

# **Biology Attitudes, Skills, & Knowledge Survey (BASKS) Form 3**

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 – 10.

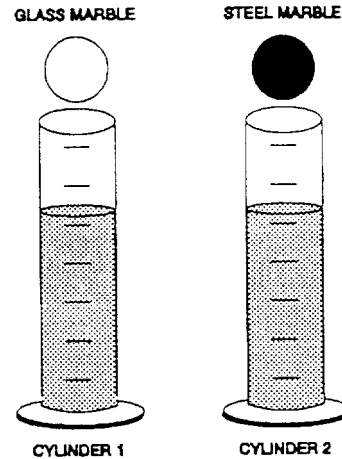
- A. strongly agree   B. agree   C. don't know   D. disagree   E. strongly disagree
4. I am good at biology.
  5. Biology is useful for everyday problems.
  6. Hypotheses/theories can not be proved to be true beyond any doubt.
  7. To test a hypothesis, one needs a prediction.
  8. The primary goal of modern science is to discover facts about nature.
  9. Coming up with hypotheses requires creative thinking.

10. To the right are drawings of two cylinders filled to the same level with water. The cylinders are identical in size and shape.

Also shown at the right are two marbles, one glass and one steel. The marbles are the same size but the steel one is much heavier than the glass one.

When the glass marble is put into Cylinder 1 it sinks to the bottom and the water level rises to the 6th mark. If we put the steel marble into Cylinder 2, the water will rise

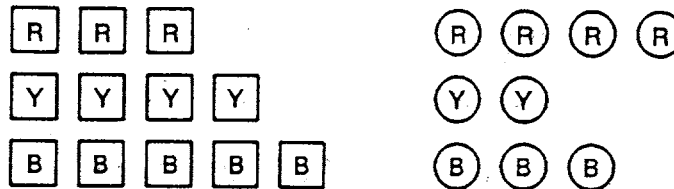
- A. to the same level as it did in Cylinder 1
- B. to a higher level than it did in Cylinder 1
- C. to a lower level than it did in Cylinder 1



11. because

- A. the steel marble will sink faster.
- B. the marbles are made of different materials.
- C. the steel marble is heavier than the glass marble.
- D. the glass marble creates less pressure.
- E. the marbles are the same size.

12. Three red square pieces of wood, four yellow square pieces, and five blue square pieces are put into a cloth bag. Four red round pieces, two yellow round pieces, and three blue round pieces are also put into the bag. All the pieces are then mixed about. Suppose someone reaches into the bag (without looking and without feeling for a particular shape piece) and pulls out one piece.



What are the chances that the piece is a red round or blue round piece?

- A. can not be determined
- B. 1 chance out of 3
- C. 1 chance out of 21
- D. 15 chances out of 21
- E. 1 chance out of 2

13. because
- A. 1 of the 2 shapes is round.
  - B. 15 of the 21 pieces are red or blue.
  - C. there is no way to tell which piece will be picked.
  - D. only 1 of the 21 pieces is picked out of the bag.
  - E. 1 of every 3 pieces is a red or blue round piece.

14. A student put a drop of blood on a microscope slide and then looked at the blood under a microscope. As you can see in the diagram below, the magnified red blood cells look like little round balls. After adding a few drops of salt water to the drop of blood, the student noticed that the cells appeared to become smaller.



Magnified Red Blood Cells

After Adding Salt Water

This observation raises an interesting question: Why do the red blood cells appear smaller?

Here are two possible explanations: I. Salt ions ( $\text{Na}^+$  and  $\text{Cl}^-$ ) push on the cell membranes and make the cells appear smaller. II. Water molecules are attracted to the salt ions so the water molecules move out of the cells and leave the cells smaller.

To test these explanations, the student used some salt water, a very accurate weighing device, and some water-filled plastic bags, and assumed the plastic behaves just like red-blood-cell membranes. The experiment involved carefully weighing a water-filled bag in a salt solution for ten minutes and then reweighing the bag.

What result of the experiment would best show that explanation I is probably wrong?

- A. the bag loses weight
  - B. the bag weighs the same
  - C. the bag appears smaller
15. What result of the experiment would best show that explanation II is probably wrong?
- A. the bag loses weight
  - B. the bag weighs the same
  - C. the bag appears smaller

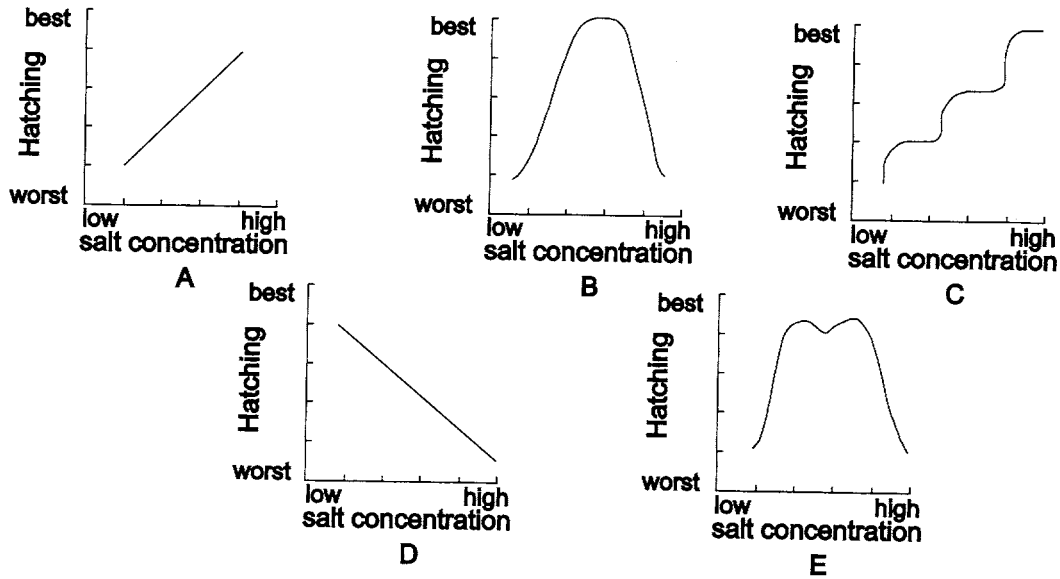
16. A new type of skin medication might have a serious side-effect. It might cause connective tissue disease. If it does, then
- A. most people that have been using the medication should have the disease.
  - B. disease incidence should be higher in people who have been using the medication than in a comparable group of people who have not.
  - C. most people not using the medication should not have the disease.
  - D. no case for a cause/effect relationship can be made because correlation can not establish cause/effect
  - E. if a trial occurs in which 150 people testify who use the medication and have the disease, then a causal link has been established.

Items 17 – 22 are based on the following: While walking around a lake one day, you find two dead fish lying about 10 feet apart on the shore. One of the fish is a bluegill, the other a bass. The bluegill is lying within one foot of the lake water on a moist, muddy area. The bass is resting on a dry, sandy area 6 feet from the water. Upon returning to the area two weeks later, you find the bluegill tissue is almost completely decomposed whereas the bass is just beginning to decompose. Use the following key to identify each item:

A. hypothesis   B. prediction   C. observation   D. question   E. conclusion

17. Several fly maggots can be seen crawling in and on both fish.
18. The bass might have tougher tissue.
19. The difference in decomposition may be due to the amount of available moisture.
20. A dead bluegill and a dead bass should decompose at a similar rate when placed within one foot of the lake.
21. Because the fish were different types, they were exposed to different types of soil, and they were exposed to different amounts of water, we can't say for sure why they are decomposing at different rates.
22. Why is the bluegill more decomposed than the bass?

Items 23 – 26 refer to the following graphs. Each graph compares amount of brine shrimp egg hatching (on the Y axis) with varying salt concentration from low to high (on the X axis).



23. Which graph best shows an optimum range for brine shrimp egg hatching with varying salt water concentrations?

- A. A
- B. B
- C. C
- D. D
- E. E

24. A biologist generates the hypothesis that two different species of brine shrimp have different salt tolerances. To test this hypothesis he attempted to hatch samples of eggs (presumably of both species mixed together) in solutions of varying salt concentration. Which of the possible results shown in the graphs would support his hypothesis?

- A. A
- B. B
- C. C
- D. D
- E. E

25. A second biologist generates the hypothesis that brine shrimp are able to use salt in the water as a food source, and that more food promotes more hatching. Which of the results graphed supports this hypothesis?

- A. A
- B. B
- C. C
- D. D
- E. E

26. A third biologist generates the hypothesis that salt poisons eggs. Which of the graphs supports this hypothesis?

- A. A
- B. B
- C. C
- D. D
- E. E

27. Ms. Croaker wants to find out how many frogs live in a pond near the school. Because she could not capture all of the frogs and count them, she caught as many as she could, put a band on each frog's left hind leg, and put them back in the pond. A week later, she returned to the pond and again caught as many frogs as she could. On the first trip to the pond, she caught and banded 55 frogs. On the second trip, she caught 72 frogs, of which 12 were banded. Assuming that the banded and unbanded frogs mixed thoroughly, what is the best estimate of the total number of frogs in the pond?

- A. 72
- B. 125
- C. 200
- D. 275
- E. 330