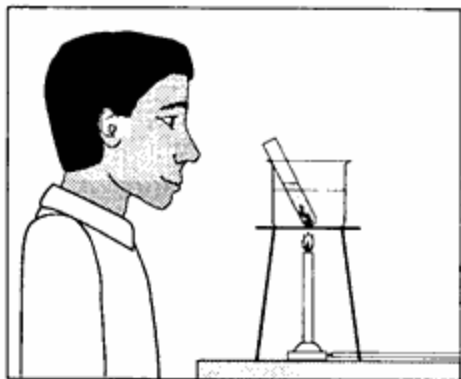


1. Base your answer on the diagram below and on your knowledge of biology.



Which statement describes *two* unsafe laboratory practices represented in the diagram?

- A) The flame is too high and the test tube is unstoppered.
- B) The opening of the test tube is pointed toward the student and the student is not wearing goggles.**
- C) The test tube is unstoppered and the student is not wearing goggles.
- D) The beaker has water in it and the flame is under the tripod.
2. A mineral supplement designed to prevent the flu was given to two groups of people during a scientific study. Dosages of the supplement were measured in milligrams per day, as shown in the table below.

Supplement Dosages

Group	Dosage (mg/day)
A	100
B	200

After 10 weeks, neither group reported a case of the flu. Which procedure would have made the outcome of this study more valid?

- A) test only one group with 200mg of the supplement
- B) test the supplement on both groups for 5 weeks instead of 10 weeks
- C) test a third group that receives 150mg of the supplement
- D) test a third group that does not receive the supplement**

Unit 1 - Science and the Living Environment

3. The current knowledge concerning cells is the result of the investigations and observations of many scientists. The work of these scientists forms a well-accepted body of knowledge about cells. This body of knowledge is an example of a
- A) hypothesis
 - B) controlled experiment
 - C) theory**
 - D) research plan
4. Which statement best expresses a basic scientific assumption?
- A) Interpretation of experimental results has provided explanations for all natural phenomena.
 - B) If a conclusion is valid, similar investigations by other scientists should result in the same conclusion.**
 - C) For any conclusion to be valid, the design of the experiment requires that only two groups be compared.
 - D) After a scientist formulates a conclusion based on an experiment, no further investigation is necessary.
5. The chart below provides information about two scientific discoveries in the field of biology.

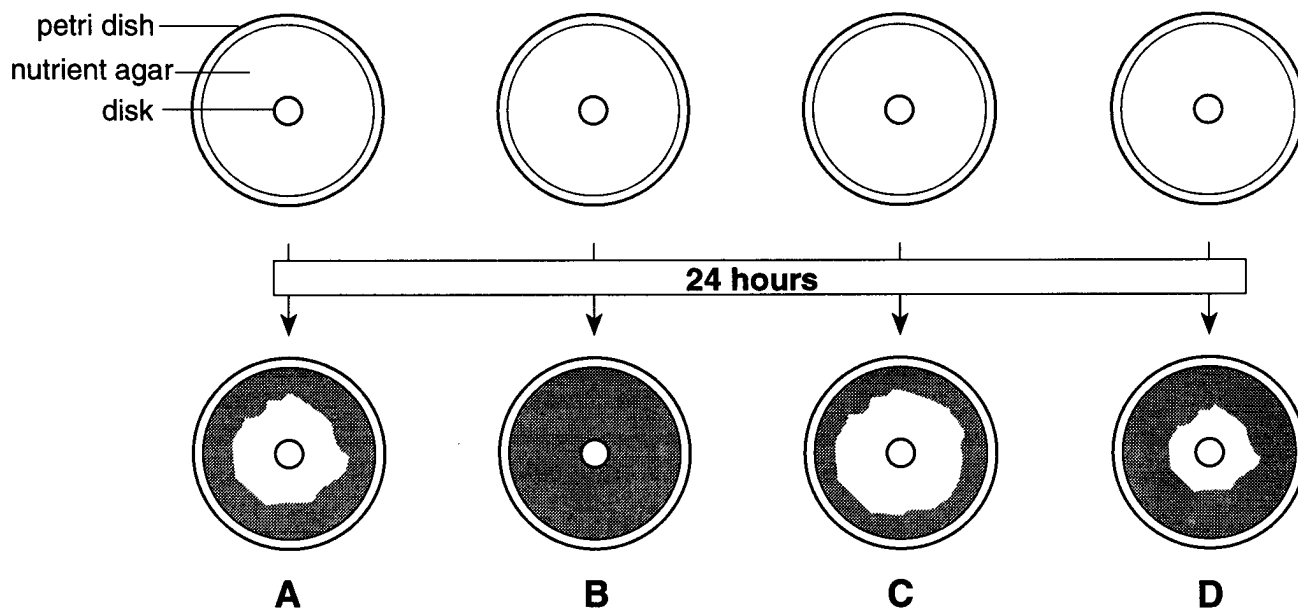
Early Discovery	Later Discovery
People living near swamps are more likely to get malaria than people who do not live near swamps. Burning swamps early in the summer reduces the amount of malaria.	Mosquitoes breed and lay their eggs in swamps and other pools of still water. Mosquitoes are the carriers of the organisms that cause malaria.
Dark-staining bodies called chromosomes can be seen only in dividing cells. The number of chromosomes doubles during cell division.	Chromosomes contain DNA, which is able to copy itself. DNA carries the genetic code, which is passed from a parent cell to two or more daughter cells.

Which statement is the best interpretation of the material presented in the chart?

- A) Scientific explanations are built by combining evidence that can be observed with what people already know.**
- B) Inquiry involves making judgments about the reliability of the source and relevance of the information.
- C) Science provides information, but values are also essential to making ethical decisions.
- D) Hypotheses are valuable even if they turn out not to be true, because they may lead to further investigation.

6. Base your answer to the following question on the information and diagram below and on your knowledge of biology.

A student investigated the effectiveness of four different mouthwashes in destroying bacteria. He inoculated the nutrient agar in four petri dishes with bacteria. Each of four paper disks, 1 centimeter in diameter, was soaked in a different mouthwash sample and placed on a different agar surface. Sterile procedures were used throughout the experiment. Each petri dish was placed in an incubator at a temperature of 37°C for a 24-hour period. The diagram below represents the sequence of events in this investigation. The shaded areas in the petri dishes represent regions of bacterial growth.



Which petri dish contains the most effective mouthwash?

- A) A B) B C) C D) D
7. A biologist in a laboratory reports a new discovery based on experimental results. If the experimental results are valid, biologists in other laboratories should be able to
- A) repeat the same experiment with a different variable and obtain the same results
 - B) perform the same experiment and obtain different results
 - C) **repeat the same experiment and obtain the same results**
 - D) perform the same experiment under different experimental conditions and obtain the same results
8. Researchers performing a well-designed experiment should base their conclusions on
- A) the hypothesis of the experiment
 - B) **data from repeated trials of the experiment**
 - C) a small sample size to insure a reliable outcome of the experiment
 - D) results predicted before performing the experiment
9. Why do scientists consider any hypothesis valuable?
- A) A hypothesis requires no further investigation.
 - B) **A hypothesis may lead to further investigation even if it is disproved by the experiment.**
 - C) A hypothesis requires no further investigation if it is proved by the experiment.
 - D) A hypothesis can be used to explain a conclusion even if it is disproved by the experiment.

10. A student hypothesized that lettuce seeds would not germinate (begin to grow) unless they were covered with soil. The student planted 10 lettuce seeds under a layer of soil and scattered 10 lettuce seeds on top of the soil. The data collected are shown in the table below.

Data Table

Seed Treatment	Number of Seeds Germinated
Planted under soil	9
Scattered on top of soil	8

To improve the reliability of these results, the student should

- A) conclude that darkness is necessary for lettuce seed germination
 - B) conclude that light is necessary for lettuce seed germination
 - C) revise the hypothesis
 - D) repeat the experiment using a larger sample size**
11. In an appropriately designed experiment, a scientist is able to test the effect of
- A) a single variable**
 - B) multiple variables
 - C) the hypothesis
 - D) scientific observations

Base your answers to questions **12** and **13** on the information below and on your knowledge of biology.

An experiment was carried out to answer the question "Does the pH of water affect the growth of radish plants?" Two groups of ten radish plants were set up. One group was watered with water having a pH of 3.0, and the other group was watered with water having a pH of 7.0. Both groups of plants received the same amount and intensity of light, the same amount of water, and they were grown in the same type of soil. The heights of the radish plants were measured every 2 days for a period of 2 weeks.

12. Which sentence is a possible hypothesis that was tested in this experiment?
- A) Does the pH of water affect the growth of radish plants?
 - B) Will the amount of water alter the heights of the radish plants?
 - C) The temperature of the water will affect the heights of the radish plants.
 - D) The pH of the water will affect the heights of the radish plants.**

13. What was the dependent variable in this experiment?

- A) **heights of the plants**
 - B) pH of the water
 - C) temperature of the water
 - D) type of soil
-

14. A student conducted an experiment to determine if listening to different types of music would affect pulse rate. She thought that pulse rate would change with different types of music. Each person participating in her experiment listened to seven different selections of music for 30 seconds each. The pulse rates were taken after each 30-second interval of music. Based on her experiment, the student concluded that a person's pulse rate changed when listening to different types of music.

The component missing from this experiment is a

- A) prediction
 - B) hypothesis
 - C) **control group**
 - D) research plan
-

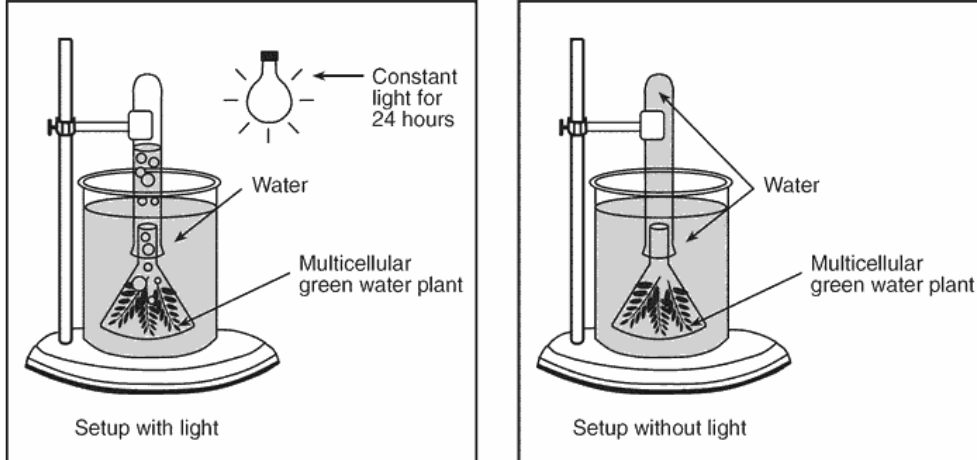
15. A new drug for the treatment of asthma is tested on 100 people. The people are evenly divided into two groups. One group is given the drug, and the other group is given a glucose pill. The group that is given the glucose pill serves as the

- A) experimental group
- B) limiting factor
- C) **control**
- D) indicator

16. Which statement best describes a hypothesis?

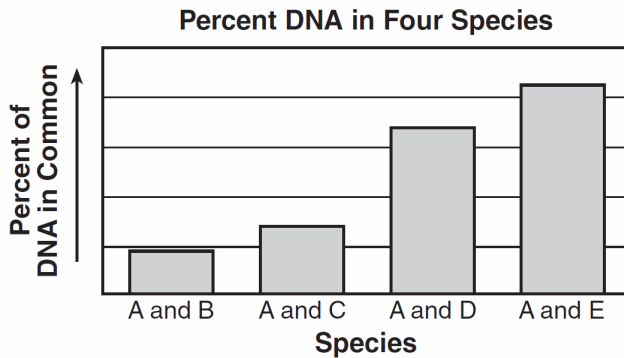
- A) A hypothesis is the process of making careful observations.
- B) The conclusion drawn from the results of an experiment is part of a hypothesis.
- C) **A hypothesis serves as a basis for determining what data to collect when designing an experiment.**
- D) The facts collected from an experiment are written in the form of a hypothesis.

17. An experimental setup is shown in the diagram below.



Which hypothesis would most likely be tested using this setup?

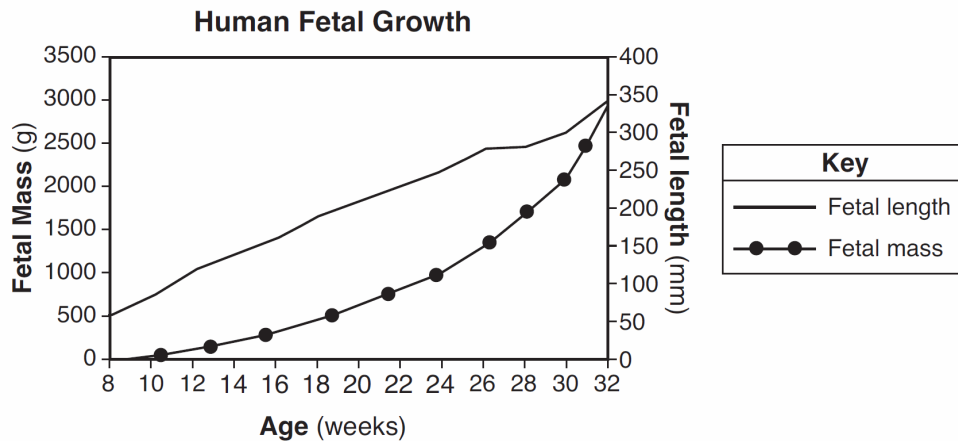
- A) **Green water plants release a gas in the presence of light.**
 - B) Roots of water plants absorb minerals in the absence of light.
 - C) Green plants need light for cell division.
 - D) Plants grow best in the absence of light.
18. The percent of DNA that species *A* has in common with species *B*, *C*, *D*, and *E* are shown in the graph below.



Which statement is a valid conclusion that can be drawn from this graph?

- A) Species *A* is closely related to species *B*, but is not related to species *E*.
- B) Fewer mutations have occurred in species *B* and *C* than in species *A*.
- C) **Species *A* and *E* have the greatest similarity in protein structure.**
- D) Environment influences the rate of evolution.

19. The graph below represents the growth in length and mass of a fetus up to week 32. The length is measured in millimeters (mm) and the mass in grams (g).



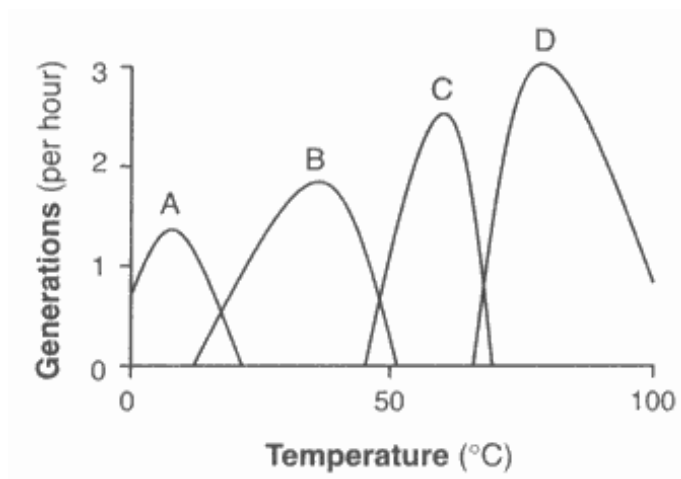
Which statement best describes human fetal growth between weeks 26 and 32?

- A) **There is a faster rate of increase in mass than in length.**
 - B) The rate of increase in mass levels off, while the increase in length constantly increases.
 - C) The fetal mass increases by 750 g and the fetal length increases by about 100 mm.
 - D) There are slight decreases in both length and mass.
-

20. Conclusions based on an experiment are most likely to be accepted when

- A) **they are consistent with experimental data and observations**
- B) they are derived from investigations having many experimental variables
- C) scientists agree that only one hypothesis has been tested
- D) hypotheses are based on one experimental design

21. The graph below provides information about the reproductive rates of four species of bacteria, *A*, *B*, *C*, and *D*, at different temperatures.



Which statement is a valid conclusion based on the information in the graph?

- A) Changes in temperature cause bacteria to adapt to form new species.
- B) Increasing temperatures speed up bacteria reproduction.
- C) Bacteria can survive only at temperatures between 0°C and 100°C.
- D) Individual species reproduce within a specific range of temperatures.**

22. Base your answer to the following question on the information below and on your knowledge of biology.

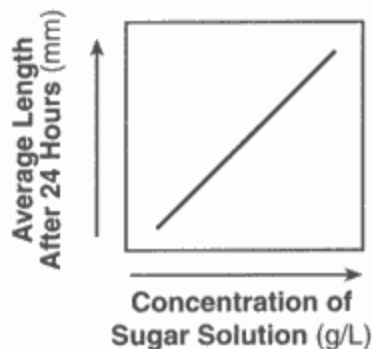
Students cut 20 rod-shaped pieces of potato of the same diameter and length. Five pieces of potato were placed into each of four beakers containing different concentrations of sugar solutions. Each potato piece was measured again after 24 hours. The table below shows the results of their experiment.

Change in Length

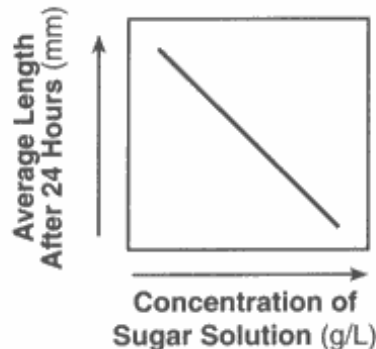
Concentration of Sugar Solution (grams per liter)	Original Length of Potato Pieces (mm)	Average Length After 24 Hours (mm)
0	50.0	52.0
5	50.0	44.0
8	50.0	43.5
10	50.0	42.5

Which graph best represents the information in the data table above?

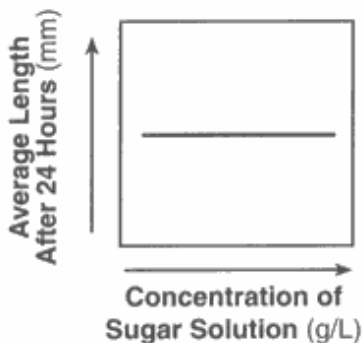
A)



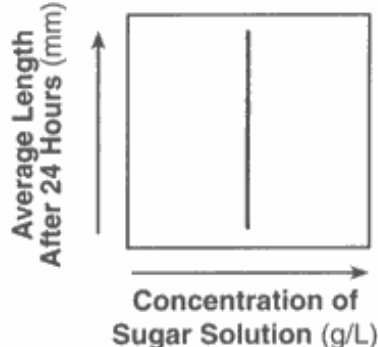
B)



C)



D)



(4)

23. Graphs of the data from laboratory investigations are used to

- A) **observe general trends in the data**
- B) make the observed data more accurate
- C) prevent errors in measuring data
- D) help change the original data tables

24. Diagrams, tables, and graphs are used by scientists mainly to

- A) design a research plan for an experiment
 - B) test a hypothesis
 - C) **organize data**
 - D) predict the independent variable
-

Answer Key
Unit 1 - Science and the Living Enviornment

1. **B**
 2. **D**
 3. **C**
 4. **B**
 5. **A**
 6. **C**
 7. **C**
 8. **B**
 9. **B**
 10. **D**
 11. **A**
 12. **D**
 13. **A**
 14. **C**
 15. **C**
 16. **C**
 17. **A**
 18. **C**
 19. **A**
 20. **A**
 21. **D**
 22. **B**
 23. **A**
 24. **C**
-