

# Chemistry Attitudes, Skills, & Knowledge Survey (CASKS) 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.



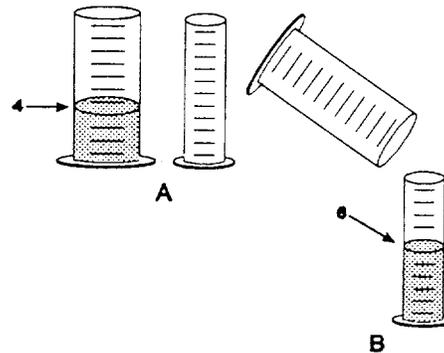
Arizona Collaborative for Excellence in the Preparation of Teachers  
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1. Which best describes your race or ethnic background?
  - A. American Indian
  - B. Asian/Pacific Islander
  - C. Hispanic
  - D. Black
  - E. White
  
2. What is the highest level 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.

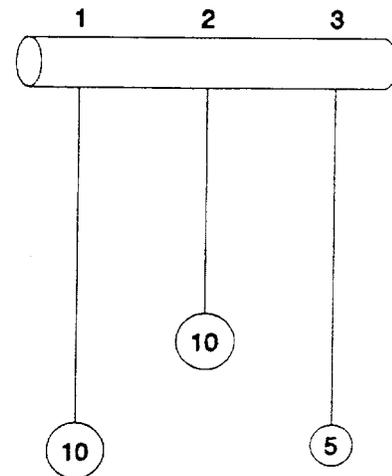
- A. strongly agree   B. agree   C. don't know   D. disagree   E. strongly disagree
4. Learning chemistry is mostly memorization.
  5. The primary goal of modern chemistry is to explain natural phenomena.
  6. A conclusion is a statement of what was observed in an experiment.
  7. To be scientific, hypotheses 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.



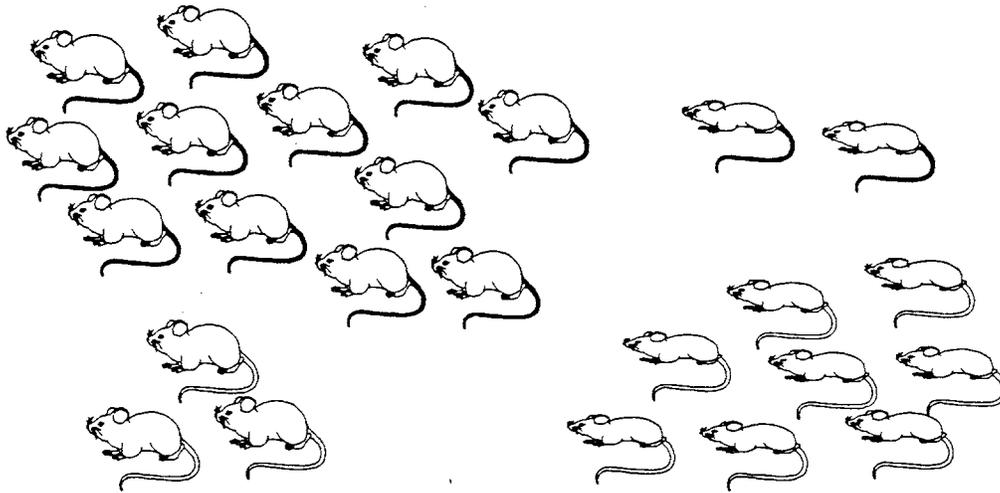
Suppose you want to find out whether the length of the string has an effect on the time it takes to swing back and forth. Which strings would you use to find out?

- 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

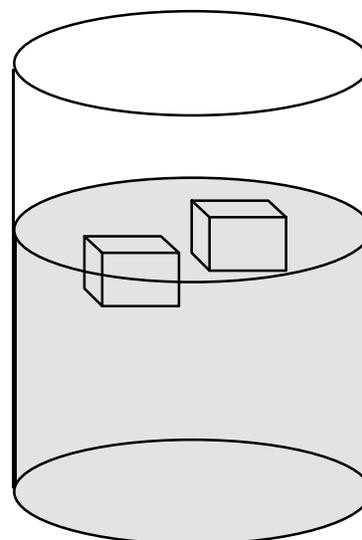
- A. there are some of each kind of mouse.
- B. there may be a genetic link between mouse size and tail color.
- C. there were not enough mice captured.
- D. most of the fat mice have black tails while most of the thin mice have white tails.
- E. as the mice grew fatter, their tails became darker.

17. During which of the following processes is there a decrease in the heat content of the form of water indicated?

- A. Ice as it forms on a lake.
- B. Water droplets as they fall to the ground.
- C. Water as it evaporates from a pond.
- D. Snow as it melts on a mountainside.

18. Two ice cubes are floating in water, as shown in the figure to the right. After the ice melts, the water level will be:

- A. higher
- B. lower
- C. the same



19. because

- A. The weight of water displaced is equal to the weight of the ice.
- B. Water is more dense in its solid form (ice).
- C. Water molecules displace more volume than ice molecules.
- D. The water from the ice melting changes the water level.
- E. When ice melts, its molecules expand.

20. Which is NOT an example of a chemical change?

- A. Boiling water
- B. Rusting iron
- C. Burning wood
- D. Baking bread

21. A balloon contains a mixture of He(g) and Ne(g). If a small leak occurs, which statement is true?

Atomic Weights: He = 4.0026 Ne = 20.179
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- A. Both He(g) and Ne(g) leak from the balloon at the same rate.
- B. All of the He(g) immediately leaks out, leaving all of the Ne(g) in the balloon.
- C. Ne(g) leaks from the balloon about 16 times faster than does He(g).
- D. He(g) leaks from the balloon faster than does Ne(g).
- E. Ne(g) leaks from the balloon about 5 times faster than does He(g).

22. Assume a beaker of pure water has been boiling for 30 minutes. What is in the bubbles in the boiling water?

- A. Air
- B. Oxygen gas and hydrogen gas
- C. Oxygen
- D. Water vapor
- E. Heat

23. Which of the following must be the same before and after a chemical reaction?

- A. The sum of the masses of all substances involved.
- B. The number of molecules of all substances involved.
- C. The number of atoms of each type involved.
- D. Both (A) and (C) must be the same.
- E. Each of the answers (A), (B), and (C) must be the same.

24. Which of the following equations is balanced?

- A.  $\text{P}_4(\text{s}) + 4\text{O}_2(\text{g}) \rightarrow \text{P}_4\text{O}_{10}(\text{s})$
- B.  $3\text{KClO}_3(\text{s}) \rightarrow 2\text{KClO}_4(\text{s}) + \text{KCl}(\text{s})$
- C.  $2\text{PbS}(\text{s}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{PbO}(\text{s}) + 2\text{SO}_2(\text{g})$
- D.  $3\text{NHNO}(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow 2\text{NO}_2(\text{g})$
- E.  $2\text{Li}(\text{s}) + \text{Se}(\text{s}) \rightarrow \text{Li}_3\text{Se}(\text{s})$