10 GENERAL SCIENCE BIOLOGY INVESTIGATION: DNA EXTRACTION 2016

Name:_____

Form:_____

Teacher: Miss Cerny

Due date:_____

Living things are made up of cells which contain the genetic code which distinguishes them from other living thing. This code is found in the chemical inside the nucleus of cells and is known as DNA.

MARKING KEY

Plagiarism

You must write in your **own words**, not copy sentences word for word from another student or another source.

Plagiarising = instant zero on assignment.

Assessment policy

Extensions are not given on the day an assessment is due.

Give me a sick note/legitimate reason from parent BEFORE due date = new negotiated due date.

One day late = -20% taken off mark.

Two days late = -40% taken off mark.

Three days late = mark of zero given and students are required to attend a detention and are still required to submit the assignment.

If you are not at school the day this assignment is due, please email it to me by the 4pm deadline.

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Aim: to extract DNA from a strawberry.

MARKING KEY

Introduction

Write an introduction using **full sentence paragraphs** that includes the following points.

- When was the first DNA isolation procedure done and by whom? What country did it occur in? (3 marks)
- **Describe** three reasons why scientists would need to extract DNA from living things today. (3 marks)

Friedrich Miescher (1)

In 1869 (1)

Germany (1)

- Extract DNA to study genes involved in cancer.
- Extracted DNA can test for genetic diseases in newborn babies.
- To analyse forensic material in criminal investigations
- To accurately organise/sort organisms into classes.
- To allow for the genetic modification of organisms.

↑ one mark for each three. Take a mark off if not written in full sentences.

Potential hazards

You will be using isopropyl alcohol in this investigation. **Describe** three potential hazards of using this chemical in the science laboratory. (3 marks)

- Hazardous in case of eye contact, it irritates and can damage eyes).
- Hazardous in case of ingestion (can cause nausea, vomiting, etc.)
- Hazardous in case of inhalation (can cause headaches, dizziness etc.)
- Slightly hazardous in case of skin contact (may irritate the skin.
- Hazardous if in contact with open flames / sparks as it is highly flammable.

Any three - describe NOT state
- Needs to relate to science lab
Take a mark off if not enough info (description is given.

Explain two things you will do to help prevent hazards occurring while using isopropyl alcohol in this investigation. Be sure to explain **why** you will take these precautions. (4 marks)

- Wear safety glasses (1) so isopropyl does not enter (1) the eyes.
- Do not crouch (1) in front of the bench as if things spill it (1) may go on you.
- Wear gloves to avoid isopropyl coming into contact with skin. OR
- Ventilate the rooms so that fumes are able to dissipate.

One mark for way to prevent hazard & one mark for explanation as to why

Title: (write a title for the investigation, needs to be detailed). (1 mark)

eg. Extraction of DNA from a strawberry

eg. Isolation of strawberry DNA to measure mass

Materials: (list all materials used, be specific with number of items used and amounts/sizes). (2 marks)

100mL distilled water

¼ tsp salt

1 x 250 ml beaker

10mL dish soap

1 x plastic zip-lock bag

1 x strawberry

1 x sieve

5 mL chilled isopropyl

1 x pair tweezers

1 x stirring rod

1 x electronic balance

1 x watch glass

1 x large measuring cylinder

1 x small measuring cylinder

(option, some groups may have used a plastic spoon).

Method

1. Measure 100 ml of distilled water into a 250 ml beaker.
2. Add ¼ tsp of salt to the water in the beaker and mix using the stirring rod.
3. Add 10 ml of dish soap to the water and salt solution and gently mix with the stirring rod.
4. Place one strawberry into a plastic zip-lock bag.
5. Pour the soap, water and salt solution into the zip-lock bag.
6. Remove as much air from the bag as possible and seal it.
7. Use your hands to squash and mush the strawberry inside the bag until there are no large pieces remaining.
8. Pour the liquid from the bag through a sieve sitting over the original beaker (that has been rinsed).
9. Use the stirring rod to press the strained strawberry through the sieve.
10. Add 5 ml of chilled isopropyl alcohol to the solution (do not stir).
11. Gently use the tweezers to remove the DNA strands from the beaker and observe.

Results

Describe the DNA that you extracted from the strawberry (what does it look like). (1 mark)

eg: The DNA strands looked like colourless, clear strings of saliva with bubbles attached

Work out how much of the strawberry's mass is made up of DNA. Show this as a percentage and show all of your working out. (You can research how to do this). eg (4 marks)

Mass of strawberry is : 12.85g

Mass of DNA is : 0.49g (1)

Amount of strawberry's mass made up of DNA = $\frac{\text{DNA mass}}{\text{mass of strawberry}} \times 100$ (1)

Amount of strawberry's mass made up of DNA = $\frac{0.49}{12.85} \times 100$ (1)

= 3.8 %. (1)

List the steps you took to complete the above task. (The mass of the strawberry was measured using an electronic balance etc.) (3 marks)

1. Strawberry was placed on electronic balance and the mass was recorded.
2. The DNA was placed in a petri dish.
3. An empty petri dish was placed on the electronic balance and re-zero'd.
4. The petri dish with DNA was placed on the electronic balance & the mass was recorded.
5. A formula was used to calculate how much of the strawberry's mass was made up of DNA.

OR something similar

Discussion

State the function of the dish soap in the extraction of DNA from the strawberry. (1 mark)

The dish soap helps to dissolve the cell membranes.

State the function of the salt in the extraction of DNA from the strawberry. (1 mark)

The salt breaks up protein chains that hold nucleic acids together.

Explain why the chosen fruit for DNA extraction was strawberries and not a different type of fruit. (1 mark)

The strawberry has more DNA than any other fruit.

Reference list

Minimum of two references. (1 mark)

Referenced using the APA referencing style. (1 mark)

If there is even one mistake (missing full stop, etc) then they do not get this mark.

Presented neatly and clearly. (1 mark)

Correct grammar and spelling. (1 mark)

Uses scientific language. (1 mark)

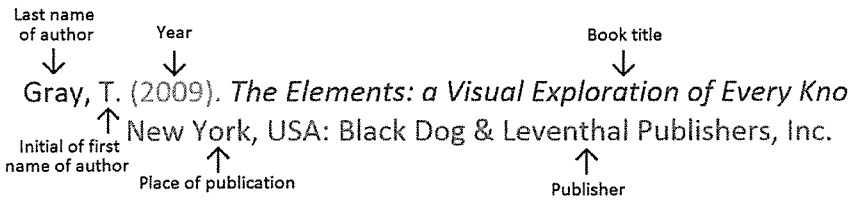
Total mark: /32

Percentage: %

Teacher's comments:

APA referencing guide

Book



Book with two authors

Shermer, M., & Benjamin, A. (2006). *Secrets of Mental Math: The Mathemagician's Guide to Lightning Calculation and Amazing Mental Math Tricks*. New York, USA: Three Rivers Press.

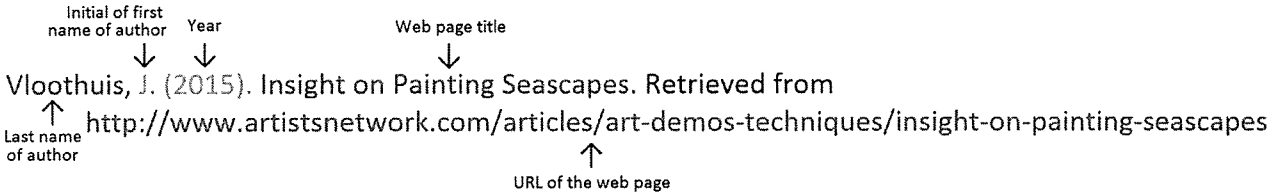
Book with three or more authors

Bulliet, R. W., Alley, R. B., Broecker, W. S., & Denton, G. H. (2011). *The fate of Greenland: Lessons from abrupt climate change*. Cambridge, MA: MIT Press.

Book with editor

Kasdorf, W. E. (Ed). (2003). *The Columbia guide to digital publishing*. New York, USA: Columbia University Press.

Website



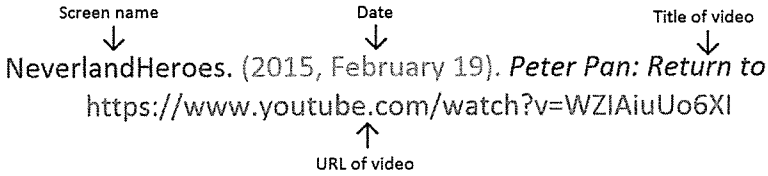
Website with no author (put title of page at the front)

Aranmore Catholic College. (2014). Retrieved from http://www.aranmore.wa.edu.au/

Website with no date

The Zadkine Museum. (n.d). Retrieved http://www.france.fr/en/museums/zadkine-museum.html

Video file



Encyclopaedia or dictionary