrate an understanding of physical Geography AND demonstrate an understanding of the interaction between physical and human Geography		12		
			60	**100**	**90**

Test Design (example) for a S5 Harmonised Test

Objectives The pupil is able to…	Theme	Questions	Points	Weight in %
Separate objectives				**57%**
I ...demonstrate the necessary terminology in their L2	Dynamic landscapes: Overview	1.a	2	17%
		1.b	4	
	Feeding the World: Production and farming	3.a	3	
		3.b	1	
II ...demonstrate an understanding of physical Geography	Dynamic landscapes: Overview	1.c	2	7%
		1.d	2	
IV ...demonstrate an understanding of the interaction between physical and human Geography	Dynamic landscapes: Coasts	2.c	5	8%
VI ...apply geographical knowledge in new situations	Dynamic landscapes:	2.b	9	15%

	Coasts			
VII **...use geographical skills in new situations**	Dynamic landscapes: Coasts	2.a	6	10%
Integrated objectives				**43%**
V – VII **...demonstrate/use** **- a sense of location at different scales** **- use geographical skills in new situations**	Feeding the World: Production and farming	3.c	6	10%
III – IV **...demonstrate/use** **- an understanding of human Geography** **- an understanding of the interaction between physical and human Geography**	Feeding the World: Production and farming	3.d	8	13%
I – II – IV **...demonstrate the necessary terminology in their L2 AND demonstrate an understanding of physical Geography AND demonstrate an understanding of the interaction between physical and human Geography**	Dynamic Landscapes	4	12	20%
			60	**100**

Harmonised exam mark and NMS

An overall marking matrix aligned to the NMS is provided;

55-60	**A Excellent**
49-54	B Very good
43-48	C Good
37-42	D Satisfactory
30-36	E Sufficient
24-29	F Failed (Weak)
0-23	Fx Failed (Very weak)

From test points to marks

Grades and Performance Indicators	Points		Marks
A Excellent	55-60	59-60	10
		57-58	9.5
		55-56	9
B Very good	49-54	52-54	8.5
		49-51	8
C Good	43-48	46-48	7.5
		43-45	7
D Satisfactory	37-42	40-42	6.5
		37-39	6
E Sufficient	30-36	34-36	5.5
		30-33 *	5
F Failed (Weak)	24-29		3.0 – 4.5
Fx Failed (Very weak)	0-23		0.0 – 2.5

*reference to the attainment descriptors

30 points is the pass threshold

- pupil has **sufficient** ability to use relevant geographical skills (mapping, drowning, analysing graph), to interpret and evaluate data to reach substantiated conclusions and communicate conclusion in L2.

Harmonised exam paper example (EN)

TITELBLATT FÜR DIE PRÜFUNGEN DER 5. KLASSEN SCHULJAHR 2017-2018

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Erlaubte Hilfsmittel / Permitted equipment / Matériel autorisé :

Besondere Bemerkungen / Special remarks / Remarques particulières:

Viel Erfolg ! Good Luck ! Bonne Chance !

Question 1 - Dynamic Landscapes: An Overview (10 marks) - (15 minutes)

a. **Define** weathering. (2)

b. **Match** the type of erosion to the correct definition. (4)

i. Abrasion
ii. Solution
iii. Attrition
iv. Hydraulic action

w) The power of water and air entering cracks in rocks and breaking them apart.

x) The repeated collision of two rocks into each other resulting in them decreasing in size.

y) The movement of rocks against the river or sea bed causing the rocks and the bed to erode.

z) The dissolving of rocks through the acidity of water.

c. **Compare** saltation and solution with reference to transportation in rivers. (2)

d. **Explain** why deposition of sediment occurs in either a river or the sea. (2)

Question 2 – Dynamic Landscapes: Coasts (20 marks) - (30 minutes)

Draw a series of labelled sketches to show the formation of a stump. (6)

Use figures 2a and 2b to answer question 2b:

Figure 2a: OS Map extract: Blakeney Point

Figure 2b: Photo of Blakeney Point (ignore point X and Y)

b)

i. **Identify** the landform shown in figure 2b? (1)

ii. With reference to figure 2a , **identify** the direction of longshore drift. (2)

iii. With reference to longshore drift and figures 2a and 2b, **explain** the formation of the landform shown in figure 2b. You are allowed to use diagrams in your answer. (6)

c)

i. **Explain** how erosion presents a challenge for people. (2)

ii. **Evaluate** one method of reducing coastal erosion. (3)

Question 3 – Feeding The World (18 marks) - (25 minutes)

a) **Identify** the three different types of farming shown in figure 3a. (3)

Figure 3a: Three Different types of farming

b) **Define** undernourishment (1)

c) **Describe**, and **suggest** reasons for, the patterns shown on figure 3b. Refer to specific data, countries and/or regions in your answer. (6)

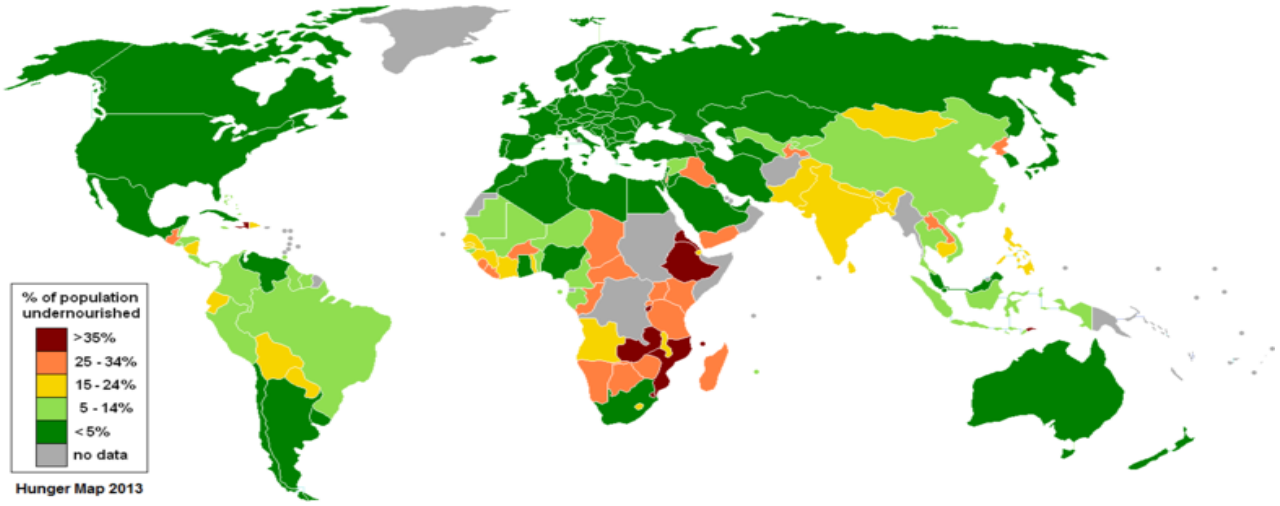

Figure 3b: A map to show the % of undernourished people, per country, in 2013

d) Using an example you have studied in class:

i) **Describe** the ways in which intensive farming is a solution to the challenges of undernourishment. (3)

ii) **Evaluate** the effectiveness and impact of intensive farming as a solution to undernourishment. (5)

Question 4 – Dynamic Landscapes: rivers (12 marks) - (20 minutes)

Write an extended paragraph or mini-essay on the theme of river flooding.

- locate the example that you have studied
- state when the event occurred and what **describe** happened
- evaluate the human and physical causes
- analyse the extent to which the flood event affected people

Your answer should be a text (no bullet points or tables) and it should consider the ways in which human and physical geography interact.

Mark scheme (EN)

Question	Sub	Part		Total	Mark break down	Notes
1						
	a		An appropriate **definition** that covers the points taught in class. For example, "the breaking down of rocks in situ for example by weather."	2	2 x 1 mark	
					E.g "break down of rocks = 1", "in-situ = 1"	
	b		i = y ii = z iii = x iv = w	4	4 x 1 mark	
	c		2 Clear **comparative** points, possibilites include transport, sediment size and movement type.	2	2 x 1 mark	
	d		A clear **explanation** that includes change in energy and reasons for this change. For example, "as a meets the sea the energy of the river is reduced, this causes sediment to be depositied."	2	2 x 1 mark	
2						
	a		Level marking	6		
			1 - 2 At lower end, poor or simple diagrams with no labels. At upper end, good series of sketches with no labels. Maximum of 2 marks available if no labels are added to diagram.		1 very well-labelled diagram, rather than a series is also acceptable	
			3 - 4 At lower end, diagrams with some labels. At upper end, good diagrams with features labelled, although a stage may be missing.			
			5 - 6 At lower end, clear and detailed diagrams with no mention of erosion. At upper end erosion or erosional processes are included.			
	b					
		i	A spit	1		
		ii	North-West or West-North-West	2	2 mark question since it requires map interpretation	
		iii	Level marking	6		
			1 - 2 At lower end, mention of movement or wave action. At upper end, additional mention of sediment or sand transport. Maximum of 2 marks available if no mention of depostion.		Diagrams are allowed but not necessary	
			3 - 4 At lower end, simple reference to deposition. At upper end, the cause of deposition is explained.		Teachers should use their proffessional judgement where answers are detailed but do not fit the level descriptors.	
			5 - 6 At lower end, comment on wave type or direction and clear link between LSD and spit formation. At upper end, must be named reference to either figure 2a or 2b.			
	c					
		i	An explanation that includes a comment on the break down or removal of rock AND its impact on people / valuable land.	2	2 x 1 mark	
		ii	A named method of coastal management. An advantage is described. A disadvantage is described.	3	3 x 1 mark	

3						
	a		a = arable, b = dairy, c = hill sheep and acceptable options	3	3 x 1 mark	
					Alternative terminology may be used	
	b		A comment about lack of food or nutrition.	1		
	c		Level marking	6		
			1 - 2 At lower end, simple descriptive comments about the map. At upper end, an attempt to see or summarise a pattern. Maximum of 2 marks available if only descriptive.		Teachers should use their professional judgement where answers are detailed but do not fit the level descriptors.	
			3 - 4 At lower end, description AND limited reasoning given. At upper end, some reasoning AND use of data.			
			5 - 6 At lower end, detailed description, reason given and data used. At upper end, specific reference to countries/regions AND/OR more than one reason given.			
	d					
		i	Appropriate descriptive comments. For example, produces more food, reliable food production, maximises the yield from the land.	3	3 x 1 mark	
		ii	Must include effectiveness AND impact, evaluation must be present. 1 Mark for each valid comment. Maximum of 3 for no evaluation. For example, a concluding sentence about whether intensive farming is a good solution. 5 marks only possible with a definite opinion/conclusion.		5 x 1 mark (Maximum of 3 for no evaluation)	
4			See matrix below	12		

Question 4 Matrix

	4 Points	**3 Points**	**2 Points**	**1 Point**
Description	Descriptions with details of effects given.	Weak descriptions of effects given.	Named, located and dated event.	Named event.
Evaluation of causes	Physical AND human causes are clearly evaluated with some idea of significance of different causes.	Physical AND human causes are referred to in detail. Basic evaluation.	More than one cause is stated.	One cause, physical or human, is given.
Analysis of impact	A number of effects are linked in detail to consequences and an attempt is made to relate these to human and physical causes. The student demonstrates an ability to contextualise their answer.	A number of effects are linked in detail to consequences and an attempt is made to relate these to flood causes.	More than one effect is linked to a number of consequences.	Simple analysis. An attempt to link an effect with a consequence or knock-on impact. For example flooded roads lead to economic loss.

Credit is given for a clear and organised structure.

Question 4 marking matrix aligned to the NMS is provided.

12	**A Excellent**
10-11	B Very good
9	C Good
7-8	D Satisfactory
6	E Sufficient
4-5	F Failed (Weak)
0-3	Fx Failed (Very weak)

Harmonised exam paper example (FR)

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Viel Erfolg ! Good Luck ! Bonne Chance !

Question 1 – Paysages Dynamiques : Un aperçu (10 points) - (15 minutes)

a. **Définir** érosion. (2)

b. **Relier** les types d'érosion avec les définitions correspondantes. (4)

i. Abrasion
ii. Solution
iii. Attrition
iv. Action hydraulique

w) La puissance de l'eau et de l'air qui pénètre dans les fissures des roches et les brisent.

x) La répétition de la collision de deux rochers ce qui résulte en réduisant leur taille.

y) Le mouvement des rochers contre la rivière ou le fond de la mer causant l'érosion des roches et du lit de la mer.

z) La dissolution des rochers à travers l'acidité de l'eau.

c. **Comparer** la saltation et la solution en référence avec la transportation dans une rivière. (2)

d. **Explique** pourquoi le dépôt de sédiments se produit dans une rivière ou dans la mer. (2)

Question 2 – Paysages dynamiques : Les côtes (20 points) - (30 minutes)

Dessine une série de croquis légendés pour montrer la formation d'une souche. (6)

Utilise les figures 2a et 2b pour répondre à la question 2b :

Nord

Figure 2a: extrait d'une carte OS: Blakeney Point

Figure 2b : Photo de Blakeney Point (les points X et Y ne sont pas importants)

b)

i. **Identifie** la forme montrée dans la figure 2b. (1)

ii. En référence à la figure 2a, **identifie** la direction de la dérive littorale. (2)

iii. En référence à la dérive littorale et aux figures 2a et 2b, **explique** la formation de la forme montrée dans la figure 2b. Tu as le droit d'utiliser des diagrammes dans ta réponse. (6)

c)

i. **Explique** en quoi l'érosion présente un problème pour les gens. (2)

ii. **Evalue** une méthode pour réduire l'érosion côtière. (3)

Question 3 – Nourrir le Monde (20 points) - (25 minutes)

a) **Identifie** les 3 différents types d'agricultures présentes sur le document 3a. (3)

Figure 3a : 3 différents types d'agricultures

b) **Définis** sous-alimentation**.** (1)

c) **Décris et suggère des raisons pour les modèles montres sur le document 3. Réfère-toi**, aux données spécifiques, pays et/ou religion dans ta réponse. (6)

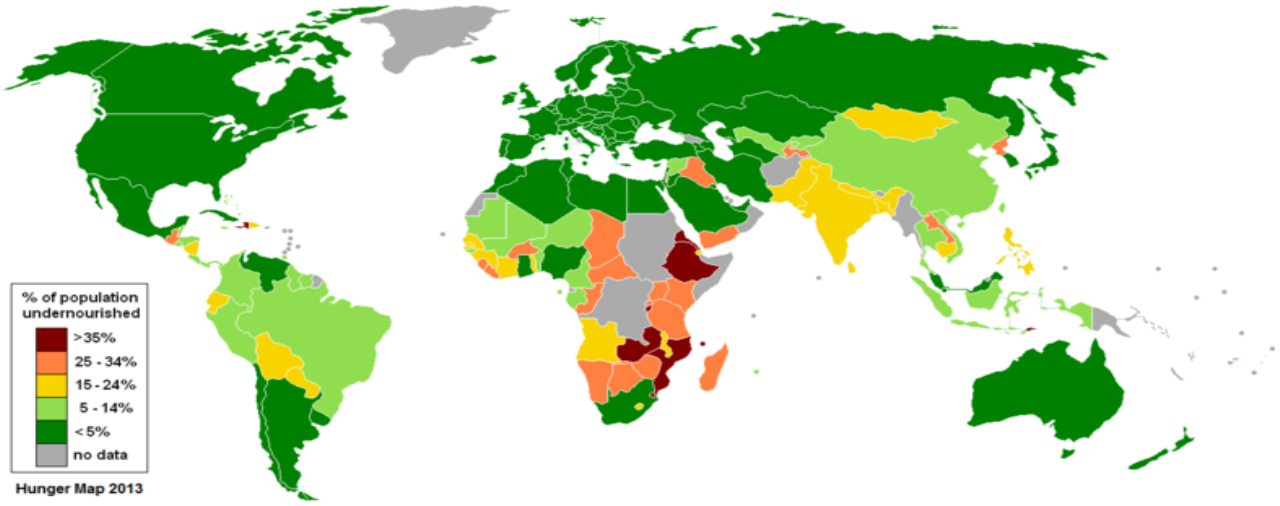


Figure 3b: une carte montrent le % de personnes sous-nourrir par pays en 2013

d) En utilisent un exemple que vous avez étudié en classe :

i) **Décris** les manières dont l'agriculture intensive est une solution aux défis de la sous-alimentation. (3)

ii) **Evaluer** l'efficacité et l'impact de l'agriculture intensive comme solution à la sous-alimentation. (5)

Question 4 – les paysages dynamiques : rivières (12 points) - (20 minutes)

Ecris un long paragraphe ou un mini-essai sur le thème d'une inondation causée par une rivière.

- Situe l'exemple que tu as étudié
- Citer quand l'événement s'est produit et décris ce qui est arrivé
- Evalue les causes physiques et humaines
- Analyse la mesure dans laquelle l'inondation a affecté la population.

Ta réponse doit être un texte (pas de tires ou tableau) et il doit considérer les façons dont la géographie humaine et physique interagissent.

Mark scheme (FR)

Question	Sub	Part		Total	A partir…	Idées
1						
	a		Une définition qui correspond avec ce qu'est appris en classe.	2	2 x 1 point	
					E.g. "break down of rocks = 1", "in-situ = 1"	
	b		i = y ii = z iii = x iv = w	4	4 x 1 point	
	c		2 points de comparaison clairs. Les possibilités comprennent le transport, la taille des sédiments et le type de mouvement.	2	2 x 1 point	
	d		Une **explication claire,** comprennent changement en énergie et les explications pour ce changement. Ex : "en entrer la mer, la puissance de la rivière diminue et donc cela provoque le dépôt des sédiments. "	2	2 x 1 point	
2						
	a		En 3 niveau	6		
			1 - 2 en bas, les croquis d'une mauvaise qualité avec pas de légende. Mieux, plus d'un croquis mais sans légendes., Maximum de 2 points disponible si aucune légende ajouter.			
			3 - 4 en bas, les croquis avec quelques mots. Mieux, les bons croquis avec les bonnes légendes mais il manqué quelque détails/sections			
			5 - 6 en bas, les croquis clairs et bien explique mais sans le mot 'érosion'. Mieux, soit érosion soit les procès d'érosion sont intégré dans les légendes.			
	b					
		i	Une pointe (?)	1		
		ii	Nord-Ouest or Ouest-Nord-Ouest	2	2 points parce qu'il faut comprendre la carte et la photo	
		iii	Par niveau	6		
			1 - 2 En bas, mention du mouvement ou de l'action des vagues. Mieux, mention supplémentaire du transport de sédiments ou de sable. Maximum de 2 points disponibles si aucune mention de dépôt.		Les croquis sont permis mais pas nécessaire.	
			3 - 4 En bas, référence simple au dépôt. Mieux, la cause du dépôt est expliquée.		Les enseignants devraient utiliser leur jugement professionnel lorsque les réponses sont détaillées mais ne correspondent pas aux descripteurs de niveau.	
			5 - 6 En bas, comment sur le type ou la direction de l'onde et dégager le lien entre la dérive littorale et la formation de la pointe. Mieux, doit être nommé référence à la figure 2a ou 2b.			
	c					
		i	Une explication qui inclut un commentaire sur l'effondrement ou l'enlèvement de la roche ET son impact sur les personnes / terres précieuses.	2	2 x 1 point	

		ii	Une méthode nommée de gestion côtière. Un avantage est décrit. Un inconvénient est décrit.	3	3 x 1 point	
3						
	a		a = arables, b = laitiers, c = agriculture de montagne	3	3 x 1 point	
					Les autres mots peuvent être utiliser, en fonction de les mots utilisée en classe.	
	b		Une phrase sur le manque d'alimentation	1		
	c		En 3 niveau	6		
			1 - 2 En bas, de simples commentaires descriptifs sur la carte. Mieux, une tentative de voir ou de résumer un motif. Maximum de 2 points disponibles si seulement descriptif.		Les enseignants devraient utiliser leur jugement professionnel lorsque les réponses sont détaillées mais ne correspondent pas aux descripteurs de niveau.	
			3 - 4 En bas, une description ET raisonnement limité donné. Mieux, un certain raisonnement ET l'utilisation des données.			
			5 - 6 En bas, une description détaille, raisonnement et l'utilisation des données. Mieux, référence spécifique au pays et/ou plus qu'une raison donnée.			
	d					
		i	Commentaires descriptifs appropriés. Par exemple, produit plus de nourriture, une production alimentaire fiable, maximise le rendement de la terre.	3	3 x 1 point	
		ii	Doit inclure l'efficacité et l'impact, l'évaluation doit être présente. 1 point pour chaque commentaire valide. Maximum de 3 pour aucune évaluation. Par exemple, une phrase pour conclure sur la question de savoir si l'agriculture intensive est une bonne solution		5 x 1 point (Maximum de 3 pour aucune évaluation)	
4			Voir ci-dessous	12		

Question 4 Grille

	4 Points	**3 Points**	**2 Points**	**1 Point**
Description	Descriptions avec les détails des effets	Faible description des effets.	Événement nommé, localisé et daté.	Evènement nommé.
Evaluation des causes	Les causes physiques et humaines sont clairement évaluées avec une certaine idée de l'importance de différentes causes.	Les causes physiques ET humaine sont données en détail avec un évaluation assez simple.	Plus qu'une cause est donnée.	Une cause, physique ou humaine, est donnée.
Analyses d'impact	Un certain nombre d'effets sont liés en détail aux conséquences et une tentative est faite pour les relier aux causes humaines et physiques. L'élève démontre une capacité à contextualiser sa réponse.	Un certain nombre d'effets sont liés en détail aux conséquences et une tentative est faite pour les relier aux causes des inondations.	Plus d'un effet est lié à un certain nombre de conséquences.	Une analyse assez simple. Une tentative de lier un effet avec une conséquence ou un impact. Par exemple, les routes inondées = des pertes économiques.

Le points sont accordé pour une structure claire et organisée.

Harmonised exam paper example (DE)

TITELBLATT FÜR DIE PRÜFUNGEN DER 5. KLASSEN SCHULJAHR 2017-2018

FRONT PAGE OF THE EXAM PAPERS YEAR 5 SCHOOL YEAR 2017-2018

PAGE DE GARDE DES ÉPREUVES ÉCRITES DES 5èmes ANNÉE SCOLAIRE 2017-2018

Datum / Date:

Prüfungsdauer / Length of examination / Durée de l'épreuve : 1h30

Gesamtzahl der Fragen / Total number of questions /

N° de questions : 4

Zu bearbeitende Fragen / Questions that must be answered /

N° de questions à traiter : 4

Erlaubte Hilfsmittel / Permitted equipment / Matériel autorisé :

Besondere Bemerkungen / Special remarks / Remarques particulières:

Viel Erfolg ! Good Luck ! Bonne Chance !

Frage 1 – Dynamische Landschaften: Ein Überblick (10 Punkte) - (15 Minuten)

a. **Definiere** den Begriff Verwitterung. (2)

b. **Ordne** die unten genannten Erosionsarten den passenden Definitionen zu. (4)

i. Abrieb
ii. Lösung
iii. Zermürbung
iv. Druck

w) Wasser dringt in die feinen Risse der Gesteine ein, gefriert und zersprengt es.

x) Zwei Steine kollidieren wiederholt miteinander, was zur Folge hat, dass diese kleiner werden.

y) Erosion aufgrund der Bewegung von Steinen in Flüssen oder am Meeresgrund.

z) Die Auflösung von Steinen durch Säuren im Wasser.

c. **Vergleiche** die in Flüssen stattfindenden Verwitterungsarten Gerölltransport und Lösung. (2)

Erkläre warum man Sedimente entweder im Fluss oder im Meer findet. (2)

Frage 2 – Dynamische Landschaften: Küsten (20 Punkte) - (30 Minuten)

a) Zeichne eine Reihe von beschrifteter Skizzen die die Bildung einer Klippe und Höhle erklären. (6)

Verwende Abbildung 2a und 2b um die Frage 2b zu beantworten:

Norden

Abbildung 2a: Kartenausschnitt: Blakeney Point

Abbildung 2b: Foto von Blakeney Point (ignoriere die Punkte y und x)

b)

i. **Welche** Landschaftsform kannst Du in Abbildung 2b erkennen? (1)

ii. Finde mit Hilfe von Abbildung 2a die Richtung der Drift in Küstennähe heraus. (2)

iii. **Erkläre** unter bezugnahme der Drift in Küstennähe und der Abbildungen 2a und 2b die Entstehung der Landschaftsform in Abbildung 2b. Für die Beantwortung dieser Frage kannst Du auch Diagramme verwenden. (6)

c)

i. **Erläutere** warum Erosion eine Herausforderung für die Menschheit darstellt. (2)

ii Erkläre eine Möglichkeit um die Erosion an der Küste zu verringern. (3)

Frage 3 – Ernährung einer wachsenden Weltbevölkerung (18 Punkt) - (25 Minuten)

a) **Identifiziere** mit Hilfe von Abbildung 3a drei verschiedene Formen von Landwirtschaft. (3)

Abbildung 3a: Drei verschiedene Formen der Landwirtschaft

b) **Definiere** den Begriff Unterernährung. (1)

c) Arbeite mit Abbildung 3b. **Beschreibe** und **benenne** mögliche Ursachen für Unterernährung auf der Welt. Beziehe Dich bei der Beantwortung der Frage auf spezifische Daten, Länder und / oder Regionen. (6)

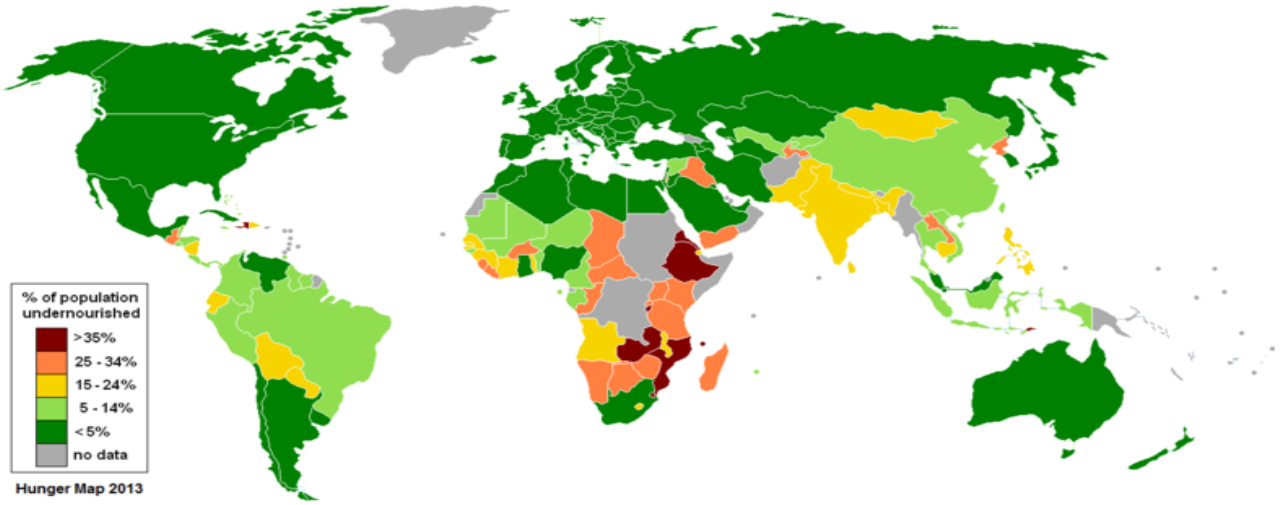


Abbildung 3b: Prozent unterernährter Menschen / Land im Jahre 2013

d) Verwende zur Beantwortung der Fragen ein Beispiel das Du im Unterricht gelernt hast:

i) **Erläutere,** auf welche Weise intensive Landwirtschaft das Problem der Unterernährung lösen kann. (3)

ii) Ist intensive Landwirtschaft die Lösung zur Bekämpfung von Unterernährung? Bewerte die Wirksamkeit als auch deren Auswirkungen. (5)

Frage 4 – Dynamische Landschaften: Flüsse (12 Punkte) - (20 Minuten)

Schreibe einen längeren Absatz oder einen Mini-Aufsatz zum Thema Überflutung von Flüssen.

- Lokalisieren das Beispiel, das Du gelernt hast
- Gib an, wann das Ereignis aufgetreten ist und was passiert ist
- Bewerte die menschlichen und physischen Ursachen
- Analysieren, inwieweit das Hochwasserereignis die betroffenen Menschen beeinflusst hat

Deine Antwort sollte ein Text sein (keine Aufzählungszeichen oder Tabellen) und sollte sowohl humane als auch physische Geographie berücksichtigen.

Mark Scheme (DE)

Frage	Unter-punkt	Teil		Gesamt	Aufgliederung der Punkte	Bemerkung
1						
	a		Eine geeignete Definition, die die im Unterricht vermittelten Punkte abdeckt. Zum Beispiel "den direkten Zerfall von Gesteinen durch physikalische, chemische oder biologische Einflüsse” Die Übersetzung des Textes wäre: “den direkten Zerfall von Gesteinen durch den Einfluss von Wetter."	2	2 x 1 Punkt	
					z.B. " Abbau von Gesteinen = 1", "in-situ (direkt) = 1"	
	b		i = y ii = z iii = x iv = w	4	4 x 1 Punkt	
	c		2 klare Vergleichspunkte, Möglichkeiten wären Transport, Sedimentgröße und Art der Bewegung.	2	2 x 1 Punkt	
	d		Eine deutliche Erklärung, die die Veränderung der Energie und die Gründe für diese Veränderung beinhaltet. Zum Beispiel: "Wenn ein Fluss in das Meer mündet, wird die Energie des Flusses reduziert, wodurch Sedimente abgelagert werden."	2	2 x 1 Punkt	
2						
	a		Niveaustufen der Bewertung	6		
			1 – 2 Im unteren Bereich schlechte oder einfache Diagramme ohne Beschriftung. Im oberen Bereich eine gute Serie von Skizzen ohne Beschriftung. Maximal 2 Punkte wenn keine Beschriftungen zum Diagramm hinzugefügt werden.		1 auch akzeptabel ist ein sehr gut beschriftetes Diagramm,statt einer Serie.	
			3 - 4 Im unteren Bereich Diagramme mit einigen Beschriftungen. Im oberen Bereich gute Diagramme mit beschrifteten Merkmalen, obwohl eine Stufe fehlen kann.			
			5 - 6 Im unteren Bereich klare und detaillierte Diagramme ohne Erwähnung von Erosion. Im oberen Bereich wird auf Erosion oder Erosionsprozesse eingegangen.			
	b					
		i	Eine Nehrung	1		
		ii	Nord-Westen oder West-Nord-West	2	2 Punkte-Frage da sie eine	

					Karteninterpretation erfordert.	
		iii	Niveaustufen der Bewertung	6		
			1 - 2 Im unteren Bereich wird von Bewegung oder Wellenbewegung gesprochen. Im oberen Bereich zusätzliche Erwähnung von Sediment oder Sandtransport. Maximal 2 Punkte verfügbar, wenn keine Erwähnung der Ablagerung.		Diagramme sind erlaubt, aber nicht notwendig.	
			3 - 4 Im unteren Bereich ein einfacher Hinweis auf die Ablagerung. Im oberen Bereich wird die Ursache der Ablagerung erklärt.		Lehrer sollten ihr professionelles Urteilsvermögen einsetzen, wenn die Antworten detailliert sind, aber nicht zu den Level-Deskriptoren passen.	
			5 - 6 Im unteren Bereich wird der Wellentyp kommentiert oder die Richtung der Wellen und es gibt eine klare Verbindung zwischen Strandversetzung und der Bildung der Nehrung. Im oberen Bereich muss entweder auf Abbildung 2a oder 2b verwiesen werden.			
	c					
		i	Eine Erklärung, die einen Kommentar über die Erosion bzw. die Abtragung von Gestein UND seine Auswirkungen auf den Menschen / auf wertvolles Land enthält.	2	2 x 1 Punkt	
		ii	Eine konkrete Methode des Küstenmanagements. Ein Vorteil wird beschrieben. Ein Nachteil wird beschrieben.	3	3 x 1 Punkt	
3						
	a		a = Ackerbau, b = Milchwirtschaft, c = Bergschafe und akzeptable Möglichkeiten	3	3 x 1 Punkt	
					Alternative Terminologie kann verwendet werden	
	b		Ein Kommentar über Nahrungsmangel oder Ernährung.	1		
	c		Niveaustufen der Bewertung	6		

			1 - 2 Im unteren Bereich einfache beschreibende Kommentare zur Karte. im oberen Bereich ein Versuch, ein Muster zu erkennen oder Merkmale zusammenzufassen. Eine reine Beschreibung ergibt maximal 2 Punkte.		Lehrer sollten ihr professionelles Urteilsvermögen einsetzen, wenn die Antworten detailliert sind, aber nicht zu den Leveldeskriptoren passen.	
			3 - 4 Im unteren Bereich Beschreibung UND eine eingeschränkte Begründung. Im oberen Bereich einige Argumente UND Verwendung von Daten.			
			5 - 6 Im unteren Bereich detaillierte Beschreibung, Begründung und Verwendung von Daten. Im oberen Bereich mit einem spezifischen Verweis auf Länder/Regionen UND/ODER mehr als ein Grund wird angegeben.			
	d					
		i	Passende beschreibende Kommentare. Zum Beispiel: Höhere Produktion von Lebensmitteln, Gewährleistung einer zuverlässigen Nahrungsmittelproduktion, Maximierung der Erträge auf den Feldern	3	3 x 1 Punkt	
		ii	Muss Wirksamkeit UND Auswirkung beinhalten, Eine Bewertung muss abgegeben werden. 1 Punkt für jeden richtigen Aspekt. Maximal 3 Punkte wenn die Auswertung fehlt. Zum Beispiel ein Schlusssatz darüber, ob intensive Landwirtschaft eine gute Lösung ist. 5 Punkte nur mit einer begründeten Meinung/Stellungnahme möglich.		5 x 1 Punkt (Maximal 3 Punkte wenn die Auswertung fehlt)	
4			Siehe Skala unten	12		

Question 4 Skala

	4 Punkte	3 Punkte	2 Punkte	1 Punkt
Beschreibung	Beschreibungen mit Angabe der Wirkungen.	Schwache Beschreibungen der Wirkungen.	Benanntes, lokalisiertes und datiertes Ereignis.	Benanntes Ereignis.
Auswertung von Ursachen	Physiogeograpische UND menschliche Ursachen werden eindeutig bewertet. Außerdem wird die Bedeutung der einzelnen Ursachen deutlich.	Auf physio-geographische UND menschliche Ursachen wird genauer eingegangen. Es gibt dabei eine grundlegende Bewertung.	Mehr als eine Ursache wird genannt.	Eine physio-geographische oder menschliche Ursache wird genannt.

		.		
Analyse der Auswirkungen	Eine Reihe von Einflüssen werden verbunden mit genauen Folgen und es wird versucht, diese mit menschlichen und physischen Ursachen in Beziehung zu setzen. Der Schüler zeigt die Fähigkeit, seine Antwort in einen Kontext zu stellen.	Eine Reihe von Einflüssen sind im Detail mit den Folgen verbunden und es wird versucht, diese mit den Ursachen von Überschwemmungen in Verbindung zu bringen.	Mehr als ein Einfluss ist mit einer Reihe von Konsequenzen verbunden.	Einfache Analyse. Ein Versuch, einen Einfluss mit einer Folge- oder Folgewirkung zu verknüpfen. Beispielsweise führen überflutete Straßen zu wirtschaftlichen Verlusten.
Link zu Leistungs- deskriptoren	Die Schülerinnen und Schüler zeigen ein exzellentes Verständnis der Bedeutung der Lage auf unterschiedlichen Ebenen. Der Schüler hat **eine ausgezeichnete** Fähigkeit dazu: die Elemente der physischen und menschlichen Geographie zu verstehen und die Wechselwirkungen zwischen ihnen zu bewerten. - die grundlegenden Ideen und Konzepte der Geographie zu nutzen und die entsprechende Terminologie in seiner zweiten Sprache zu entwickeln - die Rolle der globalen Verflechtungen in einer komplexen und vielfältigen Welt zu verstehen	Die Schülerinnen und Schüler zeigen **sehr gutes / gutes** Verständnis der Bedeutung der Lage auf unterschiedlichen Ebenen. Der Schüler hat **eine sehr gute/gute** Fähigkeit dazu: die Elemente der physischen und menschlichen Geographie zu verstehen und die Wechselwirkungen zwischen ihnen zu bewerten. die grundlegenden Ideen und Konzepte der Geographie zu nutzen und die entsprechende Terminologie in seiner zweiten Sprache zu entwickeln die Rolle der globalen Verflechtungen in einer komplexen und vielfältigen Welt zu verstehen	Die Schülerinnen und Schüler zeigen **zufriedenstellendes / ausreichendes** Verständnis der Bedeutung der Lage auf unterschiedlichen Ebenen. Der Schüler hat **eine zufriedenstellende/ ausreichende** Fähigkeit dazu: die Elemente der physischen und menschlichen Geographie zu verstehen und die Wechselwirkungen zwischen ihnen zu bewerten. die grundlegenden Ideen und Konzepte der Geographie zu nutzen und die entsprechende Terminologie in seiner zweiten Sprache zu entwickeln die Rolle der globalen Verflechtungen in einer komplexen und vielfältigen Welt zu verstehen	Die Schülerinnen/Schüler zeigen **sehr schlechtes** Verständnis der Bedeutung der Lage auf unterschiedlichen Ebenen. Der Schüler hat **eine sehr schwache** Fähigkeit dazu: die Elemente der physischen und menschlichen Geographie zu verstehen und die Wechselwirkungen zwischen ihnen zu bewerten. die grundlegenden Ideen und Konzepte der Geographie zu nutzen und die entsprechende Terminologie in seiner zweiten Sprache zu entwickeln die Rolle der globalen Verflechtungen in einer komplexen und vielfältigen Welt zu verstehen

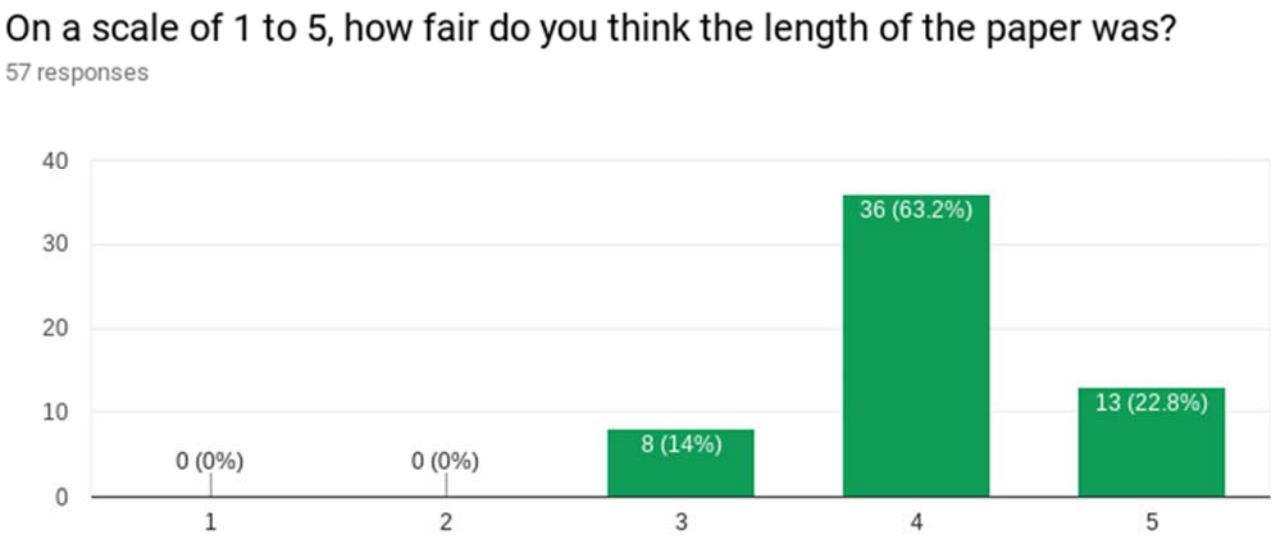
Eine klare und organisierte Struktur wird entsprechend gewürdigt.

Frage 4: Die Bewertungsskala ist auf die NMS abgestimmt.

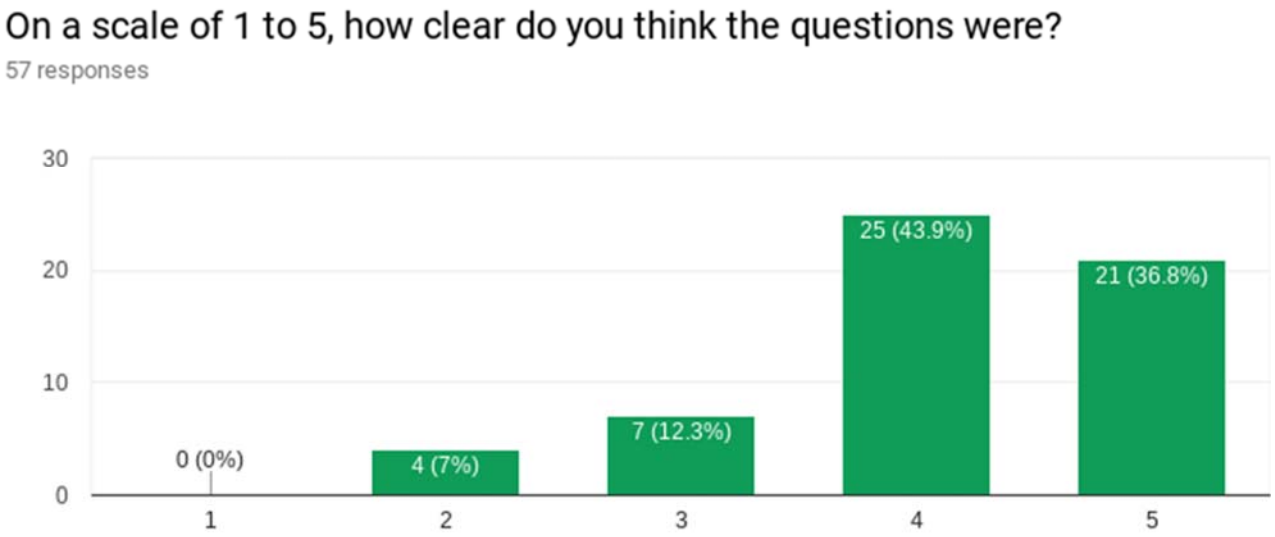
12	A Excellent
10-11	B Sehr gut
9	C Gut
7-8	D Befriedigend
6	E Ausreichend
4-5	F Ungenügend (Schwach)
0-3	Fx Ungenügend (Sehr schwach)

Student Feedback on S5 Harmonised Exam

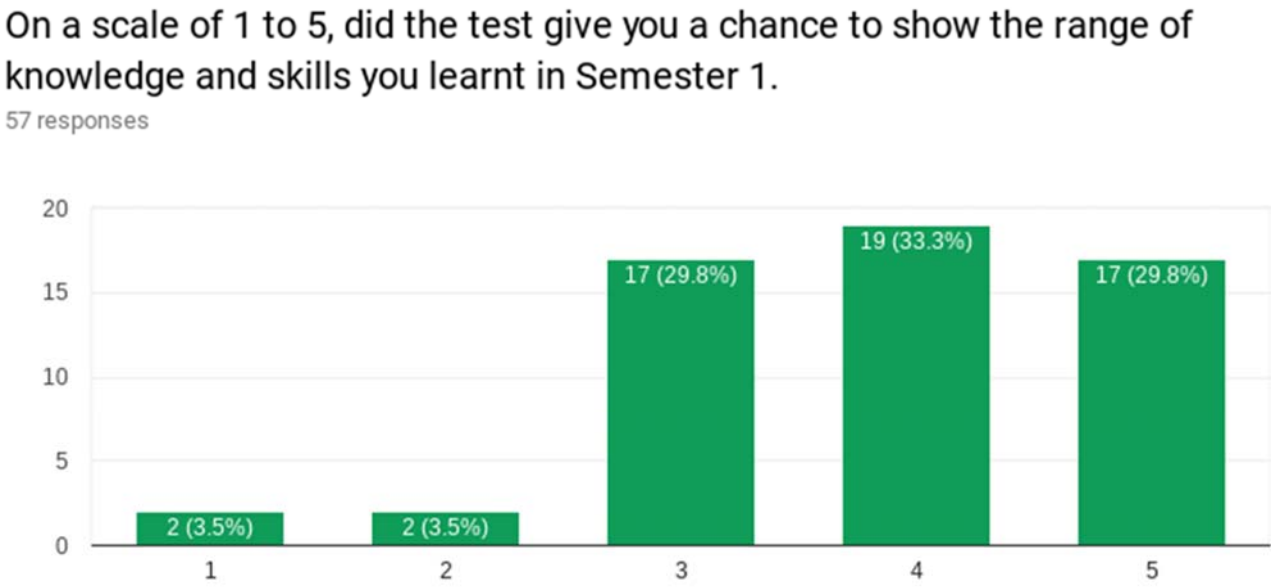
57 Students across two schools were used to trial the provided example of a S5 harmonised exam. After the students sat the exam they were asked for feedback as a way of assessing the suitability of the exam. A summary of the student feedback is outlined below.



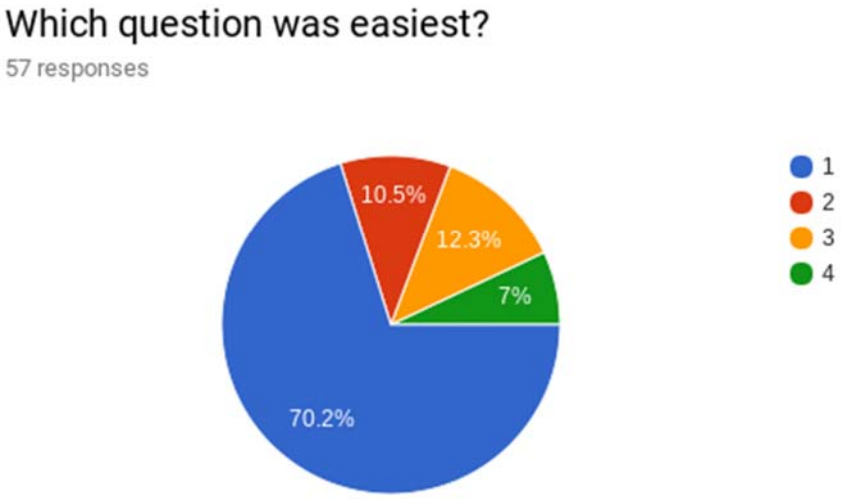
We believe the length of the paper, with respect to the and number of questions in the time allowed, was suitable. It should also be noted that 7% of the students taking the paper would normally have additional time, in the case of the test paper, extra time was not a practical option and this may explain some of the responses suggesting it was too long.



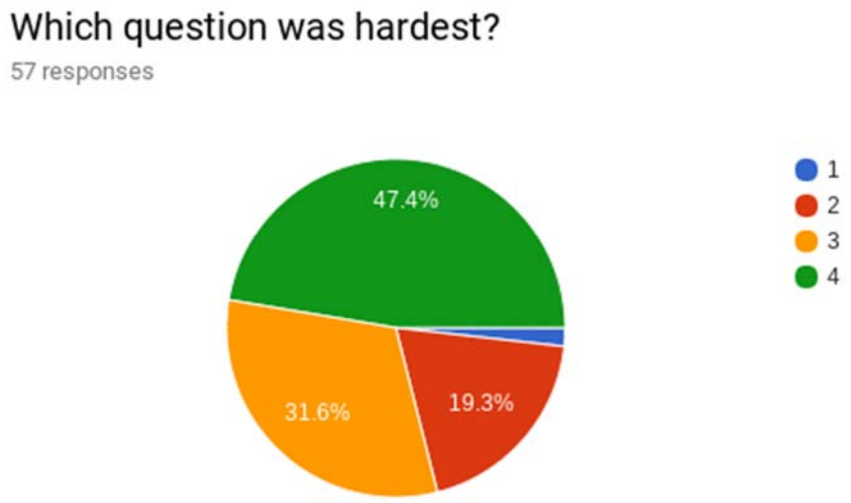
More than 80% of students scored the clarity of the questions to be 4 or 5 out of 5. This however means that perhaps there was uncertainty regarding around 20% of the questions. The most common confusion related to Q3 d part i and ii, whereby students were unsure of the difference between the two different parts of the question. There was also some confusion regarding Q2 b part ii with respect to making reference to the figures, some students were not clear that the question intended them to refer directly to the map or the photograph.



This is a challenging question to summarise simply. It is also a challenging question for a student to answer, however, the vast majority of responses (92%) scored it 3 or more. The paper tried to ensure that there was appropriate balance between assess knowledge and skill across the questions.



The response above indicates that the paper, as was intended, began with the most accessible question. This should provide weaker students with the opportunity to score some marks and build confidence for the rest of the paper. The responses also suggest that students found the last question the hardest, this was also as expected and designed.



The response above indicates that the paper, as was as also intended, ended with the most challenging question. The response also suggests that question type 2 and 3 are also challenging, which is again in line with the design of the paper. More time could be spent to differentiate the level of challenge further between all the question types.

The following appendix contains an example paper in English, French and German, and a suggested mark scheme.

Example student response - script 1

1.

a) Weathering is the break down of rock due to exposure to the atmosphere Weathering always happens in-situ.

b)

i) Abrasion - y) The movement of rocks against the river or sea bed causing the rocks and the bed to erode.

ii) Solution - z) The dissolving of rocks through the acidity of water

iii) Attrition - x) The repeated collision of two rocks into each other resulting in them decreasing in size.

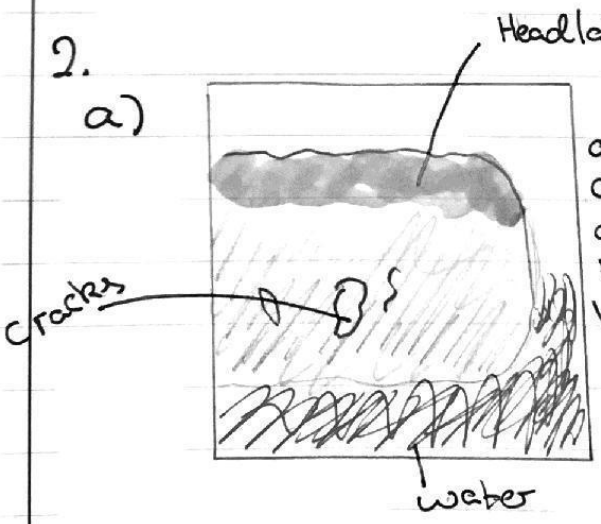
iv) Hydraulic action - w) The power of water and air entering cracks in rocks and breaking them apart.

c) Saltation is a process where a moving rock, collides with another rock and causes that one to move. Solution is the dissolving of rocks through the acidity of the water. Both could be thought of as a form of transportation. Both of the processes include the movement of rock from A to B.

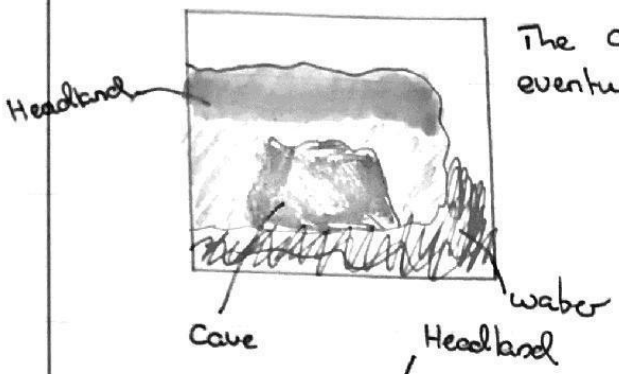
d) Deposition of sediment occurs when a river or sea, slows down and no longer has enough energy to transport the sediment. It then deposits by dropping the larger sediment. There are several ways in which rivers can slow down. One of them is when a river reaches a sea. Another is if the river becomes shallower, it also slows down.

2.

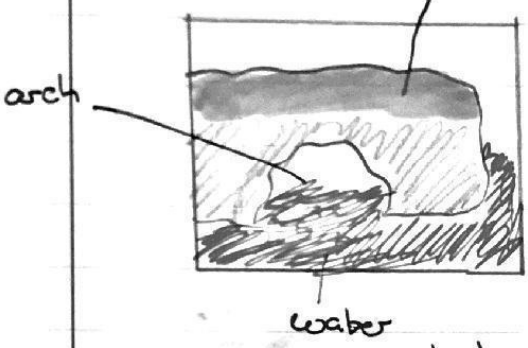
a)



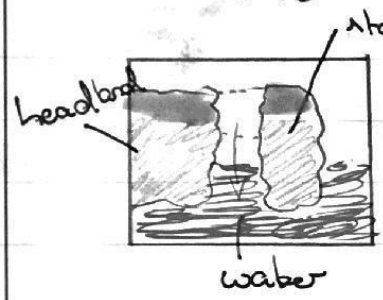
Initially there will be a headland with some cracks in the side. Through attrition and hydraulic action, these cracks will become bigger.



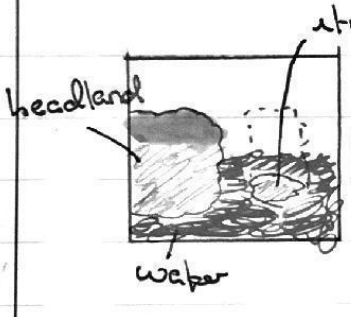
The cracks will widen until they eventually form a cave.



With time, the water will erode away the cave wall leaving you with an arch.



The arch will eventually no longer have support and collapse, leaving you with a stack



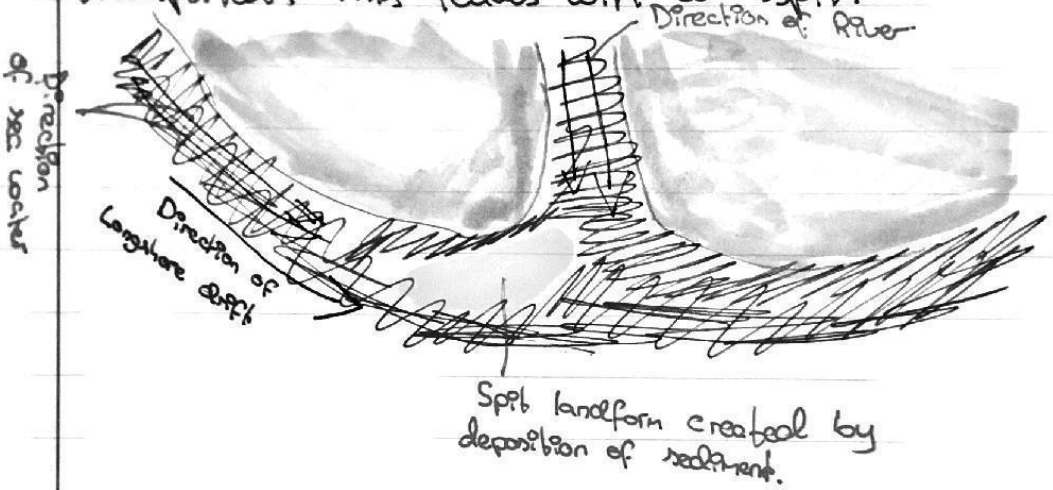
Eventually the stack will be weathered or eroded away leaving you with a stump. Another option is that the stack couldn't support itself and so toppled over leaving you with the same result.

b)

i) The landform in Figure 2b is a spit.

ii) In figure 2a, it shows us that longshore drift is going in a North-West direction.

iii) The figures 2a and 2b both show a landform called Spit. A spit is sediment that is being moved by longshore drift along the coast. Now when it reaches a river, the water slows down, leading to the deposition of the sediment transported. This leaves us with a spit.



c)

i) Erosion is a naturally occurring process which affects coastlines very heavily. It erodes away our coastline and therefore shrinks the land mass. It heavily effects people living on the coast with their houses being in danger of collapse.

2.

c)

iii) A method of reducing coastal erosion would be Beach Nourishment. In this, sediment is taken from the sea and taken to a beach. They then use that sediment to elongate the beach so that the waves loose all of their energy by the time it reaches the soil. This is a very cost effective method as it is fairly expensive and needs replacing every year or so.

3.

a)

(a) Arable Farming

(b) Pastoral Farming (Dairy)

(c) Hill Sheep Farming

b) Undernourishment is when you are not getting enough calories and protein, so, your body starts to metabolise fat cells, muscles and organs.

c) Figure 3b shows us that <5% of the population in Europe, North America, the very south of South America, the northern states of Africa, South Africa (country) and Australia are under nourished. This is as they are more ecaonmically developed countries and therefore have good enough farming systems alongside money to buy food for the population.
Places such as China or Brazil have 5-14% of population undernourished as they may not have such good farming but have money to import.
Central and Eastern Africa have the highest undernourished populations with neither money for imports nor a great farming system.

d)
i) Intensive farming could be a solution as it generates a high yields and requires no human labour as tasks can be preformed by machinery. This way we could tackle the task of producing enough food for our ever increasing population.

ii) I think that intensive farming is a good way of producing the amount of food that we need but, it will probably loose quality

and then isn't good enough quality wise for people to eat. This is highly important as quality is very important when it comes to food.

4.

River flooding occurs all over the world, it affects millions, if not billions of people yearly and can have positive and negative aspects. The example that I have studied is the flooding in Bangladesh in 1998.

May and June of that year were fairly dry with less than usual amounts of rain. In July it started to kick in and by then of the month it had already reach a peak. In August it continued to rain heavily and the rivers peaked again. By September, 70% of the country was or had been underwater and it took until the end of the month for the waters to retreat.

There are several reasons why Bangladesh floods yearly. Firstly, it has a monsoon climate which makes it very wet yearly. This combined with Bangladesh being a very flat country are physical causes for Bangladesh's intense flood.

Of course there are also human factors involved. A few that are very important are that the people settled right next to the river and built houses there. This means they are directly affected and they are in danger of loosing their homes.

Another human factor that played a role was climate change. The warmer weather led to more melting of the Himalayan glaciers and therefore more water

Example student response - script 2

Question 1

a)

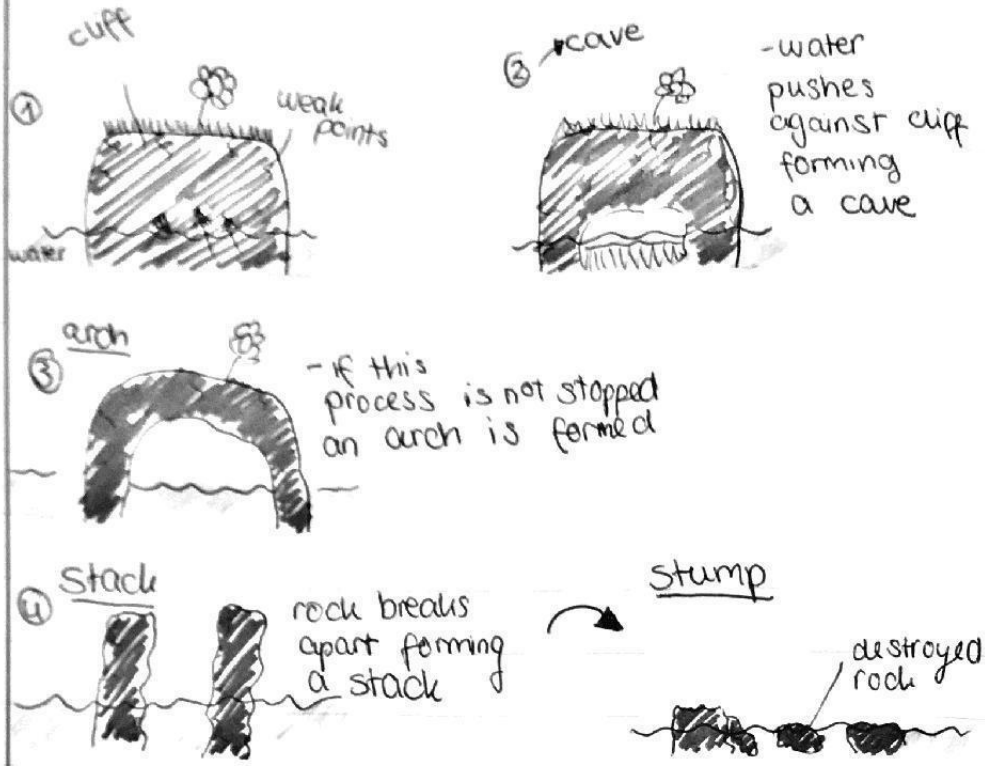
Weathering is the exposure, and break-down of material, soil, rocks etc, to the atmosphere.

b) i)- x) iii)- y)
ii)- z) iv)- w

c) Saltation is when mostly smaller rocks start to bounce underwater (energy is given from one pebble to another). → Solution is the dissolvement of material due to acidic water

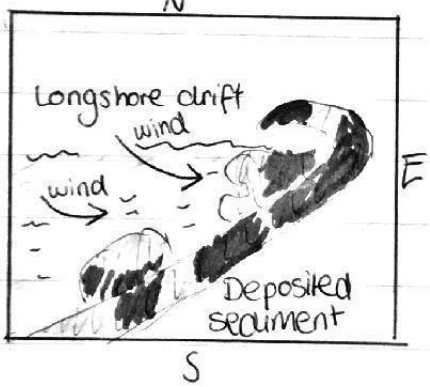
d) Deposition of sediment occurs when the velocity of the river/sea changes. This is common in rivers or seas

Question 2



b) i) landform → spit

ii)



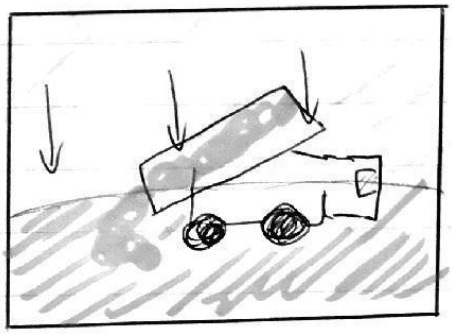
Sketch

- longshore drift occures from North-west → sediment can be deposited (eroded sediment from the coast oppositely)

ii;) Due to erosion sediment is broken of from coasts and transported (longshore drift) with the wind where sediment can be deposited in other areas to form a new landscape. In figure 2b you can see a coastal line. The water eroded the material and due to longshore drift and deposition a spit was formed.

c)i)Erosion is a problem for people who live in those coastal areas. If the landscape becomes smaller, so does their space, where they may have built their houses or planted their crops.

ii) A method of stopping or reducing this process is possible. This is called coastal managment. One example is beach nourishment. This is when already eroded material is replaced with new one. New soil can be taken from the sea ground → sand for example This method is often used at beach



-new material is transported by lorry

Question 3

a)

i). Arable - farming
ii) dairy farming
iii) sheep (hill) farming

b) Undernourishment is the lack of nutritions, vitamins etc a body must have in order to produce energy

c) 25-35% of the population in the south-east of Africa are undernourished. The reason for this is that Africa is a very economically poor country due to background history of slavery. If the economy is poor it's near to impossible to spend money on trading with other countries in order to get enough food to feed such a large amount of people

d)

i) intensive farming is the agriculture on a small piece of land. space doesn't go to waste and a lot of products can be grown. If more food is produced then the more food can be exported to the areas where people need it → for example Africa.

ii) If more of the intense farming is used then more food can be produced in order to feed undernourished areas where planting crops is near to impossible (due to climate or money). Land costs a lot of money. But if the same amount of crops can be planted on a much smaller area, then this can be sold for a less expensive price, making it more afordable for people who usually don't have enough money.

Question 4

Many areas are effected by the flooding, either rivers, seas or lakes cause.
One example for this is the flooding in Bangladesh (Asia) which occured in 1998.
Bangladesh is surraunded by mainly India.
Many rivers like the Jhamaptral flow through Bangladesh making it a perfect victim for floods
During the "flood" season, when river banks are at their highest, many houses were underwater making hundreds and thousands homeless.
The reason, for these floodings, is simple.
Rivers and seas rise due to (mealtment) is that even a word? of the poles caused by pollution, a human cause.
If the heat gets trapped inside our atmosphere ice starts to melt, sea levels rise.
A natural cause for this flood is that Bangladesh lays in an area which is affected by monsoon ~~the~~ climate. This means that it rains a lot during the summer weather making the rivers rise even more.
The effect it has on people is very large.
Electricity is out off, people become homeless and there is no running water causing people to die.

Example student response - script 3

Q1)

a) When large amounts of water erodes materials.

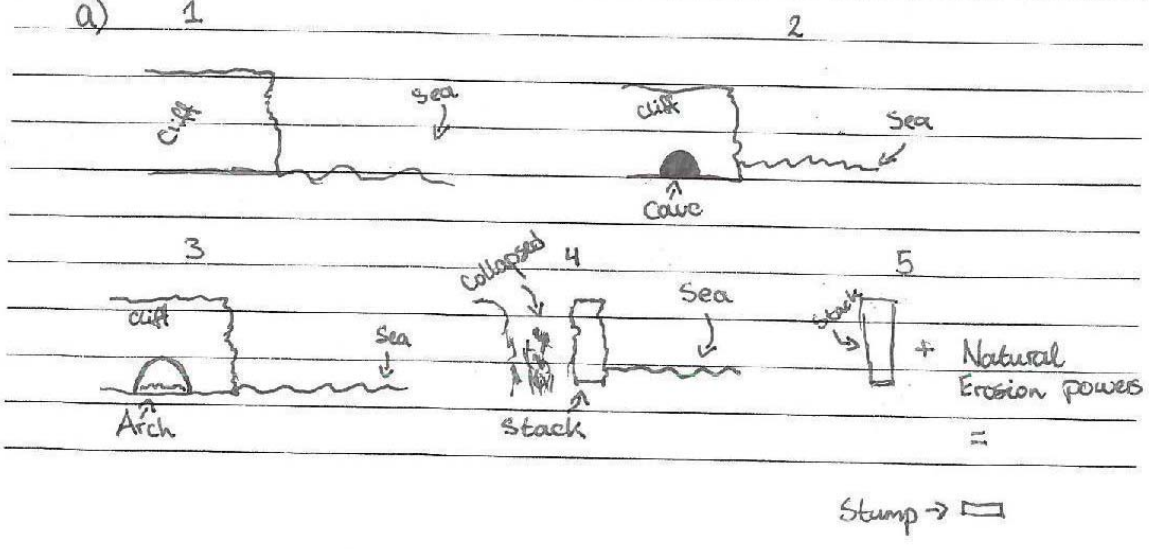
b) Abrasion: y
Solution: z
Attrition: w
Hydrolic Action: x

c) Saltation carries smaller pieces of material while Solution leaves little or no trail.

d) Deposition happens in rivers at the end of the river because at that point the water wouldn't be moving as fast and material from further up the river would fall to the bottom

Q2)

a)



b) i) The landform is a spit

ii) Longshoredrift is going east, because all the sand is on the west side and it's creeping eastwards.

c) i) Erosion is a problem because the entire spit is made of sand which erodes very easily and quickly.

ii) Sea walls: Sea walls is one of the ways to protect a place from the ocean. It is a wall of concrete that deflects off waves so they can't move towards dunes of sand or other erodable material. They are the most expensive, best they are also the most efficient and helpful.

Q3)

a) a: Internal

b: External

c: Hill sheep

b) Undernourishment is when one does not get the requiered amount of calories per day. Developing countries have a higher level of undernourished people.

c) Countries who has more poor people will have more undernourished people because people doesn't have enough money for food. It also shows that, countries who has/is fighting a war would be more undernourished than countries who have peace. Also, countries who have recently escaped or are still under the rule of a dictator are more undernourished than others.

d) i) Intensive farming may be a solution because, it has a higher yield, and will most often be used for crops and animals which you can have a lot of. Also, it could help restore food security.

ii) Intensive farming could be effective, but might also not be. There are benefits to it, like high yield and food security, but some of the cons are that a lot of polution will be made, because of fertalizers & pesticides. Also, it is not very good for animal life, and can spreads deseases quicker.

Q4)

On December 5th, 2015, a storm was coming towards the West of England. It's name was Storm Desmond. It had been carried towards land by powerful winds, and caused a lot of rain. The rivers, Eden & Greta, were both quickly flooded. This is because the ground around the rivers was not absorbant to water, so the rain ran straight into the rivers. This caused the town of Cumbria to flood. Within 24 hours, 400 mm of rain fell. This caused some major problems in Cumbria. 5200 homes flooded, and 61,000 lost power. Farmland was destroyed. Sheep drowned. Causes of this horrific flood would be Storm Desmond floating everything, and people overfarming the land, which led to the water rushing into the rivers.

Example marks for student response - script 1

Question	Sub	Part		Total	Mark break down	Result
1						
	a		An appropriate **definition** that covers the points taught in class. For example, "the breaking down of rocks in situ for example by weather."	2	2 x 1 mark	**2**
					E.g "break down of rocks = 1", "in-situ = 1"	
	b		i = y ii = z iii = x iv = w	4	4 x 1 mark	**4**
	c		2 Clear **comparative** points, possibilites include transport, sediment size and movement type.	2	2 x 1 mark	**2**
	d		A clear **explanation** that includes change in energy and reasons for this change. For example, "as a meets the sea the energy of the river is reduced, this causes sediment to be depositied."	2	2 x 1 mark	**2**
2						
	a		Level marking	6		**6**
			1 - 2 At lower end, poor or simple diagrams with no labels. At upper end, good series of sketches with no labels. Maximum of 2 marks available if no labels are added to diagram.		1 very well-labelled diagram, rather than a series is also acceptable	
			3 - 4 At lower end, diagrams with some labels. At upper end, good diagrams with features labelled, although a stage may be missing.			
			5 - 6 At lower end, clear and detailed diagrams with no mention of erosion. At upper end erosion or erosional processes are included.			
	b					
		i	A spit	1		**1**
		ii	North-West or West-North-West	2	2 mark question since it requires map interpretation	**2**
		iii	Level marking	6		**6**
			1 - 2 At lower end, mention of movement or wave action. At upper end, additional mention of sediment or sand transport. Maximum of 2 marks available if no mention of depostion.		Diagrams are allowed but not necessary	
			3 - 4 At lower end, simple reference to deposition. At upper end, the cause of deposition is explained.		Teachers should use their proffessional judgement where answers are detailed but do not fit the level descriptors.	
			5 - 6 At lower end, comment on wave type or direction and clear link between LSD and spit formation. At upper end, must be named reference to either figure 2a or 2b.			
	c					
		i	An explanation that includes a comment on the break down or removal of rock AND its impact on people / valuable land.	2	2 x 1 mark	**2**
		ii	A named method of coastal management. An advantage is described. A disadvantage is described.	3	3 x 1 mark	**3**
3						

	a		a = arable, b = dairy, c = hill sheep and acceptable options	3	3 x 1 mark	**3**
					Alternative terminology may be used	
	b		A comment about lack of food or nutrition.	1		**1**
	c		Level marking	6		**6**
			1 - 2 At lower end, simple descriptive comments about the map. At upper end, an attempt to see or summarise a pattern. Maximum of 2 marks available if only descriptive.		Teachers should use their professional judgement where answers are detailed but do not fit the level descriptors.	
			3 - 4 At lower end, description AND limited reasoning given. At upper end, some reasoning AND use of data.			
			5 - 6 At lower end, detailed description, reason given and data used. At upper end, specific reference to countries/regions AND/OR more than one reason given.			
	d					
		i	Appropriate descriptive comments. For example, produces more food, reliable food production, maximises the yield from the land.	3	3 x 1 mark	**3**
		ii	Must include effectiveness AND impact, evaluation must be present. 1 Mark for each valid comment. Maximum of 3 for no evaluation. For example, a concluding sentence about whether intensive farming is a good solution. 5 marks only possible with a definite opinion/conclusion.		5 x 1 mark (Maximum of 3 for no evalaution)	**4**
4			See matrix below	12		**11**

Question 4 Matrix

	4 Points	**3 Points**	**2 Points**	**1 Point**
Description	Descriptions with details of effects given.	Weak descriptions of effects given.	Named, located and dated event.	Named event.
Evaluation of causes	Physical AND human causes are clearly evaluated with some idea of significance of different causes.	Physical AND human causes are referred to in detail. Basic evaluation.	More than one cause is stated.	One cause, physical or human, is given.
Analysis of impact	A number of effects are linked in detail to consequences and an attempt is made to relate these to human and physical causes. The student demonstrates an ability to contextualise their answer.	A number of effects are linked in detail to consequences and an attempt is made to relate these to flood causes.	More than one effect is linked to a number of consequences.	Simple analysis. An attempt to link an effect with a consequence or knock-on impact. For example flooded roads lead to economic loss.

Overall paper mark

	Overall	Nearest 0.5 / 10	Level
Total	58/60	9.5	A Excellent

Example marks for student response - script 2

Question	Sub	Part		Total	Mark break down	Result
1						
	a		An appropriate **definition** that covers the points taught in class. For example, "the breaking down of rocks in situ for example by weather."	2	2 x 1 mark	**2**
					E.g "break down of rocks = 1", "in-situ = 1"	
	b		i = y ii = z iii = x iv = w	4	4 x 1 mark	**2**
	c		2 Clear **comparative** points, possibilites include transport, sediment size and movement type.	2	2 x 1 mark	**1**
	d		A clear **explanation** that includes change in energy and reasons for this change. For example, "as a meets the sea the energy of the river is reduced, this causes sediment to be depositied."	2	2 x 1 mark	**1**
2						
	a		Level marking	6		**5**
			1 - 2 At lower end, poor or simple diagrams with no labels. At upper end, good series of sketches with no labels. Maximum of 2 marks available if no labels are added to diagram.		1 very well-labelled diagram, rather than a series is also acceptable	
			3 - 4 At lower end, diagrams with some labels. At upper end, good diagrams with features labelled, although a stage may be missing.			
			5 - 6 At lower end, clear and detailed diagrams with no mention of erosion. ~~At upper end erosion or erosional processes are included.~~			
	b					
		i	A spit	1		**1**
		ii	North-West or West-North-West	2	2 mark question since it requires map interpretation	**2**
		iii	Level marking	6		**3**
			1 - 2 At lower end, mention of movement or wave action. At upper end, additional mention of sediment or sand transport. Maximum of 2 marks available if no mention of depostion.		Diagrams are allowed but not necessary	
			3 - 4 At lower end, simple reference to deposition. ~~At upper end, the cause of deposition is explained.~~		Teachers should use their proffessional judgement where answers are detailed but do not fit the level descriptors.	
			5 - 6 At lower end, comment on wave type or direction and clear link between LSD and spit formation. At upper end, must be named reference to either figure 2a or 2b.			
	c					
		i	An explanation that includes a comment on the break down or removal of rock AND its impact on people / valuable land.	2	2 x 1 mark	**2**
		ii	A named method of coastal management. An advantage is described. A disadvantage is described.	3	3 x 1 mark	**3**
3						

	a		a = arable, b = dairy, c = hill sheep and acceptable options	3	3 x 1 mark	**3**
					Alternative terminology may be used	
	b		A comment about lack of food or nutrition.	1		**1**
	c		Level marking	6		**4**
			1 - 2 At lower end, simple descriptive comments about the map. At upper end, an attempt to see or summarise a pattern. Maximum of 2 marks available if only descriptive.		Teachers should use their professional judgement where answers are detailed but do not fit the level descriptors.	
			3 - 4 At lower end, description AND limited reasoning given. At upper end, some reasoning AND use of data.			
			5 - 6 At lower end, detailed description, reason given and data used. At upper end, specific reference to countries/regions AND/OR more than one reason given.			
	d					
		i	Appropriate descriptive comments. For example, produces more food, reliable food production, maximises the yield from the land.	3	3 x 1 mark	**3**
		ii	Must include effectiveness AND impact, evaluation must be present. 1 Mark for each valid comment. Maximum of 3 for no evaluation. For example, a concluding sentence about whether intensive farming is a good solution. 5 marks only possible with a definite opinion/conclusion.		5 x 1 mark (Maximum of 3 for no evalaution)	**4**
4			See matrix below	12		**8**

Question 4 Matrix

	4 Points	**3 Points**	**2 Points**	**1 Point**
Description	Descriptions with details of effects given.	Weak descriptions of effects given.	Named, located and dated event.	Named event.
Evaluation of causes	Physical AND human causes are clearly evaluated with some idea of significance of different causes.	Physical AND human causes are referred to in detail. Basic evaluation.	More than one cause is stated.	One cause, physical or human, is given.
Analysis of impact	A number of effects are linked in detail to consequences and an attempt is made to relate these to human and physical causes. The student demonstrates an ability to contextualise their answer.	A number of effects are linked in detail to consequences and an attempt is made to relate these to flood causes.	More than one effect is linked to a number of consequences.	Simple analysis. An attempt to link an effect with a consequence or knock-on impact. For example flooded roads lead to economic loss.

Overall paper mark

	Overall	Nearest 0.5 / 10	Level
Total	45/60	7	C Good

Example marks for student response - script 3

Question	Sub	Part		Total	Mark break down	Result
1						
	a		An appropriate **definition** that covers the points taught in class. For example, "the breaking down of rocks in situ for example by weather."	2	2 x 1 mark	**2**
					E.g "break down of rocks = 1", "in-situ = 1"	
	b		i = y ii = z iii = x iv = w	4	4 x 1 mark	**4**
	c		2 Clear **comparative** points, possibilites include transport, sediment size and movement type.	2	2 x 1 mark	**2**
	d		A clear **explanation** that includes change in energy and reasons for this change. For example, "as a meets the sea the energy of the river is reduced, this causes sediment to be depositied."	2	2 x 1 mark	**2**
2						
	a		Level marking	6		**2**
			1 - 2 At lower end, poor or simple diagrams with no labels. At upper end, good series of sketches with no labels. Maximum of 2 marks available if no labels are added to diagram.		1 very well-labelled diagram, rather than a series is also acceptable	
			3 - 4 At lower end, diagrams with some labels. At upper end, good diagrams with features labelled, although a stage may be missing.			
			5 - 6 At lower end, clear and detailed diagrams with no mention of erosion. At upper end erosion or erosional processes are included.			
	b					
		i	A spit	1		**1**
		ii	North-West or West-North-West	2	2 mark question since it requires map interpretation	**X**
		iii	Level marking	6		**4**
			1 - 2 At lower end, mention of movement or wave action. At upper end, additional mention of sediment or sand transport. Maximum of 2 marks available if no mention of depostion.		Diagrams are allowed but not necessary	
			3 - 4 At lower end, simple reference to deposition. At upper end, the cause of deposition is explained.		Teachers should use their proffessional judgement where answers are detailed but do not fit the level descriptors.	
			5 - 6 At lower end, comment on wave type or direction and clear link between LSD and spit formation. At upper end, must be named reference to either figure 2a or 2b.			
	c					
		i	An explanation that includes a comment on the break down or removal of rock AND its impact on people / valuable land.	2	2 x 1 mark	**2**
		ii	A named method of coastal management. An advantage is described. A disadvantage is described.	3	3 x 1 mark	**3**
3						

	a		a = arable, b = dairy, c = hill sheep and acceptable options	3	3 x 1 mark	**2**
					Alternative terminology may be used	
	b		A comment about lack of food or nutrition.	1		**1**
	c		Level marking	6		**4**
			1 - 2 At lower end, simple descriptive comments about the map. At upper end, an attempt to see or summarise a pattern. Maximum of 2 marks available if only descriptive.		Teachers should use their professional judgement where answers are detailed but do not fit the level descriptors.	
			3 - 4 At lower end, **description** AND limited **reasoning** given. At upper end, some reasoning AND use of data.			
			5 - 6 At lower end, ~~detailed description,~~ reason given and data used. At upper end, specific reference to countries/regions AND/OR more than one reason given.			
	d					
		i	Appropriate descriptive comments. For example, produces more food, reliable food production, maximises the yield from the land.	3	3 x 1 mark	**3**
		ii	Must include effectiveness AND impact, evaluation must be present. 1 Mark for each valid comment. Maximum of 3 for no evaluation. For example, a concluding sentence about whether intensive farming is a good solution. 5 marks only possible with a definite opinion/conclusion.		5 x 1 mark (Maximum of 3 for no evalaution)	**5**
4			See matrix below	12		**11**

Question 4 Matrix

	4 Points	**3 Points**	**2 Points**	**1 Point**
Description	Descriptions with details of effects given.	Weak descriptions of effects given.	Named, located and dated event.	Named event.
Evaluation of causes	Physical AND human causes are clearly evaluated with some idea of significance of different causes.	Physical AND human causes are referred to in detail. Basic evaluation.	More than one cause is stated.	One cause, physical or human, is given.
Analysis of impact	A number of effects are linked in detail to consequences and an attempt is made to relate these to human and physical causes. The student demonstrates an ability to contextualise their answer.	A number of effects are linked in detail to consequences and an attempt is made to relate these to flood causes.	More than one effect is linked to a number of consequences.	Simple analysis. An attempt to link an effect with a consequence or knock-on impact. For example flooded roads lead to economic loss.

Overall paper mark

	Overall	Nearest 0.5 / 10	Level
Total	48/60	7.5	C Good