

YEAR 10 SCIENCE
EXAMINATION - SEMESTER 2, 2015



KINROSS
COLLEGE
Believe · Act · Achieve

WRITTEN QUESTION AND ANSWER BOOKLET 2

STUDENT'S NAME:
TEACHER'S NAME:
DATE:

Topic	Section	Marks
Earth Science	Multiple choice	/10
	Short answer	/20
	Investigating	/15
	Extended /answer	/15
Genetics and Evolution	Multiple choice	/10
	Short answer	/20
	Investigating	/15
	Extended Answer	/15
Total		/120

INSTRUCTION TO CANDIDATES:

1. **Read** through the paper to familiarise yourself with all of the questions.
2. Use a **blue or black** ballpoint / ink pen. Use pencil for drawing any graphs.
3. **Write** your answers in this booklet.
4. Should you require more space than you have been given please use **the spare sheet** (at the back of this booklet) and ensure that you include your name and the question / statement to which you are responding.

No other items may be taken into the examination room.

It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **BEFORE** reading any further. All iPads and mobile phones must be turned off and in your bag along with any other devices and notes. Bags are to be closed and placed under the desk.

AT THE END OF THE EXAMINATION:

- Any planning sheets or other pieces of paper **MUST** be handed in with this booklet.
- At the end of the examination make sure that your name is on your booklet and any other pieces of paper used.

Note: Do not turn the page until you are asked to do so.

1. Organisms have **adaptations** that make them better suited to their environment. These adaptations can be classified into three different types. Complete the table below on adaptation types:

Adaptation type	Description	Example
Structural		
	An adaptation that affects the internal workings of the organism	
		Desert animals are more active at night

(6 marks)

2. Malaria is a deadly disease caused by a parasite that invades your red blood cells. It is passed to humans when they are bitten by infected mosquitos. The species of mosquito that carries the disease is only found in countries near the equator.

Sickle Cell Disease is an inherited disease that changes the shape of your red blood cells, making it difficult to transport oxygen around your body. It occurs as a natural variation in humans. People with sickle cell disease have a variety of serious health issues.

People with sickle cell disease cannot contract malaria.

- a. In terms of natural selection, why do you think sickle cell disease is very rare in ethnic groups from northern Europe?

(3 marks)

- b. Do you think sickle cell disease would be more or less common in ethnic groups from equatorial areas? Explain your answer.

(4 marks)

3. a. What is selective breeding?

(2 marks)

b. Would selective breeding bring about changes in populations faster or slower than natural selection? Explain your answer.

(3 marks)

c. Suggest two characteristics in any agricultural species that humans might want to selectively breed for

(2 mark)

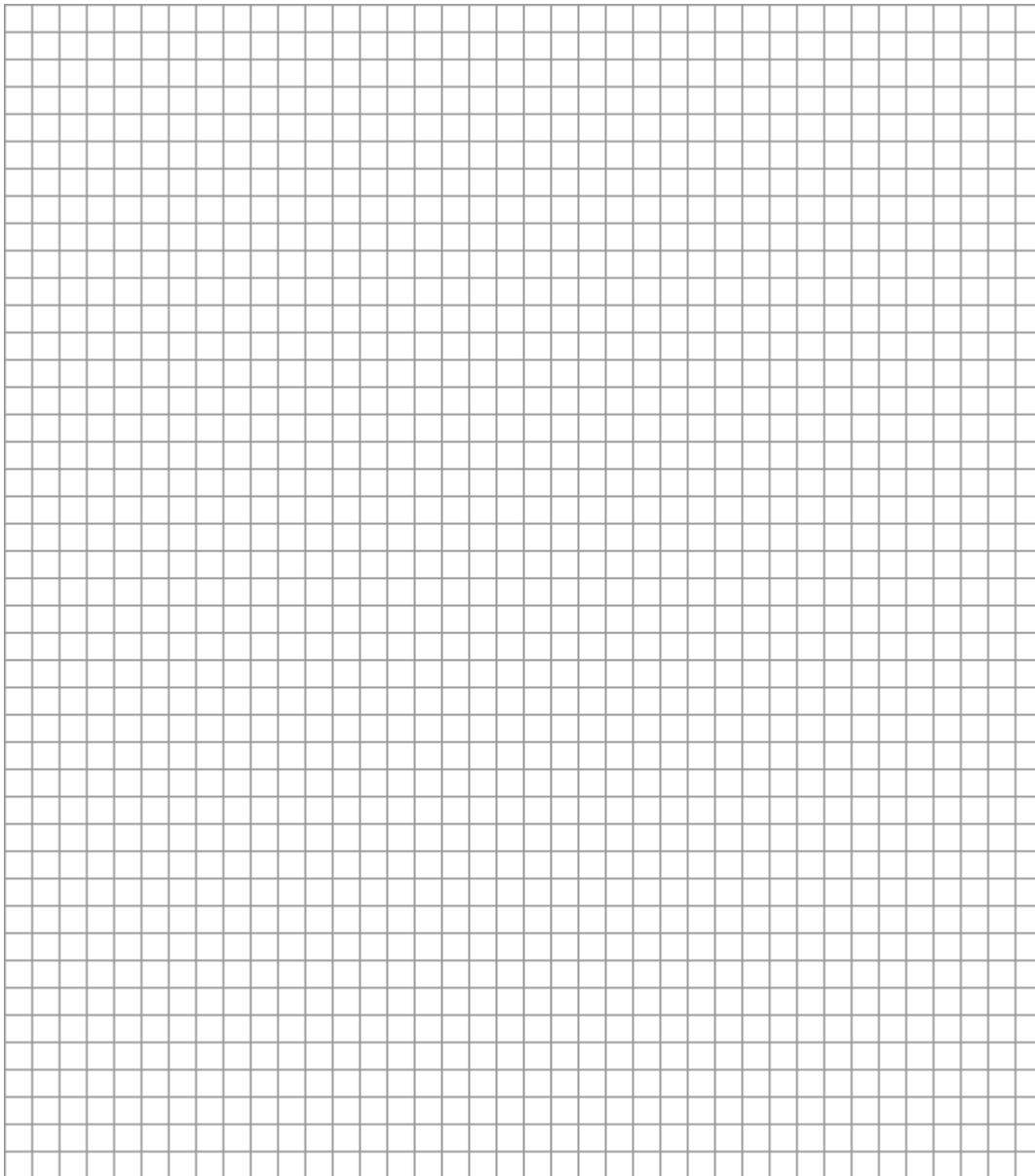
4. Peppered moths are a type of insect that has two, naturally occurring, colourations. They are either light in colour or dark in colour. The light colouration gives excellent camouflage against clean tree trunks, while the dark colouration gives excellent camouflage against a black background.

During the industrial revolution of the late 1800s, when factories produced a lot of pollution in the form of black dust, or soot, dramatic changes were observed in the population of peppered moths in England.

The table below gives the results of a study of moth numbers from this time:

Year	Number of light moths	Number of dark moths	Year	Number of light moths	Number of dark moths
1882	536	113	1888	147	493
1883	483	195	1889	85	545
1884	399	217	1890	55	600
1885	236	275	1891	60	577
1886	225	337	1892	79	560
1887	194	412	1893	122	497

a. On the grid below (over the page), plot a line graph showing the change in moth populations over time. You should have two lines on your graph, one for light moths and one for dark moths.



(8 marks)

b. Describe what happens to the numbers of light moths between 1882-1893

(2 marks)

c. Describe what happens to the numbers of dark moths between 1882-1893

(2 marks)

d. A law was passed during this period forcing factories to reduce the pollution they produced. What year do you think this happened? Explain your answer.

(3 marks)

5. The diagram below shows an ambulance, with its siren sounding, speeding off to an emergency:



Although the siren continually produces the same sound, the pitch of that sound appears to change depending on whether the ambulance is moving towards you or away from you.

- a. The ambulance is moving away from Zoe and towards Tom. For each of Tom and Zoe, state whether the pitch sounds **higher** or **lower**. (2 marks)

For Zoe the pitch sounds - _____

For Tom the pitch sounds - _____

- b. Explain your answer to part a. You should use the words **wavelength**, **frequency**, **higher**, **lower**, **pitch**, **stretched** and **compressed** in your answer. You may also draw a diagram to help explain your answer. (8 marks)

- c. What is the name given to this apparent change in pitch. (1 mark)

6. a. Name the eight planets of our solar system (4 marks)

b. The eight planets are sometimes grouped as the four inner planets and the four outer planets. State two **physical/structural** differences between the inner planets and the outer planets. (2 marks)

c. All eight planets spin around an imaginary line that runs from their north pole, through the centre of the planet, to their south pole. What is this line called? (1mark)

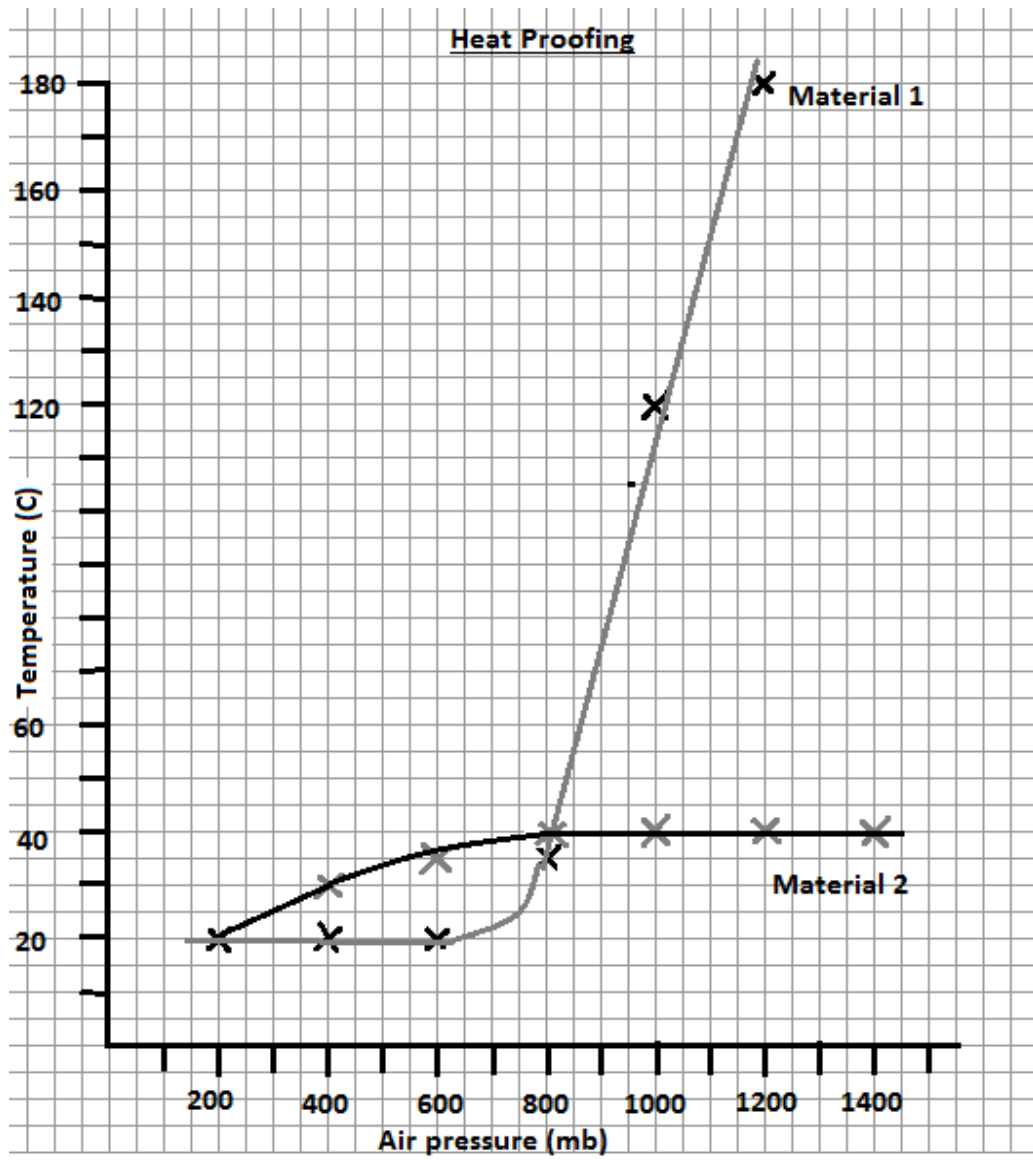
d. One of the planets spins with a **retrograde motion**. What does retrograde motion mean? (1 mark)

e. Which planet is it that has a retrograde motion? (1 mark)

7. When the Space Shuttle returns to Earth after a mission it becomes very hot due to air resistance as it re-enters the Earth's atmosphere. For this reason, it has a heat resistant material throughout its structure.

Scientists wanted to test a new material to use for this purpose. To do this they built a scale model of the space shuttle and tested it in a special wind tunnel where they could alter the air pressure acting on the model to mimic conditions in different areas of the atmosphere. Temperature sensors inside the model allowed them to compare the effectiveness of the new materials they were testing.

The graph below (over the page), shows their results for two materials:



(Answer question on next page)

a. When they tested material 1 what were the:

Independent variable - _____

Dependent variable - _____

(2 marks)

b. Name one thing, when comparing the two materials, which would need to have been kept the same to ensure it was a fair test.

(1 mark)

c. Use the graph to predict the temperature for:

Material 1 at a pressure of 300mb- _____

Material 1 at a pressure of 1100mb- _____

Material 2 at a pressure of 500mb- _____

Material 2 at a pressure of 1100mb- _____

(4 marks)

d. Use the graph to predict the pressure when:

(4 marks)

Material 1 was at a temperature of 110C- _____

Material 1 was at a temperature of 165C- _____

Material 2 was at a temperature of 33C- _____

Material 2 was at a temperature of 25C- _____

e. Which was the better material at lower air pressures?

(1 mark)

f. Which was the better material at higher air pressures?

(1 mark)

g. Which material would you choose to line the Space Shuttle? Explain your answer.

(2 marks)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

9. Answer **either** Question A **or** Question B below. **DO NOT ATTEMPT BOTH QUESTIONS.**

- A. (**VET** Classes) Describe meteors, meteorites, comets and asteroids (include at least three pieces of information for each) (12 marks)

- and list them in general size order from largest to smallest (3 marks)

OR

- B. (**ATAR** Classes) Write an essay about the greenhouse effect

 - Describe what the greenhouse effect is (3 marks)
 - Describe what the enhanced greenhouse effect is, naming two greenhouse gases and where they come from (6 marks)
 - Use examples of other planets in our solar system to describe the effect extreme atmospheric differences can have on the planets' climate (6 marks)

.....

.....

.....

.....

