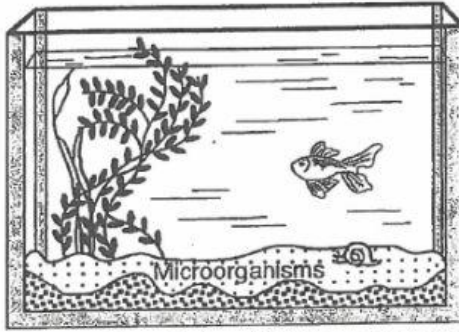


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Living Environment – Topics 8 & 9 practice

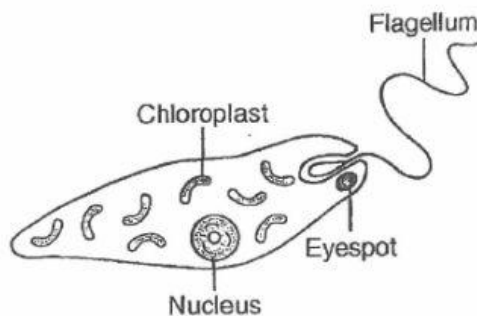
- 1) Which of the following statements most accurately predicts what would happen in the aquarium shown below if it were tightly covered and maintained in natural light for one month?



- A) The rate of reproduction of the fish would be affected.
 B) The process of respiration in the snail would decrease.
 C) The water temperature would rapidly decrease.
 D) The organisms would probably survive because materials would cycle.

Questions 2 and 3 refer to the following:

Euglena are single-celled organisms that live in ponds. All euglena have chloroplasts and can make their own food. They can also take in food from the environment. The diagram below represents a euglena.



An experiment was set up to determine the effect of nitrates, a pollutant, on the number of chloroplasts present in euglena. Five tanks were set up, each with euglena and a different concentration of nitrate solution: 0%, 0.5%, 1.0%, 1.5%, and 2.0%.

The tanks were placed in a sunny location where each tank received the same amount of light.

- 2) Which statement is a possible hypothesis for the given experiment that could be supported by the results of the experiment?
- A) If the number of euglena in a tank increases, will more nitrates be produced?
 B) If the nitrate concentration is decreased, then more light will reduce the average number of chloroplasts in euglena.
 C) If the average number of chloroplasts in euglena decreases, will less nitrate be needed in each tank?
 D) If the nitrate concentration is increased, then the euglena will have a lower average number of chloroplasts.
- 3) Which statement correctly identifies a variable in the given experiment?
- A) The dependent variable is the number of euglena placed in the tanks.
 B) The independent variable is the amount of sunlight.
 C) The independent variable is the concentration of nitrate solution used.
 D) The dependent variable is the number of tanks used.
- 4) Reasons for conducting peer review include all of the following *except*
- A) identifying an illogical conclusion
 B) pointing out possible bias
 C) analyzing the experimental design
 D) changing data to support the hypothesis
- 5) A piece of refrigerated, cooked meat will remain safe to eat for a longer period of time than a refrigerated piece of raw meat of similar size. Which one of the following statements is a valid inference based on this information?
- A) Cooked meat contains antibodies that destroy decomposers.
 B) Cooking meat kills many bacteria and fungi.
 C) Cool temperatures stimulate the growth of microbes on raw meat.
 D) Raw meat cannot be preserved.
- 6) A biologist formulates a hypothesis, performs experiments to test his hypothesis, makes careful observations, and keeps accurate records of his findings. In order to complete this process, the biologist should
- A) adjust the data to support the hypothesis
 B) evaluate the findings and, if necessary, alter the hypothesis based on his findings, and test the new hypothesis
 C) write a research paper explaining his theories before performing his experiments, in order to gain funding sources
 D) eliminate data that do not support the hypothesis

- 7) 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. What is a procedure that would have made the outcome of this study more valid?

- A) test a third group that does not receive the supplement
 B) test only one group with 200 mg of the supplement
 C) test a third group that receives 150 mg of the supplement
 D) test the supplement on both groups for 5 weeks instead of 10 weeks
- 8) A company that manufactures a popular multivitamin wanted to determine whether their multivitamin had any side effects. For its initial study, the company chose 2,000 individuals to take one of their multivitamin tablets per day for one year. Scientists from the company surveyed the participants to determine whether they had experienced any side effects. The *greatest* problem with this procedure is that
- A) the sample size was not large enough
 B) only one brand of vitamin was tested
 C) no control group was used
 D) the study lasted only one year

- 11) The data table below shows an effect of secondhand smoke on the birth weight of babies born to husbands and wives living together during pregnancy.

Effect of Secondhand Smoke on Birth Weight

	Wife: Nonsmoker Husband: Nonsmoker	Wife: Nonsmoker Husband: Smoker
Number of Couples	837	529
Average Weight of Baby at Birth	3.2 kg	2.9 kg

Based on these data, a reasonable conclusion that can be drawn about secondhand smoke during pregnancy is that secondhand smoke

- A) blocks the receptors on antibody cells
 B) causes mutations in cells of the ovaries
 C) is unable to pass from the mother to the fetus
 D) slows the growth of the fetus

- 9) Conclusions based on an experiment are most likely to be accepted when

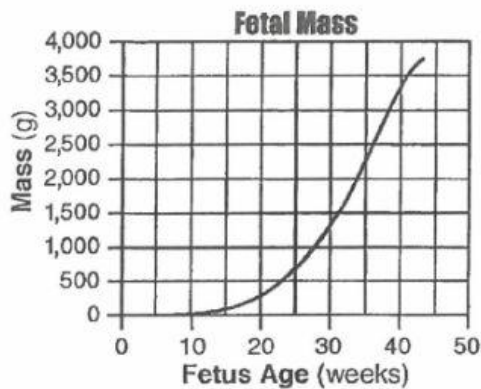
- A) hypotheses are based on one experimental design
 B) they are consistent with experimental data and observations
 C) they are derived from investigations having many experimental variables
 D) scientists agree that only one hypothesis has been tested

- 10) An investigation was carried out to determine which of three antibacterial soaps is most effective. Four petri dishes labeled A, B, C, and D were set up. The same amount and type of bacteria was added to each dish. Next, 2 mL of a different brand of soap were added to dishes B, C, and D. Then, 2 mL of water were added to dish A, instead of soap. The dishes were incubated at 37°C for 24 hours. At the end of the investigation, the amount of bacteria in each dish was determined. Dish D had the least bacteria. It was concluded that the soap in dish D was the most effective soap to use against bacteria.

Which statement *best* describes the validity of this conclusion?

- A) The conclusion is not valid since the same amount of bacteria was used in each dish.
 B) The conclusion is valid since the amounts of bacteria were measured at the end of the investigation.
 C) The conclusion is valid since too small a sample of bacteria was used in this investigation.
 D) The conclusion might not be valid since the investigation was carried out only once.

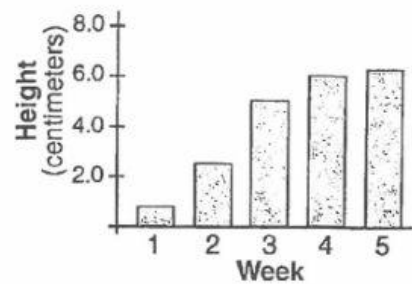
- 12) The graph represents changes in the mass of a fetus from week 8 to its birth at week 43.



During which five-week period shown in the given graph did the fetal mass increase at the *greatest* rate?

- A) weeks 10-15 C) weeks 25-30
B) weeks 15-20 D) weeks 30-35

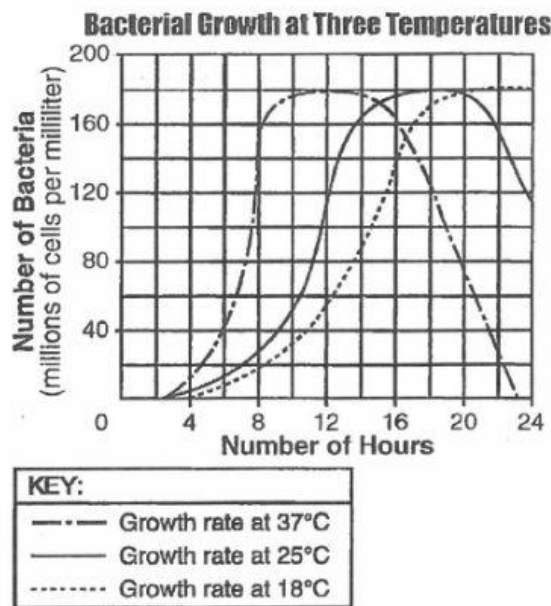
- 13) The bar graph below shows the height of a plant at the end of each week of a five-week growth period.



Which one of the following statements represents a valid conclusion based on the information in the graph?

- A) The plant will grow faster during the sixth week than it did during the fifth week.
B) The plant grew slowest during the first three weeks, and then it grew faster.
C) The plant was given water during the first three weeks, only.
D) The plant grew fastest during the first three weeks, and then it grew slower.

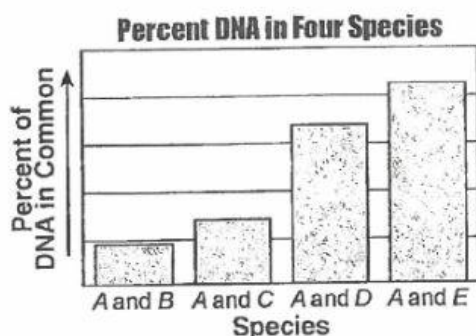
- 14) The graph below represents the growth of bacteria cultured at three different temperatures over a period of 24 hours.



Which of the following statements concerning the rate of cell division in the bacteria culture is correct?

- A) Cell division is most rapid at 37°C between 6 and 8 hours after it began.
B) Cell division is most rapid at 25°C between 20 and 24 hours after it began.
C) Cell division is most rapid at 18°C between 4 and 8 hours after it began.
D) Cell division occurs at the same rate no matter what the temperature.

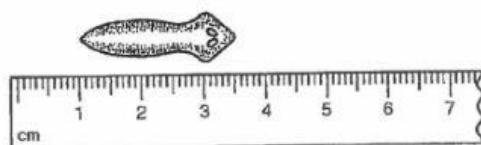
- 15) The percent of DNA that species *A* has in common with species *B*, *C*, *D*, and *E* are shown in the graph below.



Which one of the following statements 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) Environment influences the rate of evolution.
 C) Fewer mutations have occurred in species *B* and *C* than in species *A*.
 D) Species *A* and *E* have the greatest similarity in protein structure.

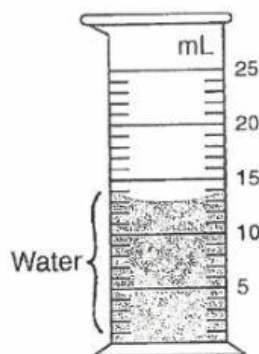
- 16) The diagram below represents the measurement of a biological specimen.



What is the approximate length of the specimen in millimeters?

- A) 30 mm C) 25 mm
 B) 35 mm D) 40 mm

- 17) What is the volume of water represented in the graduated cylinder shown below?



- A) 13.0 mL C) 10.3 mL
 B) 14.0 mL D) 15.0 mL

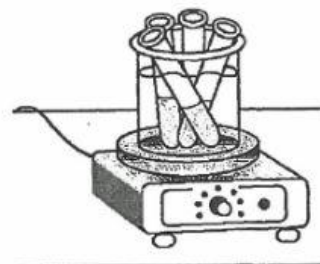
- 18) A diagram of the actual size of a peppered moth wingspan is shown below.



An estimated length of the wingspan could be

- A) 3 grams C) 3 centimeters
 B) 3 kilometers D) 3 milliliters

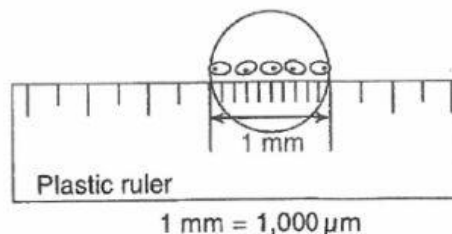
- 19) Part of a laboratory procedure is shown in the diagram below.



This setup would most likely be involved in a procedure to

- A) determine the pH of solutions
 B) separate pigments in a mixture
 C) stain specimens while making a wet mount
 D) test for the presence of glucose using an indicator

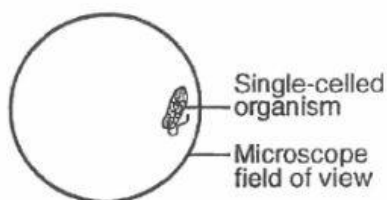
- 20) Part of a clear plastic ruler is placed across the middle of the field of view of a compound light microscope. A row of cells can be seen under low-power magnification (100 $\times$).



What is the average length of a single cell in micrometers (μm)?

- A) 100 μm C) 200 μm
 B) 10 μm D) 2,000 μm

- 21) A student used the low-power objective of a compound light microscope and observed a single-celled organism as shown in the diagram below.



When he switched to high power, the organism was no longer visible. This most likely happened because switching to high power made the

- A) area of the slide being viewed smaller
- B) fine-adjustment knob no longer functional
- C) image too small to be seen
- D) field too bright to see the organism

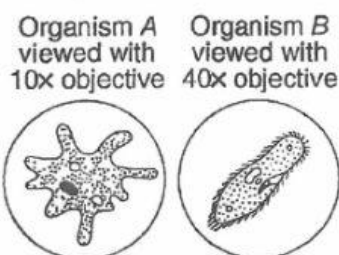
- 22) A wet-mount slide preparation of a specimen is stained in order to

- A) remove water from the slide
- B) eliminate some organelles
- C) make cell structures more visible
- D) use the high-power lens

- 23) When using a compound light microscope, the most common reason for staining a specimen being observed is to

- A) determine the effects of chemicals on the organism
- B) reveal details that are otherwise not easily seen
- C) keep the organism from moving around
- D) make the view more colorful

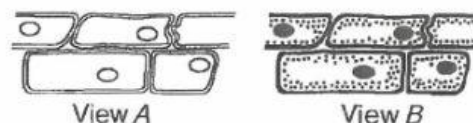
- 24) The drawings below were made during a laboratory exercise in which a microscope was used to view slides of preserved protozoa. The microscope had a 10x eyepiece and two different objectives.



Which statement about the size of the organisms is correct?

- A) Organism B is larger than organism A.
- B) The relative size of the organisms cannot be determined from the information given.
- C) Organism A is larger than organism B.
- D) Organisms A and B are both the same size.

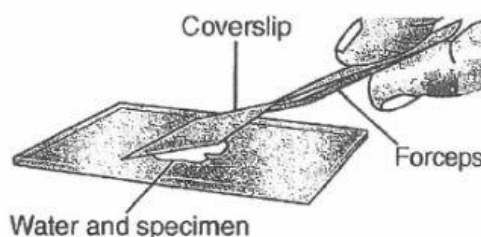
- 25) A student observes some cells with a compound light microscope as shown in view A below.



What did the student most likely do to obtain view B?

- A) applied distilled water to the slide
- B) used electrophoresis
- C) used a higher magnification
- D) applied a biological stain to the slide

- 26) A laboratory technique is illustrated in the diagram below.



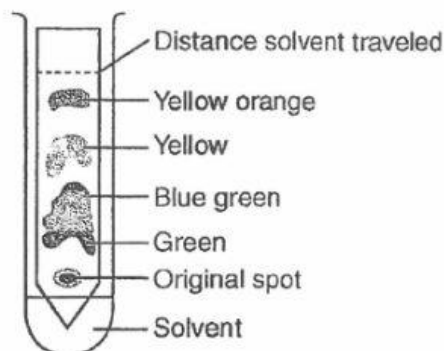
The technique of lowering the coverslip at an angle is used to

- A) reduce the formation of air bubbles
- B) reduce the size of the specimen
- C) make the specimen transparent
- D) make organelles more visible

- 27) A coverslip should be slowly lowered from a 45° angle onto a slide in order to

- A) prevent the slide from being scratched
- B) reduce the formation of air bubbles
- C) stop the loss of water from under the coverslip
- D) ensure that the specimen being viewed will stay alive

- 28) A technique used to analyze pigments in spinach leaves is shown in the diagram below.



This technique is known as

- A) paper chromatography
- B) gene manipulation
- C) dissection
- D) staining