

New science knowledge questions

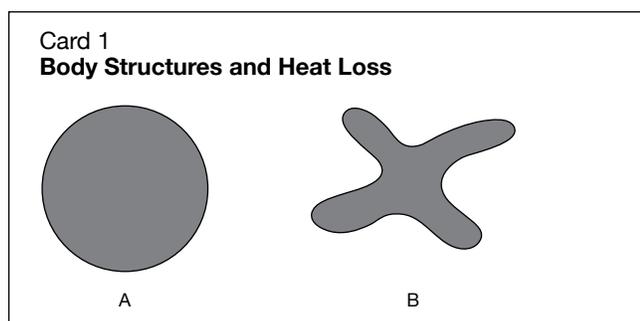
These questions were included in the 2008 General Social Survey to assess different aspects of science and technology knowledge. Answers are bold. The factual knowledge questions (questions 1, 3–5, and 7–11) are combined into “factual knowledge of science, scale 2” in appendix table 7-18; see also chapter table 7-8. Other questions test a person’s knowledge of charts and statistics (questions 12 and 13), use of reasoning skills or knowledge of life sciences (questions 2 and 14), and understanding of the experiment/controlling variables concept (questions 6 and 14–16); see appendix tables 7-15 and 7-16. The correct answer for question 14 can be reached by using reasoning skills, knowledge of life sciences, or understanding of the experiment/controlling variables concept.

Opening script: Now, we are going to do some more detailed questions on science and technology. Scientists and educators are interested in how familiar adults are with the things being taught in today’s schools. Many of these questions are likely to concern things that weren’t taught or emphasized when you were in school. Some of the questions involve pictures or graphs.

1. What property of water is most important for living organisms?

- A) It is odorless.
- B) It does not conduct electricity.
- C) It is tasteless.
- D) It is liquid at most temperatures on Earth.**

2. Please look at Card 1. The two objects shown there have the same mass, but object B loses heat more quickly than object A.



Which combination of bodily features would be BEST suited to a small animal that lives in a cold climate and needs to minimize heat loss?

- A) Long ears and a long body.
- B) Small ears and a short tail.**
- C) A long nose and a long tail.
- D) A short nose and large ears.
- E) A long tail and a short nose.

3. Which of the following is a key factor that enables an airplane to lift?

- A) Air pressure beneath the wing is greater than that above the wing.**
- B) Pressure within the airplane is greater than that of the outside.
- C) Engine power is greater than that of friction.
- D) The plane’s wing is lighter than air.

4. Lightning and thunder happen at the same time, but you see the lightning before you hear the thunder. Explain why this is so.

A correct response indicates that light travels faster than sound so the light gets to your eye before the sound reaches your ear.

5. A solution of hydrochloric acid (HCl) in water will turn blue litmus paper red. A solution of the base sodium hydroxide (NaOH) in water will turn red litmus paper blue. If the acid and base solutions are mixed in the right proportion, the resulting solution will cause neither red nor blue litmus paper to change color.

A correct response refers to a neutralization or a chemical reaction that results in products that do not react with litmus paper.

6. Please look at Card 2. A student wants to find out if temperature affects the behavior of goldfish. He has 4 fish bowls and 20 goldfish. Which of the experiments on Card 2 should he do? **Correct answer: A.**

7. A farmer thinks that the vegetables on her farm are not getting enough water. Her son suggests that they use water from the nearby ocean to water the vegetables. Is this a good idea?

- A) Yes, because there is plenty of ocean water.
- B) Yes, because ocean water has many natural fertilizers.
- C) No, because ocean water is too salty for plants grown on land.**
- D) No, because ocean water is much more polluted than rainwater.

8. Which one of the following is NOT an example of erosion?

- A) The wind in the desert blows sand against a rock.
- B) A glacier picks up boulders as it moves.
- C) A flood washes over a riverbank, and the water carries small soil particles downstream.
- D) An icy winter causes the pavement in a road to crack.**

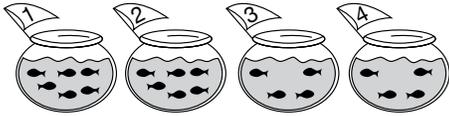
Card 2

A



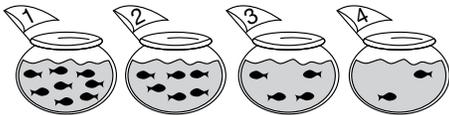
Number of fish	5 fish	5 fish	5 fish	5 fish
Temperature	15°C	20°C	25°C	30°C

B



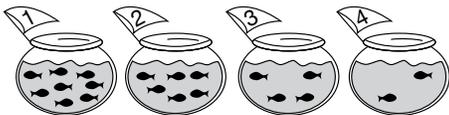
Number of fish	6 fish	6 fish	4 fish	4 fish
Temperature	20°C	20°C	30°C	30°C

C



Number of fish	8 fish	6 fish	4 fish	2 fish
Temperature	25°C	25°C	25°C	25°C

D



Number of fish	8 fish	6 fish	4 fish	2 fish
Temperature	15°C	20°C	25°C	30°C

9. Traits are transferred from generation to generation through the...

- A) sperm only.
- B) egg only.
- C) **sperm and egg.**
- D) testes.

10. How do most fish get the oxygen they need to survive?

- A) They take in water and break it down into hydrogen and oxygen.
- B) **Using their gills, they take in oxygen that is dissolved in water.**
- C) They get their oxygen from the food they eat.
- D) They come to the surface every few minutes to breathe air into their lungs.

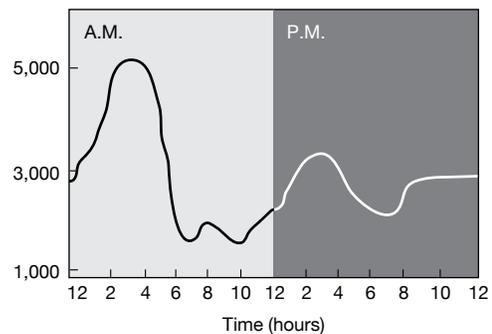
11. For which reason may people experience shortness of breath more quickly at the top of a mountain than along a seashore?

- A) A slower pulse rate.
- B) A greater gravitational force on the body.
- C) **A lower percent of oxygen in the blood.**
- D) A faster heartbeat.
- E) A slower circulation of blood.

12. Please look at Card 3. Day-night rhythms dramatically affect our bodies. Probably no body system is more influenced than the nervous system. The figure on Card 3 illustrates the number of errors made by shift workers in different portions of the 24-hour cycle.

Card 3
Day-Night Cycles

Number of Errors



Based on the data illustrated in the figure, during which of these time periods did the most errors occur?

- A) **2 A.M. to 4 A.M.**
- B) 8 A.M. to 10 A.M.
- C) 12 P.M. to 2 P.M.
- D) 2 P.M. to 4 P.M.
- E) 8 P.M. to 10 P.M.

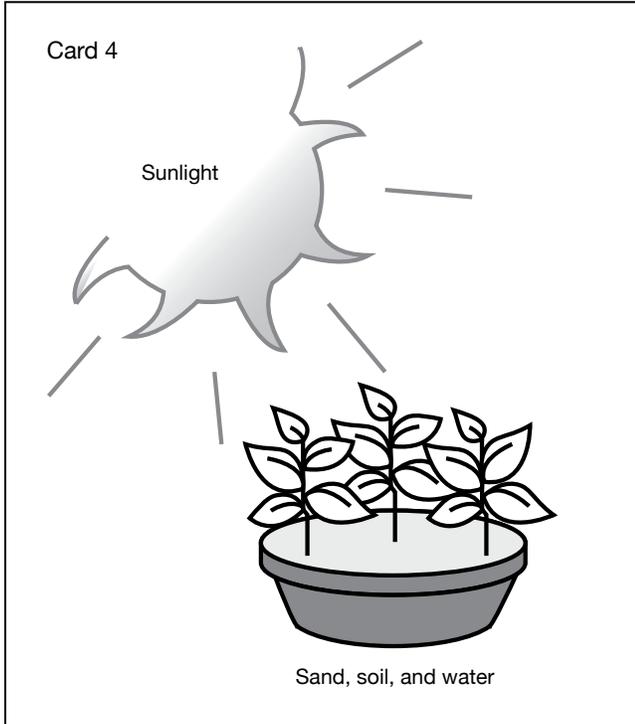
13. As part of a laboratory experiment, five students measured the weight of the same leaf four times. They recorded 20 slightly different weights. All of the work was done carefully and correctly. Their goal was to be as accurate as possible and reduce error in the experiment to a minimum.

Which of the following is the BEST method to report the weight of the leaf?

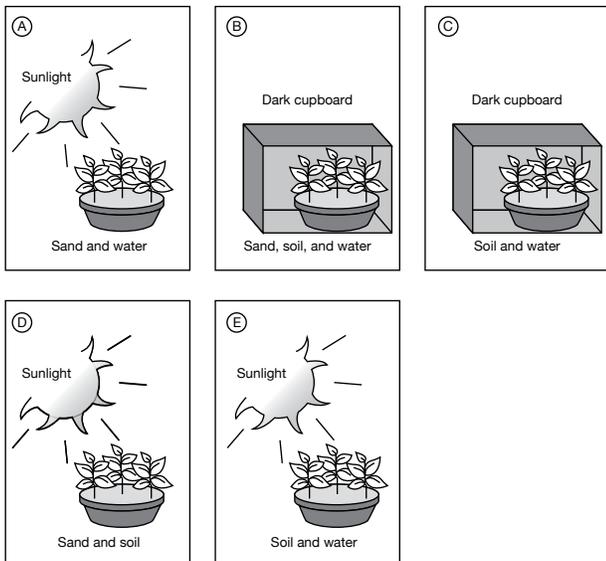
- A) Ask the teacher to weigh the leaf.
- B) Report the first measurement.
- C) **Average all of the weights that were recorded.**
- D) Average the highest and lowest weights recorded.
- E) Discard the lowest five weights.

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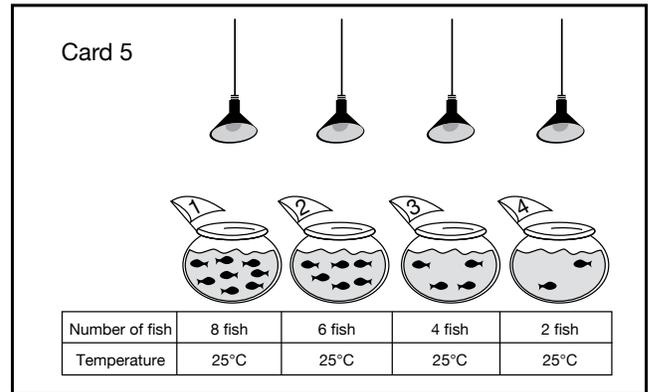
14. Please look at Card 4. A gardener has an idea that a plant needs sand in the soil for healthy growth. In order to test her idea she uses two pots of plants. She sets up one pot of plants as shown on the top part of the card. Which one of the pictures on the bottom part of the card shows what she should use for the second pot? **Correct answer is E.**



Which ONE of the following should she use for the second pot of plants?



15. Please look at Card 5. What is the scientist trying to find out from this experiment?



- A) **If the number of fish in the fish bowl affects the behavior of the fish.**
- B) If the temperature of the fish bowl affects the behavior of the fish.
- C) If the temperature and the amount of light affect the behavior of the fish.
- D) If the number of fish, the temperature, and the amount of light affect the behavior of the fish.

16. Why did you choose that answer?

- A) Because I already know what affects the behavior of fish.
- B) Because that is what is allowed to change in this experiment.**
- C) Because that is what stays the same in this experiment.
- D) Because that is what the scientist decided to include in this experiment.

SOURCE: University of Chicago, National Opinion Research Center, General Social Survey (2008).