Why is it not recommended to decorate a cheese cake with pineapple

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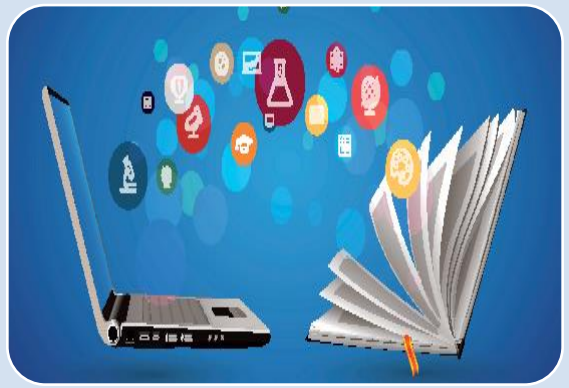
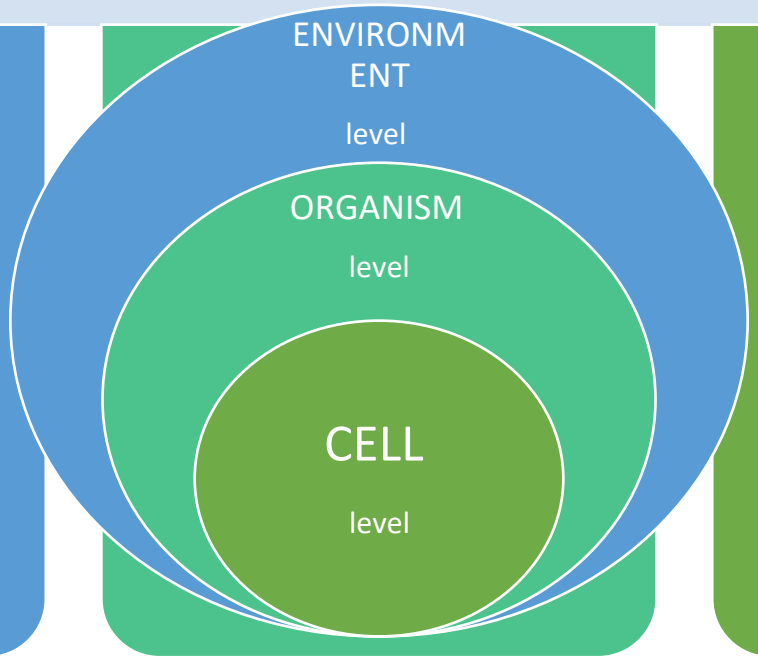
Biology education goals are:
Understanding of concepts, recognition and understanding of facts, phenomena, processes, principles and central ideas of biology



practical studies: Open Inquiry project



Practical studies: Guided inquiry

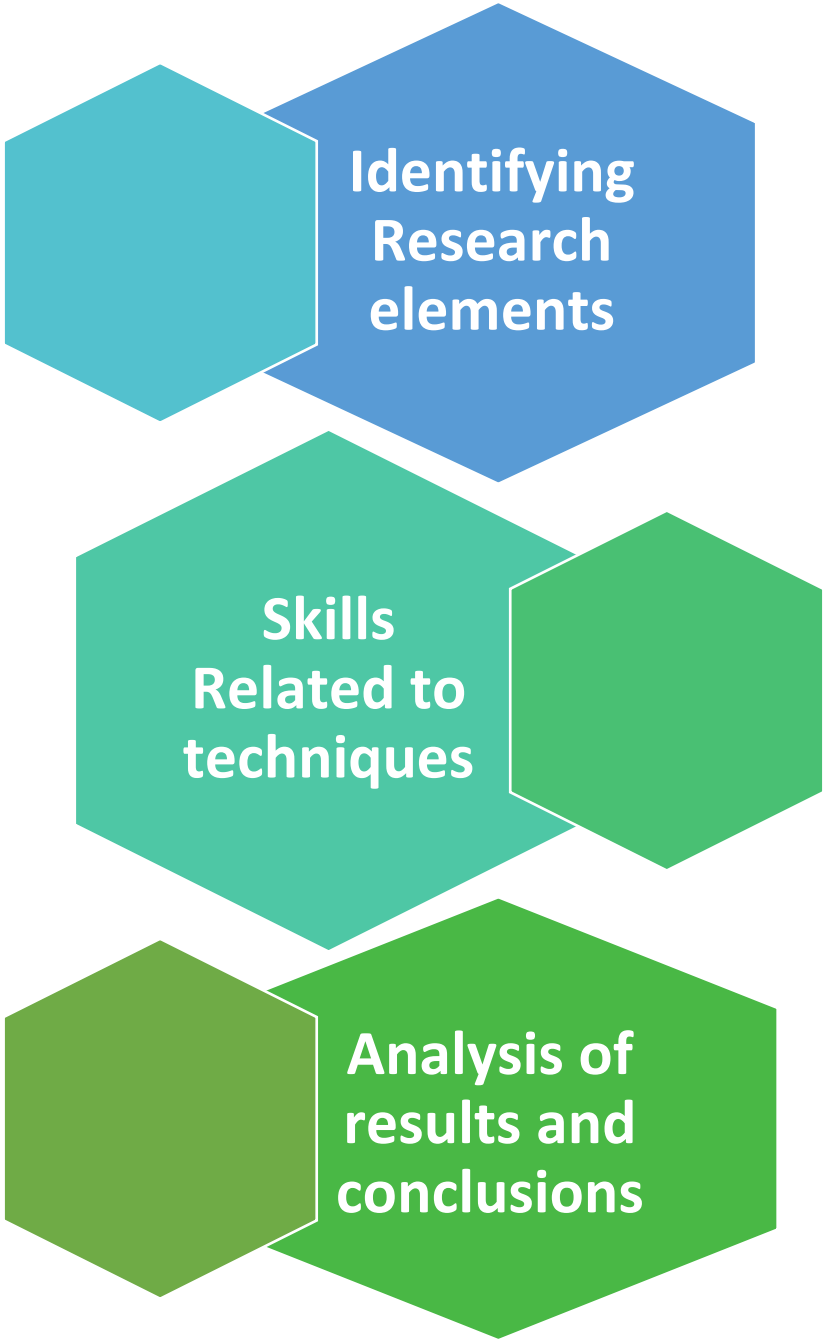
BIOLOGY LAB

Biology is a science based on knowledge obtained through theoretical and experimental research

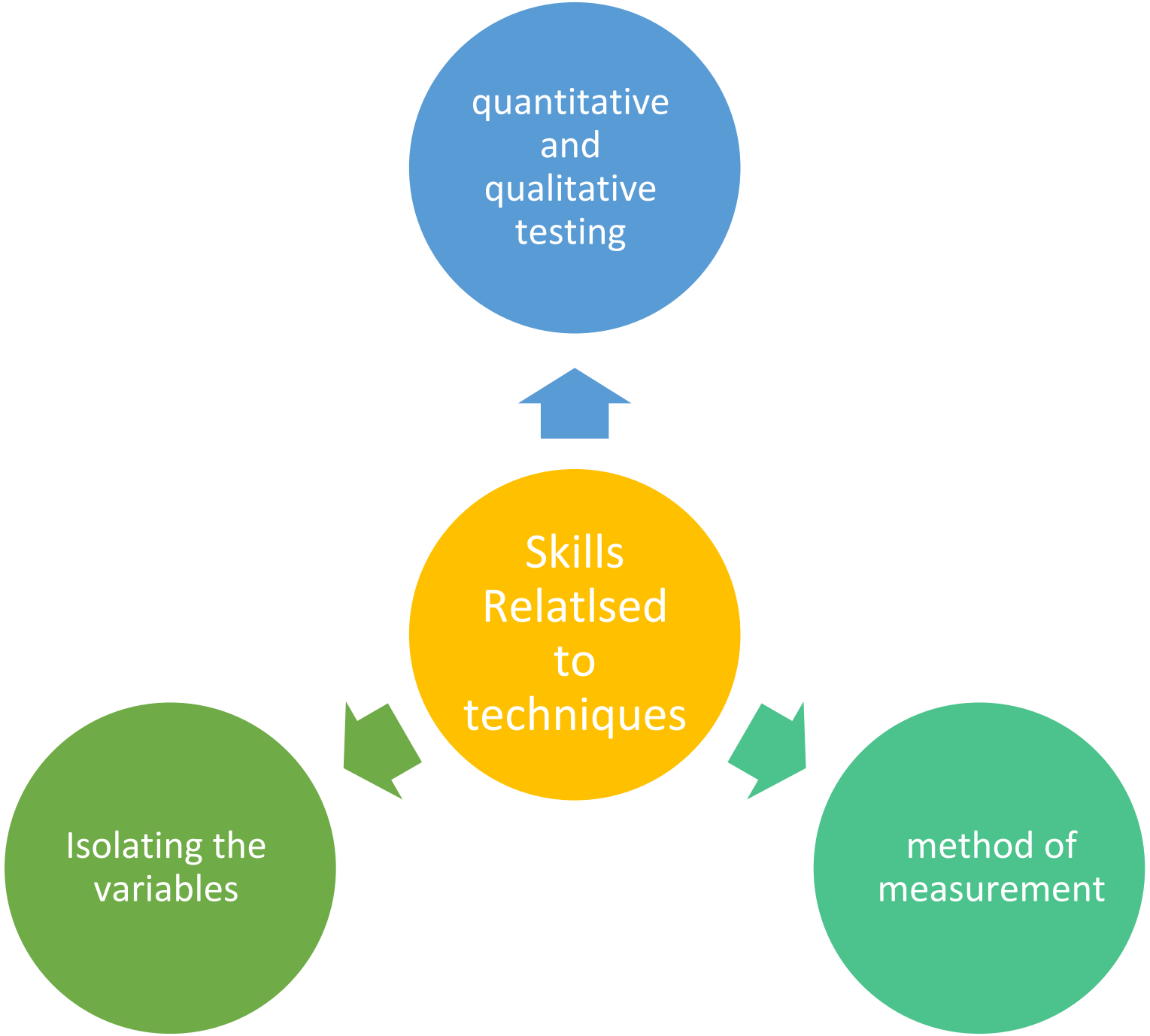
Answering questions

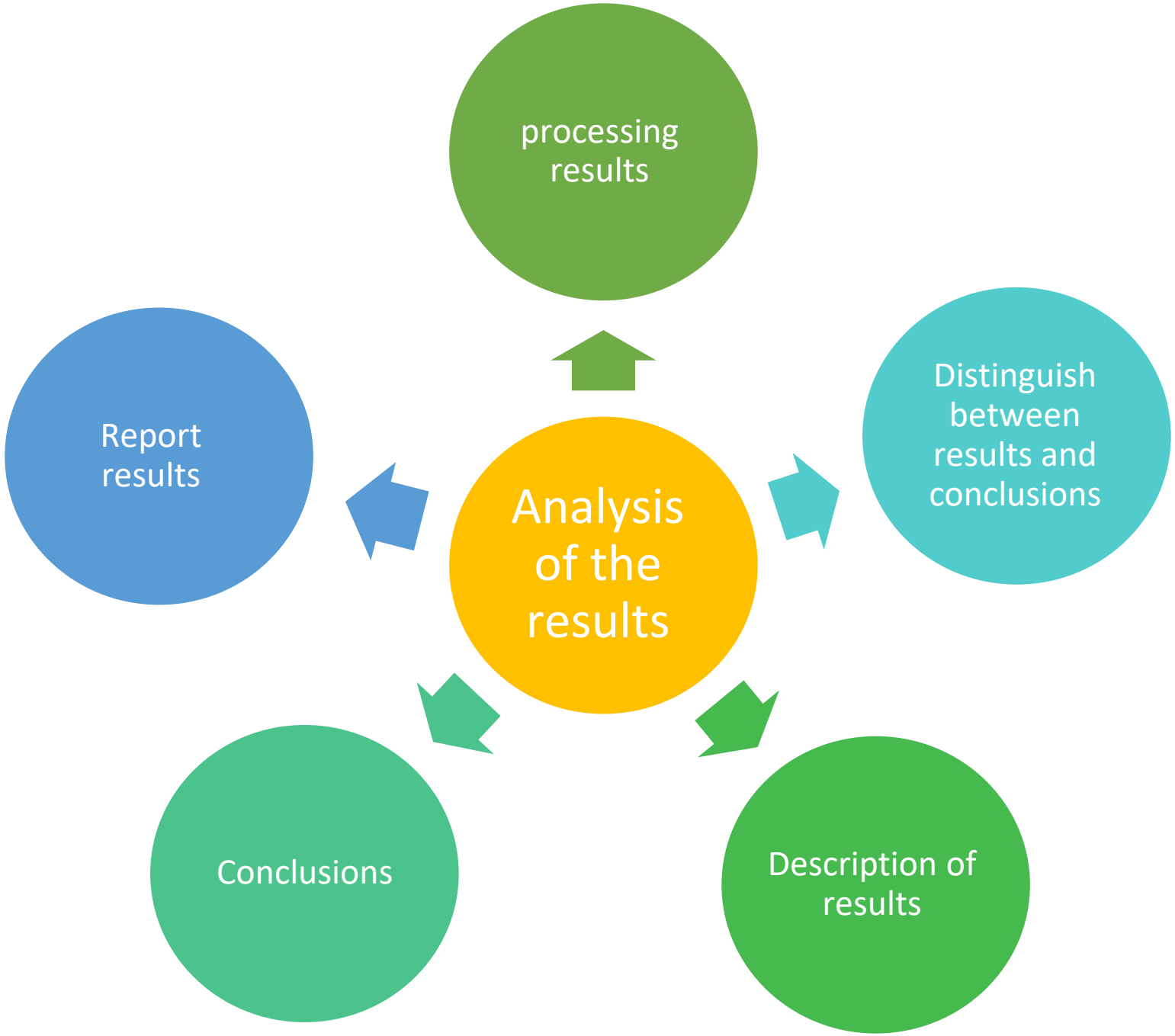
Conducting the experiment

Laboratory skills that are required to answer the questions




Research question & hypothesis
Independent variable
Dependent variable
Research elements
control
Constant factors


quantitative and qualitative testing
Skills Relatlsed to techniques
Isolating the variables
method of measurement


processing results
Distinguish between results and conclusions
Description of results
Conclusions
Report results
Analysis of the results

On your table you have one kit and directions to perform the experiment

- **You will work in pairs**

- **Perform and answer questions please**


WORK
TIME


key answers

PART 1: Effect of pineapple extract on the protein gelatin

37. a. In your notebook, draw a Table 1 for the experiment you performed. Start with Item I. Include in the table a column for recording results

a- Building a table to summarize the experiment

37. b. In the results column of Table 1 in your notebook, record whether the solution in the test-tubes "set" or "did not set". — Give the results column a title.

b- Report reults

PART 1: Effect of pineapple extract on the protein gelatin

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Question 37 a					Question 37 b
	A	B	C	D	E
tube	volume of the gelatin solution (m"l)	Volume of pineapple extract (m"l)	Volume of Trypsin solution (m"l)	Volume of water (m"l)	Results: Gelatin coagulation
A	2	0	1	0	Not set \ -
B	2	1	0	0	Not set \ -
C	2	0	0	1	set \ +

38. a. Explain why it was important to keep Test-Tubes A-C in bath 1

Method of measurement

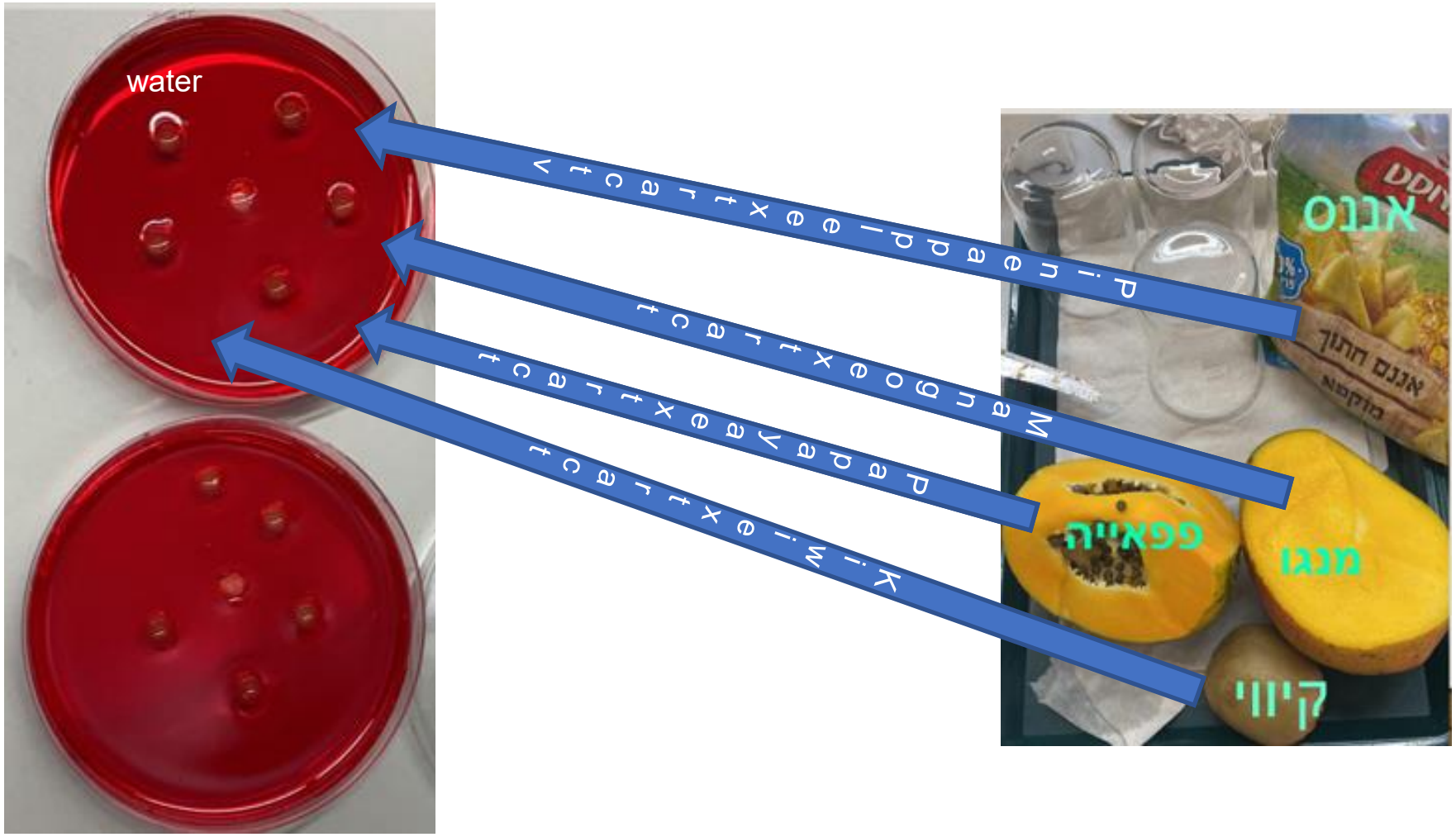
a. The temperature [in bath 1] is suitable for enzymatic decomposition\digestion of the protein / gelatin

38. b. Explain the results you obtained in the three test-tubes A-C. In your explanation, use the Informational Note on page 3, Figures 1 and 2.

Explain \ conclusion

To test tube B we added pineapple extract which has an enzyme that catalyzes the breakdown of protein / gelatin.
The breakdown product / the short chains / the peptides, do not coagulate [even if the temperature is lower than 10 ºC.]
To test tube A, add the enzyme trypsin / which catalyzes the decomposition of protein / gelatin, therefore there is no coagulation
In test tube C there was no enzyme / there was no pineapple extract / there was only water, so the gelatin coagulated

From guided inquiry to open inquiry



part 2- The experiment: Activity of a pineapple-extract enzyme

39. Calculate the concentration of pineapple extract in each of the test-tubes
1-4. Write the concentrations you calculated in the correct places in Table 2

39-40:Table 3:effect pineapple extract concentration on the degree of gelation.

Test-Tube	A	B	C	D
	Pineapple extract concentration (%)	Volume of gelatin solution (ml)	Results: Degree of gelation at temperature lower than 10 0c	Results: Volume of peptide solution (product of gelation digestion) (ml)
1	0%	2	congealed	0
2	5%	2	partially congealed	1.8
3	10%	2	partially congealed	2.3
4	50%	2	not congealed	3

- calculation of concentrations
- completion of experimental setup
- reporting results

C1*V1=C2*V2 Equation

part 2- The experiment: Activity of a pineapple-extract enzyme

41. What is the **independent variable** in the experiment you conducted?

The concentration of the extract\ the enzyme.

42.a. What is the **dependent variable** in the experiment you conducted?

activity level of the protein-digesting enzyme.

43.b. List one other **factor** that was kept **constant** in this experiment.

The temperature \ The PH level\ the source of the extract\total volume.

Identification of experimental components (independent\ dependent variable)\ constant factor

part 2- The experiment: Activity of a pineapple-extract enzyme

42.b. How was the **dependent variable measured**?

Explain how the measuring method is suited to measuring the dependent variable.

Method of measurement

The method of measurement: measuring the volume of **the peptide solution** / the volume of the gelatin decomposition products that did not coagulate.

Explanation: The higher the rate of enzyme activity, the more gelatin will be broken down [into peptides] / more will be created Peptides that do not coagulate [at low temperature.

part 2- The experiment: Activity of a pineapple-extract enzyme

43.a. In the experiment you conducted the **concentration of the gelatin solution in Test-Tubes 1-4 is constant**.
Explain why it was important to keep this specific factor constant in this experiment.

components of an experiment (constant factor).

The concentration of gelatin affects the rate of **enzyme activity** / the extent of gelatin decomposition / the rate of peptide formation /
The number of encounters between enzyme and substrate.
In this experiment we test the effect of the concentration of the extract / enzyme / variable other independent.

part 2- The experiment: Activity of a pineapple-extract enzyme

44. What **conclusion** can you **draw** from the results of this experiment?

conclusion

[Without extracting the pineapple, the gelatin coagulates]. As the concentration of the enzyme was higher [in the concentration range (0%- 2%), thus the degree/rate/level of activity of the enzymes [which accelerate the breakdown of proteins] increased/the breakdown of gelatin [to peptides] rose

Part 3 - Analysis of experimental results: Pest-control in crops using the fungus Beauveria bassiana

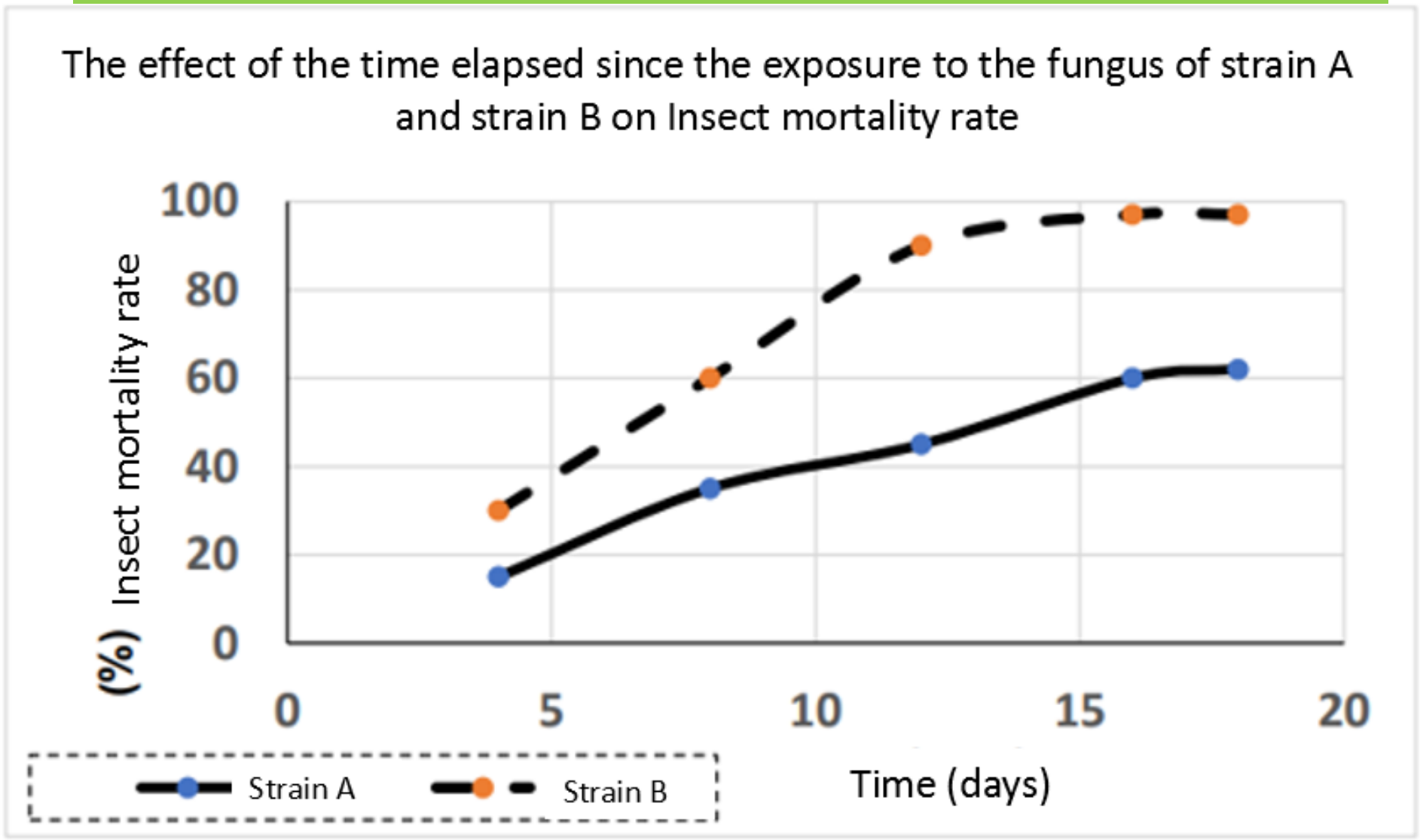
45. a. Present in graphical form the experimental results shown in Table 4. What type of graphical representation is best suited to describing the results, a continuous graph or a column diagram? Explain your answer.

processing results

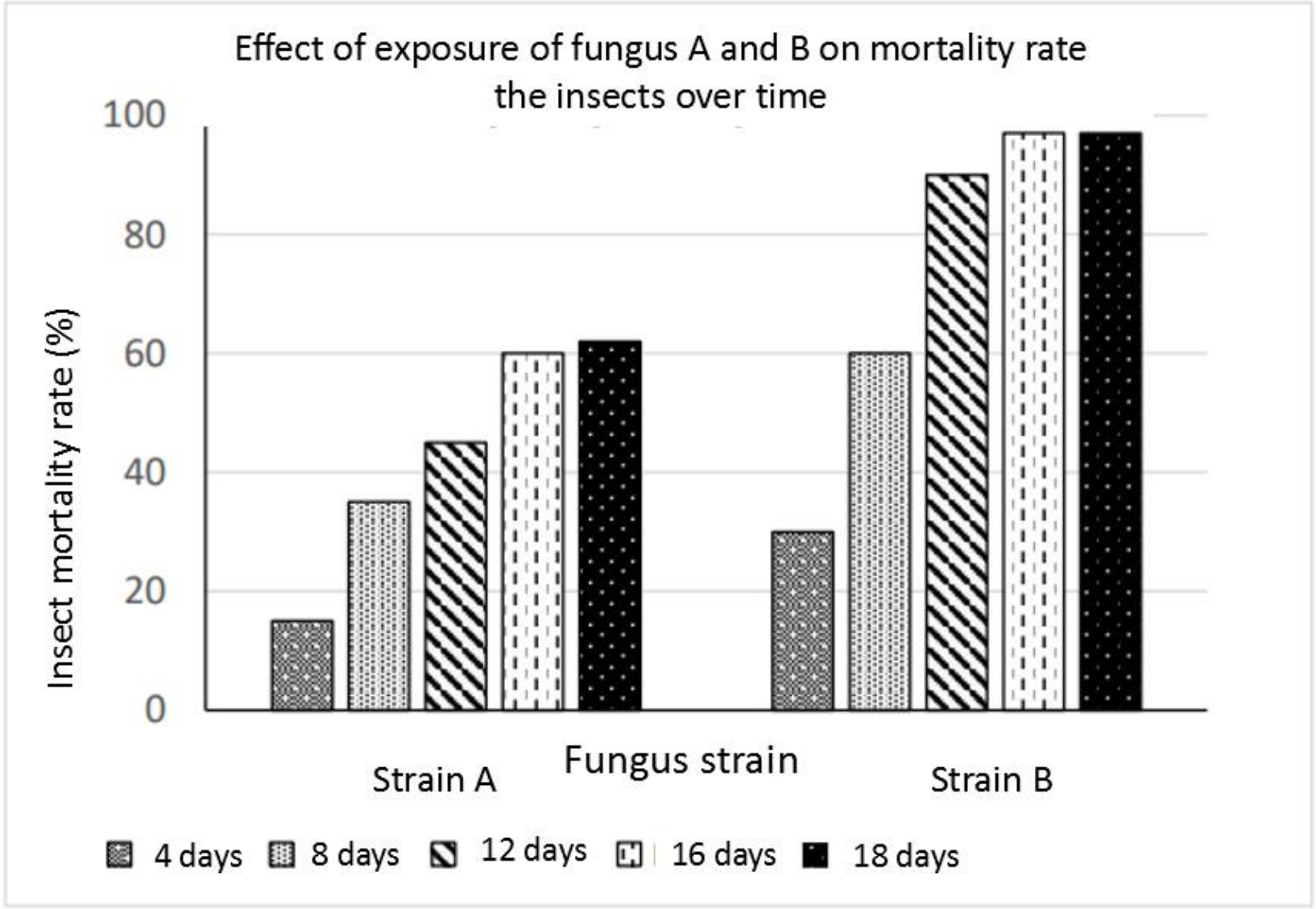
Graph / Curve

Reasoning: the independent variable / time from exposure to two strains of fungus is **continuous** / **quantitative** / **measurable**

45. b. You have been given graph paper in the enclosed attachment. Use it to draw a suitable graphical representation of the results shown in Table 4.



Option 2


Effect of exposure of fungus A and B on mortality rate the insects over time
Insect mortality rate (%)
100
80
60
40
20
0
Strain A
Fungus strain
Strain B
4 days
8 days
12 days
16 days
18 days

46.a. Describe the results represented in the graph

Description of results

After the exposure of the insects to the fungus strains, the rate/percentage of mortality increased [for 18 days [for the time. The mortality rate in exposure to strain B was higher.

46. b. In a control group (not shown in Table 4), the researchers checked the mortality rate of insects that were maintained under the same conditions but were not exposed to Strain A or Strain B fungi.
Explain the importance of this control group.

The importance of control

This is how researchers knew what the percentage of natural insect mortality was / without intervention [after comparing to it the result of Any treatment \ to verify that the enzyme secreted by the fungus caused an increase in the death rate of the insects.

47. Based on the introduction to Part C and the findings of Experiment 2, explain the results of Experiment 1.

Application of knowledge from the experiment

The answer should include these elements:

* The activity\ efficiency of the enzyme that breaks down gelatin/protein is more effective in strain B than strain A
* The insect body sheath contains a protein [that is not gelatin]
* A strain B fungus breaks down the insect's body covering at a faster rate
* Reference to the results of experiment 1: a higher mortality rate of the insects after exposure to a fungus of strain B

48. The pineapple enzymes that digest protein are enclosed in organelles, and are not loose in the cytoplasm. Based on the experiment you conducted in Part A and the results of the study you read about in Part C, explain how keeping these enzymes inside organelles benefits the pineapple cells.

Application of knowledge from the experiment and prior knowledge

1. If the protein-decomposing enzymes were free in the cytoplasm, they would cause the breakdown of various proteins essential in the cells of the pineapple fruit.

2. Maintaining protein-decomposing enzymes inside organelles in the cell protects the enzymes from damage by substances in the cytoplasm.

3. Keeping the enzymes inside organelles allows the enzymes to operate in an environment where conditions are optimal

Thank You

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