

Biology Attitudes, Skills, & Knowledge Survey (BASKS) Form 1

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.



Arizona Collaborative for Excellence in the Preparation of Teachers
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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

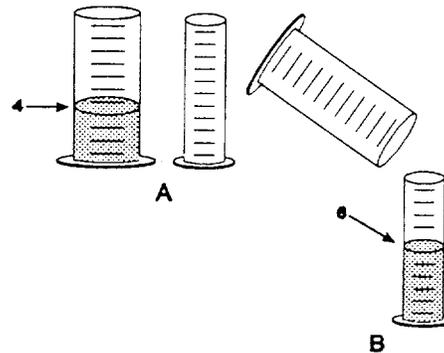
2. What is the highest level of education your mother obtained?
 - A. did not finish high school
 - B. high school graduate
 - C. some education after high school
 - D. college graduate
 - E. I don't know

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.

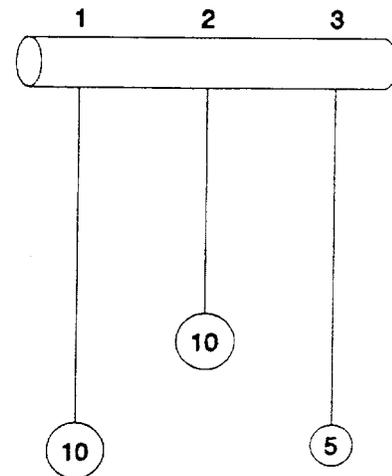
- A. strongly agree B. agree C. don't know D. disagree E. strongly disagree
4. Learning biology is mostly memorization.
 5. The primary goal of modern biology is to explain natural phenomena.
 6. A conclusion is a statement of what was observed in an experiment.
 7. To be scientific, hypotheses must be testable.
 8. A well-supported theory becomes a law.
 9. Current scientific theories portray nature more accurately than those they replaced.
 10. Scientists think atoms exist primarily because they have seen them through powerful microscopes.

11. 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, and water is poured into the narrow cylinder up to the 11th mark. How high would this water rise if it were poured into the empty wide cylinder?

- A. to about $7 \frac{1}{2}$
 B. to about 9
 C. to about 8
 D. to about $7 \frac{1}{3}$
 E. none of these answers is correct
12. because
- A. the ratios must stay the same.
 B. one must actually pour the water and observe to find out.
 C. the answer can not be determined with the information given.
 D. it was 2 less before so it will be 2 less again.
 E. you subtract 2 from the wide for every 3 from the narrow.
13. At the right are drawings of three strings hanging from a bar. The three strings have metal weights attached to their ends. String 1 and String 3 are the same length. String 2 is shorter. A 10 unit weight is attached to the end of String 1. A 10 unit weight is also attached to the end of String 2. A 5 unit weight is attached to the end of String 3. The strings (and attached weights) can be swung back and forth and the time it takes to make a swing can be timed.



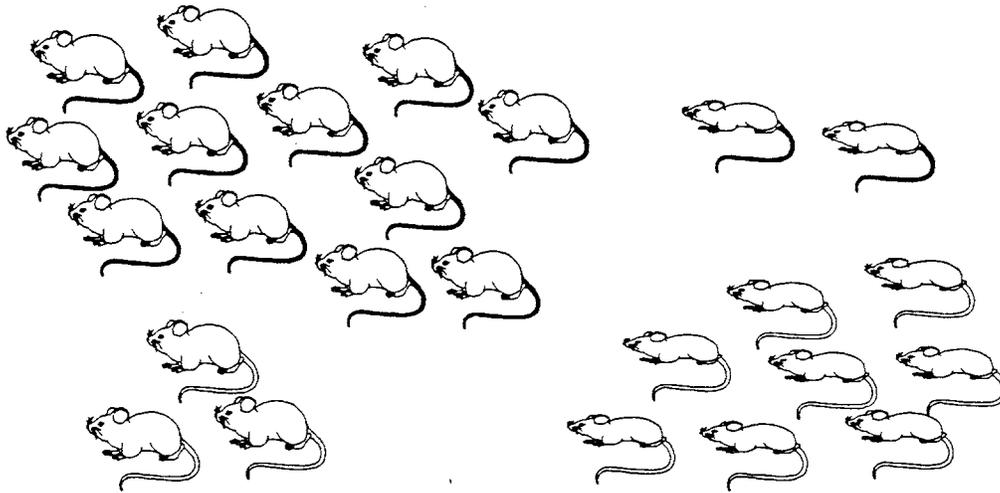
Suppose you want to find out whether the length of the string has an effect on the time it takes to swing back and forth. Which strings would you use to find out?

- A. only one string
 B. all three strings
 C. 2 and 3
 D. 1 and 3
 E. 1 and 2

14. because

- A. you must use the longest strings.
- B. you must compare strings with both light and heavy weights.
- C. only the lengths differ.
- D. to make all possible comparisons.
- E. the weights differ.

15. Farmer Brown was observing the mice that live in his field. He discovered that all of them were either fat or thin. Also, all of them had either black tails or white tails. This made him wonder if there might be a link between the size of the mice and the color of their tails. So he captured all of the mice in one part of his field and observed them. Below are the mice that he captured.



Do you think there is a link between the size of the mice and the color of their tails?

- A. appears to be a link
- B. appears not to be a link
- C. can not make a reasonable guess

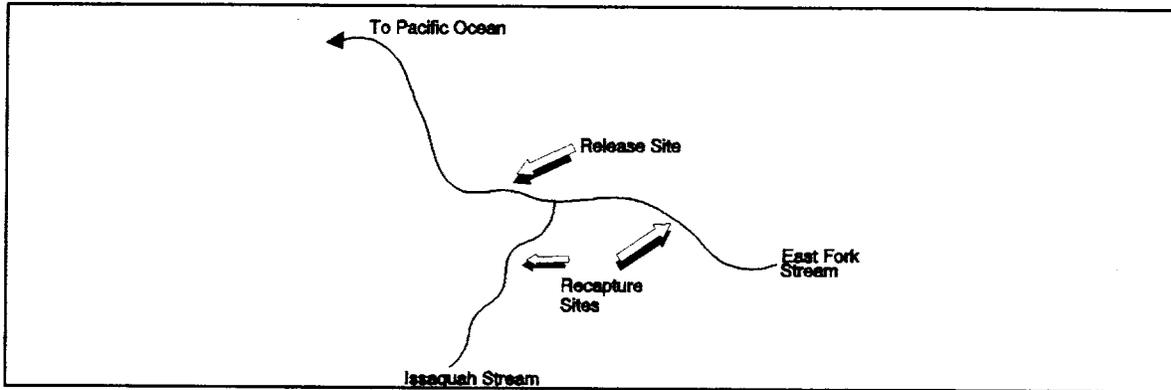
16. because

- A. there are some of each kind of mouse.
- B. there may be a genetic link between mouse size and tail color.
- C. there were not enough mice captured.
- D. most of the fat mice have black tails while most of the thin mice have white tails.
- E. as the mice grew fatter, their tails became darker.

17. According to evolution theory, which should occur?

- A. Fossil species and present-day species look the same.
- B. Simple and complex species first appear in the fossil record at the same time.
- C. Fossil diversity is the same from rock strata to rock strata.
- D. Fossils are found in rocks formed before and after life arose on earth.
- E. Fossils of intermediate species exist.

Items 18 – 21 are based on the following: Salmon are born in freshwater streams and then swim downstream to the ocean. When they are mature, they return to their homestream to spawn. In an experiment to determine the way salmon find their homestream, a biologist captured East Fork and Issaquah salmon after they returned to their homestreams. He then plugged the noses of some of the fish from both streams (the experimental fish) and he left the noses of the other fish unplugged (the control fish). He then took all the fish to the release site (as marked on the map). The fish then swam back up stream and were recaptured in the East Fork or Issaquah streams at the two points marked recapture sites. The biologist's data are shown in Tables 1 and 2.



Map of Issaquah and East Fork streams showing salmon release and recapture sites.

TABLE 1: RESULTS FOR EXPERIMENTAL FISH WITH PLUGGED NOSES

Homestream	Recapture Site	
	Issaquah	East Fork
Issaquah	39	12
East Fork	16	3

TABLE 2: RESULTS FOR CONTROL FISH WITH UNPLUGGED NOSES

Homestream	Recapture Site	
	Issaquah	East Fork
Issaquah	46	0
East Fork	8	19

18. What hypothesis is the biologist testing?
- A. How do salmon find their way home?
 - B. Salmon find their homestream by sense of smell.
 - C. Plugging a salmon's nose should prevent it from getting home.
 - D. If a salmon's nose is plugged, then it should not be able to navigate.
 - E. Control group salmon are better at getting home than are experimental group salmon.
19. Based on the results in Table 1, what percentage of fish made the wrong turn?
- A. 77%
 - B. 60%
 - C. 40%
 - D. 28%
 - E. 16%
20. Assuming that salmon navigate by smell, what percentage of the experimental fish would you expect to be recaptured in their home stream?
- A. 100%
 - B. 60%
 - C. 50%
 - D. 25%
 - E. 0%
21. Do the results in Tables 1 and 2 support the biologist's hypothesis?
- A. No, because some control fish made the wrong turn and some experimental fish made the correct turn.
 - B. Yes, because a significantly greater percent of experimental fish made the wrong turn than did control fish.
 - C. Yes, because none of the fish with plugged noses found their home stream.
 - D. No, because a significantly greater percent of experimental fish did not make the wrong turn.
 - E. Cannot tell because the sample is too small.
22. Environmental factors
- A. do not include conditions such as temperature and amount of rainfall.
 - B. remain constant with increasing altitude.
 - C. include plants but not animals.
 - D. are different on the north and south facing slopes of a mountain.
 - E. are the same during the summer and winter.

23. According to natural selection theory, species change over time only when the following condition is met:
- A. individuals having favorable characteristics breed with individuals having unfavorable characteristics.
 - B. characteristics acquired during an individual's lifetime are passed down to its offspring.
 - C. characteristics are inherited by offspring.
 - D. population growth is unlimited by environmental factors.
 - E. climactic conditions change over time.
24. According to gene theory:
- A. genes recombine in a specific order during egg and sperm production.
 - B. the larger gene of a pair dominates the expression of the smaller gene.
 - C. gene pairs separate independently during zygote production.
 - D. an individual has two pairs of genes for each observable characteristic.
 - E. genes are located in DNA.
25. Biological populations:
- A. must increase in size over time.
 - B. usually contains individuals with variable characteristics.
 - C. represents organisms of various types living and reproducing in a particular location.
 - D. refers to both living and non-living components of biological communities.
 - E. must decrease in size over time.
26. The phrase "limiting factors" best refers to environmental components that:
- A. are organic.
 - B. are non-biological aspects that limit population size.
 - C. do not change in importance as population size changes.
 - D. are not strong enough to destroy a large population of organisms.
 - E. keep the reproductive potential of populations in check.
27. Carnivores:
- A. are animals that eat both plants and animals.
 - B. must have fur.
 - C. live only on land.
 - D. are animals that eat other animals.
 - E. are classified as ecological producers.

28. Artificial selection:
- A. is similar to natural selection primarily with respect to the selective agent.
 - B. is a process that has operated in nature long before humans inhabited the Earth.
 - C. has caused the extinction of many native species.
 - D. differs from natural selection in that it operates across generations.
 - E. can produce offspring with characteristics desired by humans.
29. Biological communities:
- A. have distinct and well-defined borders.
 - B. are relatively simple biological systems.
 - C. exist in terrestrial but not aquatic habitats.
 - D. usually do not include bacteria and fungi.
 - E. are groups of organisms that rely on each other for food and nutrients.
30. Photosynthesis:
- A. is carried out by green plants, fungi, and cyanobacteria.
 - B. actively transports glucose molecules into cell chloroplasts.
 - C. is a process that occurs in leaves, stems, and roots of green plants.
 - D. uses solar energy to combine CO₂ and H₂O molecules.
 - E. produces products similar to cellular respiration.
31. Snakes in the deserts of the southwestern United States and northern Africa appear very similar because they:
- A. eat the same types of foods.
 - B. have been subjected to similar selective pressures.
 - C. share a common ancestor within the past thousand years.
 - D. interbreed in nature.
 - E. were created to look similar.
32. All but which of the following statements are true about biogeochemical cycles?
- A. They include biotic and abiotic components.
 - B. They can influence many ecosystems.
 - C. They involve the recycling of biologically important atoms and molecules.
 - D. They are limited primarily to plant-soil interactions.
 - E. They can illustrate pathways that energy and elements take as they pass through biological systems.