Hoërskool Johan Jurgens

Grade 10 Life Sciences 2025

School Based Assessment

Term 2 Assignment

Examiner: **Mr K. da Gama**

Moderator: **Mrs S. Stoltz**

Duration: **60 minutes**
Total Marks: **55**

Name: _____

Grade: 10 key __

Instructions and information:

1. Read the following instructions carefully before answering the questions.
2. Answer ALL the questions.
3. This paper consists of 8 pages and includes FOUR questions
4. START EACH QUESTION ON A NEW PAGE.
5. Write ALL the answers in the ANSWER SHEET PROVIDED.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Present your answers according to the instructions of each question.
8. Do ALL drawings in pencil and label them in blue ink.
9. Draw diagrams, tables, or flow charts only when asked to do so.
10. The diagrams in this question paper are NOT necessarily drawn to scale.
11. You may use a non-programmable calculator, protractor, and a compass where necessary.
12. Round off all calculations to two decimals after the comma.
13. Write neatly and legibly.

Question 1: Food test for starch

Aim: To find out if starch is present in common types of food.

Apparatus/Chemicals:

1. Ten medium sized test – tubes (preferably ±10 cm tall or a test plate (white).
2. Scalpel or razor blade
3. Dropper
4. Materials: Small amounts of different food stuffs (preferably the ones easily available to you (what learners use every day), e.g., carrot, rice, grapes, potato, egg white, fish, ripe banana, bread rolls, chicken, cooking oil, breakfast cereal.
5. Reagent: Iodine solution.

Method:

- Cut a small piece from each of your food stuffs and put each piece in a separate cell of your test plate or test tube.
- For your control put half a spatula-full of starch powder in one of the cells of your test plate/test tube.
- Use the dropper to put one drop of the iodine solution on each of the types of food.
- Leave the experiment for 30 seconds without disturbing the test plate/test tubes.
- Observe the results: Observe the color of each type of food and compare it to the color change of starch after adding iodine solution.

Precautions:

1. Do not leave the bottle containing iodine open because iodine (I_2) sublimes (changes from solid to vapor once exposed to air).
2. Make sure that the iodine solution is not exposed to direct sunlight; hence you are instructed to keep it in an amber bottle.
3. Make sure that there is no spillover of the liquid from any of the test plate cells.
4. Avoid touching iodine crystals and iodine solution with your bare hands.
5. Do not include any processed food among the type of food you are testing. Examples: processed food; bread, yoghurt, cakes, viennas etc.

Observation below:

		Observation		Results	
	Original name of food	**Color change when iodine solution is added**	**(+) or (-)**	**A lot of starch present**	**No starch present**
Example	**Rice grains**	**Blue black**	**+**	**Starch present**	**-**
1	Eggs white	None	**-**		
2	Fish	None	**-**		
3	Potatoes	Blue black	**+**		
4	Grapes	None	**-**		
5	Ripe Banana	Blue black	**+**		
6	Bread Rolls	Blue black	**+**		
7	Chicken	None	**-**		
8	Cooking Oil	None	**-**		
9	Carrots	Blue black	**+**		
10	Breakfast cereal	Blue black	**+**		

Questions:

Answer the following questions in response to what you observed:

1.1. Redraw the table above on your answer sheet, then use the observation to complete it, by stating whether the foods have “starch present” or “no starch present” (11)

1.2. Name and explain the method we used in the experiment above to test for the presence of starch? (3)

1.3. Starch provides the body with a lot of energy and if taken in excess it is converted to fat in the body. Which two types of food from your list should be taken by a busy athlete? Give a reason for your answer. (3)

1.4. Which two types of food from your list would make part of a good diet for a diabetic person. Give a reason for your answer. (3)

1.5. Suggest two food types from your list, that you would advise a person who would like to lose weight to include in his or her diet. (3)

1.6. Provide a possible conclusion. (4)

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Question 2:

Enzymes: Investigation to test the working of a “biological” washing powder

Have you heard or seen advertisements for washing powders that claim the powders contain enzymes that can remove specific stains? Are the claims of the manufacturers true?
Let’s see ...

Our bodies use food to give us energy. Some foods, like proteins such as gelatine and starch, need to be broken down before our bodies can use them. The units, or molecules that make up proteins and starches are large, but they again are made up of smaller units. This breaking down of the larger units into smaller ones is called digestion. Our bodies use enzymes to burn the foods (or digest them) for their energy.

The enzymes which help in digestion are specialists. An enzyme which would digest a protein will not digest starch, nor would a starch-digesting enzyme break down proteins.

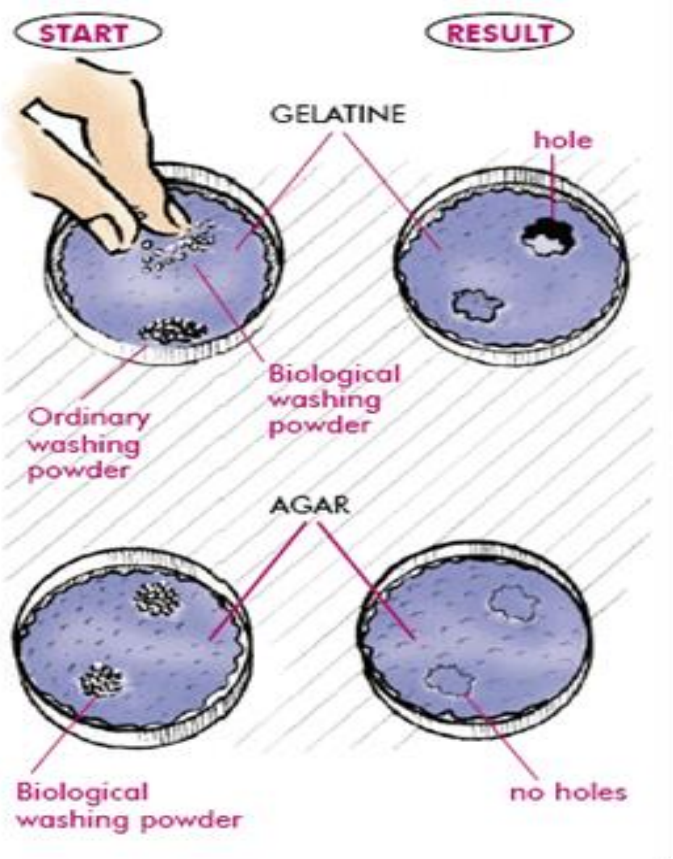
Experiment 1: Hole in jelly

Method:

1. Read the instructions on the packets carefully and prepare two dishes of clear jelly, one of gelatine, and the other of agar.

2. On each jelly, put a small pinch of an ordinary powder detergent, and of a so-called biological washing powder.

Observations/Results:



Discussion:

The biological powder is supposed to contain an enzyme which 'removes difficult stains like egg, gravy and blood'. These contain proteins.

If this is a true claim, we would expect to find the gelatine (a protein) dissolved away under the 'biological' washing powder, but not under the ordinary powder.

The agar (not a protein) should not be dissolved by either. The jelly might soften a little for many reasons, but do not be misled by this. Look for a great hole in the jelly.

If there is a hole in the gelatine under the biological washing powder, but not one under the ordinary washing powder, then the claims of the manufacturer are true.

Questions:

Answer the following questions in response to what you observed in the above experiments:

2.1 Provide a possible aim for the experiment. (1)

2.2. Identify the dependent variable. (1)

2.3. Identify the independent variable. (1)

2.4 Name the two important apparatus used in the experiment. (2)

2.5 Provide a possible conclusion for this experiment. (4)

[9]

QUESTION 3

In 2004 a Red Data Book of mammals in South Africa was produced and 295 mammal species of South Africa, both marine and terrestrial, were assessed to rate their risk of extinction. A 'Six Risk Level Criteria' was used to categorize the mammals.

The table below shows number of mammal species in **three risk levels** only.

RISK LEVEL	**NUMBER OF SPECIES**
Critically endangered	10
Endangered	18
Vulnerable	29

3.1. Identify the Risk Level with the **lowest number** of mammal species in the table (1)

3.2. The table above shows only three Risk Levels out of the six that were in the Red Data Book. Calculate the **total number of mammal species** in the remaining Three Risk Levels which are not recorded. Show your working. (3)

3.3. Use the information in the table to plot a pie chart. (6)

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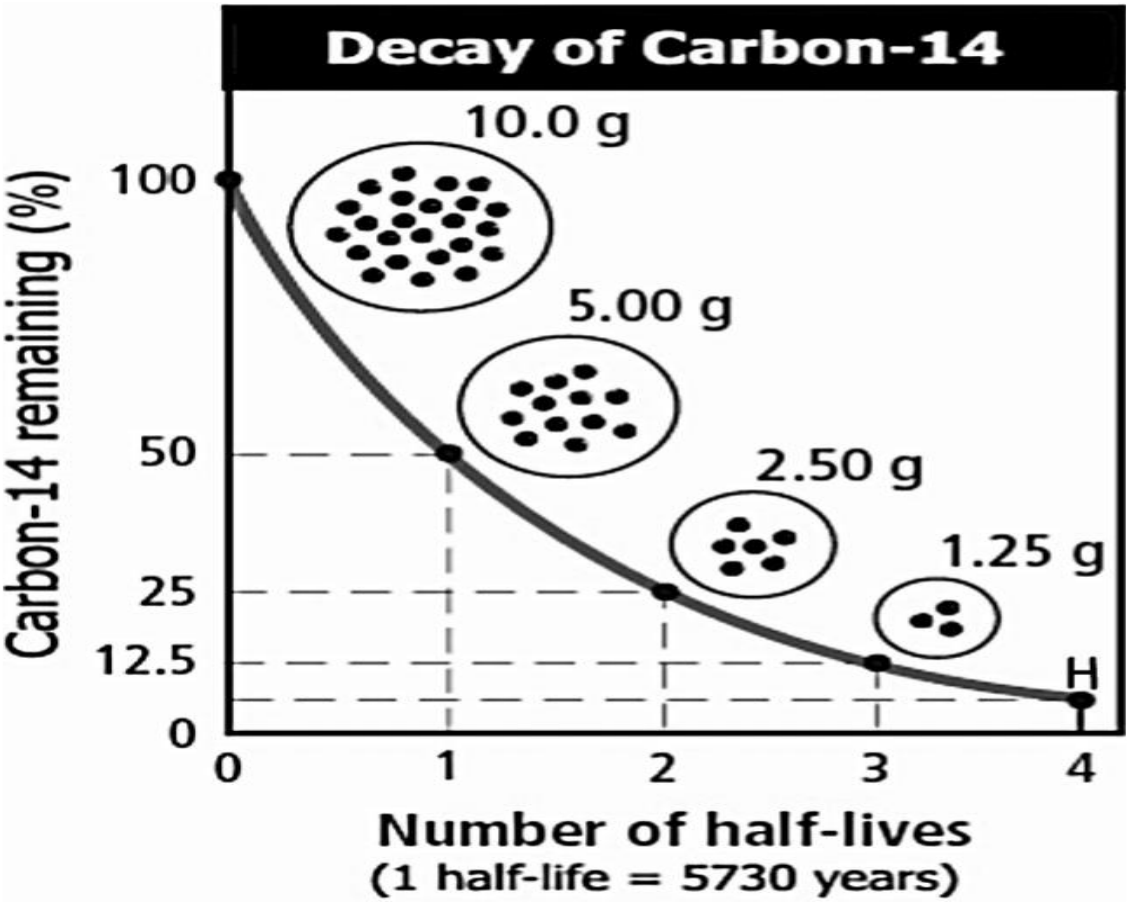
QUESTION 4

Radiometric dating using Carbon-14.

Living organisms like plants and animals absorb Carbon-14 into their tissue. When they die, Carbon-14 starts to change into other atoms over time.

Carbon-14 has a half-life of 5730 years. This means that half the amount of Carbon-14 in the dead organism will change to other atoms in that amount of time.

By calculating the amount of Carbon-14 still left in a fossil and calculating how much has been changed to other atoms, scientists are able to calculate the age of fossils.



4.1.1. State the number of half-lives of Carbon-14 indicated in the graph. (1)

4.1.2. Give the percentage of Carbon-14 present in a fossil at point H. (1)

4.1.3. Identify the dependent variable. (1)

4.1.4. State the relationship between the number of half-lives and the percentage of Carbon-14 of a fossil. (1)

4.2 Use the table below on Carbon-14 decay to answer questions 4.2.1 and 4.2.2.

Half-Life	Mass of Carbon-14 (grams)	Fraction of the original amount of Carbon-14 remaining.	Number of years
0	200	1	0
1	100	1/2	5730
2	50	1/4	11460
3	25	1/8	17190
4	12.5	1/16	X
5	6.25	1/32	28650
6	W	1/64	Y

4.2.1. Write down the values of (3)

i) **W**
ii) **X**
iii) **Y**

4.2.2. Explain why the amount of Carbon-14 left in the fossil cannot be use for dating fossils older than 60 000 years (2)

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Total marks: [60]

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