

# **Biology Attitudes, Skills, & Knowledge Survey (BASKS) Form 2**

Directions to Students:

Do not open this booklet until you are told to do so. Please respond to the following items by marking the best answer on your answer sheet using a #2 pencil. Please do not write on this survey. Scratch paper will be provided on request. If you do not understand what is being asked in an item, please ask the survey administrator for clarification.

Calculators not permitted.



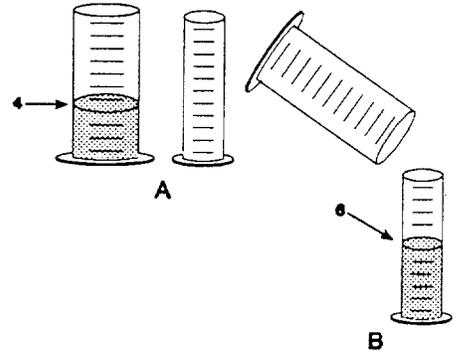
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1. Which best describes your race or ethnic background?
  - A. American Indian
  - B. Asian/Pacific Islander
  - C. Hispanic
  - D. Black
  - E. White
  
2. What is the highest level of education your mother obtained?
  - A. did not finish high school
  - B. high school graduate
  - C. some education after high school
  - D. college graduate
  - E. I don't know
  
3. What is the highest level of education your father obtained?
  - A. did not finish high school
  - B. high school graduate
  - C. some education after high school
  - D. college graduate
  - E. I don't know

Use the following key to indicate to what degree you agree with items 4 – 11.

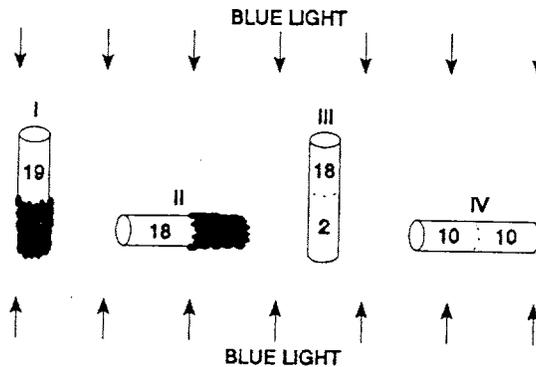
- A. strongly agree   B. agree   C. don't know   D. disagree   E. strongly disagree
4. I like biology.
  5. If given a choice, I would not study biology.
  6. Hypotheses are derived from controlled observations of nature.
  7. A hypothesis is a prediction of what will be observed in the future.
  8. Hypotheses/theories can be disproved beyond any doubt.
  9. A well-supported hypothesis becomes a theory.
  10. Explanations that seem reasonable and make intuitive sense need not be tested.
  11. To conclude that a hypothesis has been “supported” or “not supported,” one must first compare observations with expectations.

12. To the right are drawings of a wide and a narrow cylinder. The cylinders have equally spaced marks on them. Water is poured into the wide cylinder up to the 4th mark (see A). This water rises to the 6th mark when poured into the narrow cylinder (see B).



Both cylinders are emptied (not shown) and water is poured into the wide cylinder up to the 6th mark. How high would this water rise if it were poured into the empty narrow cylinder?

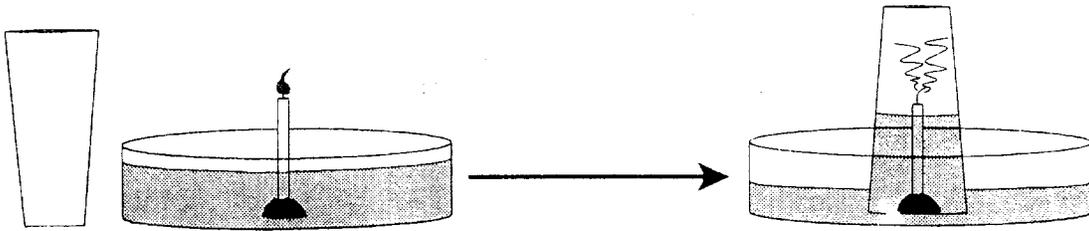
- A. to about 8  
 B. to about 9  
 C. to about 10  
 D. to about 12  
 E. none of these answers is correct
13. because
- A. the answer can not be determined with the information given.  
 B. it went up 2 more before, so it will go up 2 more again.  
 C. it goes up 3 in the narrow for every 2 in the wide.  
 D. the second cylinder is narrower.  
 E. one must actually pour the water and observe to find out.
14. Twenty fruit flies are placed in each of four glass tubes. The tubes are sealed. Tubes I and II are partially covered with black paper; Tubes III and IV are not covered. The tubes are placed as shown. Then they are exposed to blue light for five minutes. The number of flies in the uncovered part of each tube is shown in the drawing.



These data show that these flies respond to (respond means move to or away from):

- A. blue light but not gravity  
 B. gravity but not blue light  
 C. both blue light and gravity  
 D. neither blue light nor gravity

15. because
- some flies are in both ends of each tube.
  - the flies need light to see and must fly against gravity.
  - the flies are spread about evenly in Tube IV and in the upper end of Tube III.
  - most flies are in the lighted end of Tube II but do not go down in Tubes I and III.
  - most flies are in the upper end of Tube I and the lighted end of Tube II.
16. The figure below at the left shows a drinking glass and a burning birthday candle stuck in a small piece of clay standing in a pan of water. When the glass is turned upside down, put over the candle, and placed in the water, the candle quickly goes out and water rushes up into the glass (as shown at the right).



This observation raises an interesting question: Why does the water rush up into the glass?

Here is a possible explanation. The flame converts oxygen into carbon dioxide. Because oxygen does not dissolve rapidly into water but carbon dioxide does, the newly-formed carbon dioxide dissolves rapidly into the water, lowering the air pressure inside the glass.

Suppose you have the materials mentioned above plus some matches and some dry ice (dry ice is frozen carbon dioxide). Using some or all of the materials, how could you test this possible explanation?

- Saturate the water with carbon dioxide and redo the experiment noting the amount of water rise.
- The water rises because oxygen is consumed, so redo the experiment in exactly the same way to show water rise due to oxygen loss.
- Conduct a controlled experiment varying only the number of candles to see if that makes a difference.
- Suction is responsible for the water rise, so put a balloon over the top of an open-ended cylinder and place the cylinder over the burning candle.
- Redo the experiment, but make sure it is controlled by holding all independent variables constant; then measure the amount of water rise.

17. What result of your test (mentioned in #16 above) would show that your explanation is probably wrong?
- A. The water rises the same as it did before.
  - B. The water rises less than it did before.
  - C. The balloon expands out.
  - D. The balloon is sucked in.
18. A biologist found two forms of mice living in a valley - those with slight toe webbing and those without toe webbing. The later damming of a river made much of the valley marshy. Years later most of the mice living in the valley were found to have webbed toes. Very few, if any, of the non-webbed form could be found. Which statement best explains the observed change in the mouse population?
- A. Webbed toes in mice are controlled by more than one gene.
  - B. Mice with toe webbing survived at a higher rate and reproduced more often than did the non-webbed form.
  - C. The mice ran in the marshy valley so most developed webbing
  - D. Dampness in the valley increased the mutation rate in the mouse population.
  - E. Mice with non-webbed toes grew webbing because it helped them run and move about in the marshy valley.
19. When a tree grows bigger, most of the new tree material comes from
- A. the sun.
  - B. the soil.
  - C. the air.
  - D. the seed.

Items 20 – 24 are based on the following: Assume that eye color in fruit flies is determined by a pair of genes in which the gene for red eyes (R) is dominant over the gene for dark eyes (r). Also assume wing shape is determined by a pair of genes in which the gene for normal wings (N) is dominant over the gene for wrinkled wings (n).

20. When a cell in a growing fruit fly produces two new cells from one old cell by mitosis, how many genes for eye color will end up in each new cell?
- A. 0
  - B. 1
  - C. 2
  - D. 3
  - E. 4
21. When a female fruit fly produces eggs via meiosis, how many genes for wing shape will end up in each egg?
- A. 0
  - B. 1
  - C. 2
  - D. 3
  - E. 4

22. Suppose a male fly with a RrNn genotype produces sperm. What is the probability that any single sperm will have a RN genotype?
- A. 0%
  - B. 25%
  - C. 50%
  - D. 75%
  - E. 100%
23. Suppose that male flies all with the RRNN genotype mate with female flies all with the rrnn genotype. About what percentage of offspring flies will have red eyes and normal wings?
- A. 0%
  - B. 25%
  - C. 50%
  - D. 75%
  - E. 100%
24. Suppose several offspring in item 23 above mate with each other. About what percentage of their offspring will have dark eyes and wrinkled wings?
- A. 0%
  - B. 6%
  - C. 19%
  - D. 56%
  - E. 87%
25. Food chains:
- A. seldom include herbivores.
  - B. typically start with plants.
  - C. typically end with an omnivore.
  - D. are usually more complex than food webs.
  - E. usually include predators but not prey.
26. Darwin's evolution theory:
- A. provides an explanation for present-day species diversity.
  - B. claims that humans evolved from present-day monkeys.
  - C. provides an explanation for how life started on Earth.
  - D. provides an explanation of how organisms change during their lifetimes.
  - E. claims that evolutionary changes were rapid and of short duration.
27. Nocturnal animals are:
- A. active during the day.
  - B. active during the night.
  - C. herbivores.
  - D. omnivores.
  - E. ecological decomposers.

28. Osmosis:
- A. occurs when concentrations of water on both sides of a membrane are equal.
  - B. is not influenced by temperature.
  - C. occurs when membranes block diffusion.
  - D. occurs only through living cell membranes.
  - E. involves random ionic and/or molecular collisions.
29. An external stimulus:
- A. is caused by a response to an organic factor.
  - B. is some object, event, or situation that provokes a response in an organism.
  - C. can influence animal behavior but not plant growth.
  - D. can not occur in conjunction with other types of stimuli.
  - E. is an effect.
30. Animal species:
- A. usually refers to individual organisms.
  - B. typically can breed with other species in nature.
  - C. refers to organisms similar enough to produce fertile offspring.
  - D. have binomial names that are usually written in French
  - E. are diverse and number from 10 to 12 thousand.
31. All but which of the following statements are true about fossils?
- A. They are the preserved tissues of once-living animals.
  - B. They are usually found embedded in sedimentary rock, ice, or tar.
  - C. They may be dated in a relative way by the location.
  - D. They show little variance in diversity among differently aged rock layers.
  - E. They include the remains of so-called missing links.