

Science Attitudes, Skills, & Knowledge Survey (SASKS) 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. Items 25 and 26 are essay items. Please respond on the accompanying sheet. 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

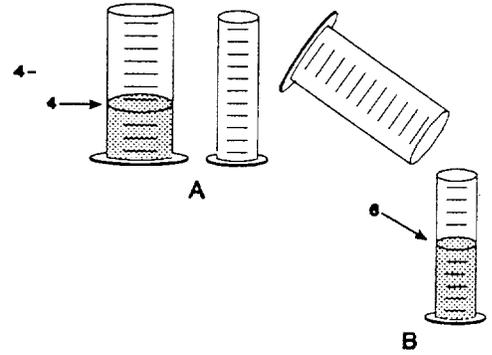
2. What is the highest level of education your mother obtained?
 - A. did not finish high school
 - B. high school graduate
 - C. some education after high school
 - D. college graduate
 - E. I don't know

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.

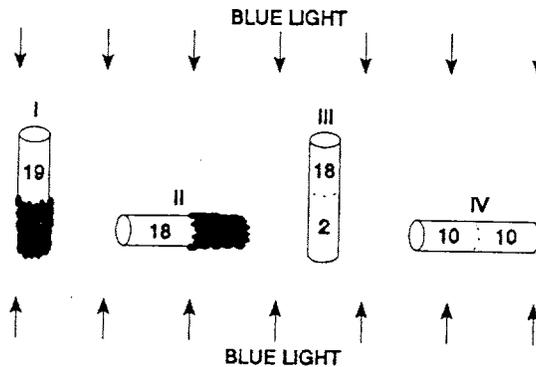
- A. strongly agree B. agree C. don't know D. disagree E. strongly disagree
4. I like science.
 5. If given a choice, I would not study science.
 6. Hypotheses are derived from controlled observations of nature.
 7. A hypothesis is a prediction of what will be observed in the future.
 8. Hypotheses/theories 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?

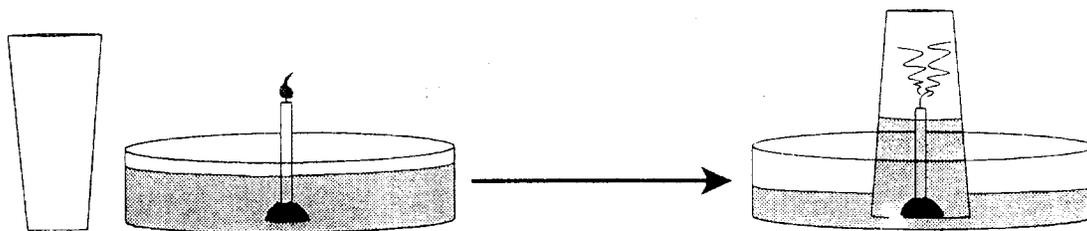
- A. to about 8
 B. to about 9
 C. to about 10
 D. to about 12
 E. none of these answers is correct
13. because
- A. the answer can not be determined with the information given.
 B. it went up 2 more before, so it will go up 2 more again.
 C. it goes up 3 in the narrow for every 2 in the wide.
 D. the 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.

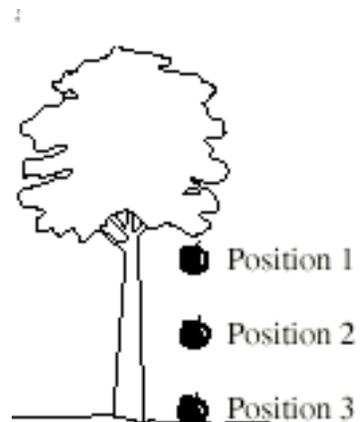
Suppose you have the materials mentioned above plus some matches and some dry ice (dry ice is frozen carbon dioxide). Using some or all of the materials, how could you test this possible explanation?

- 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.

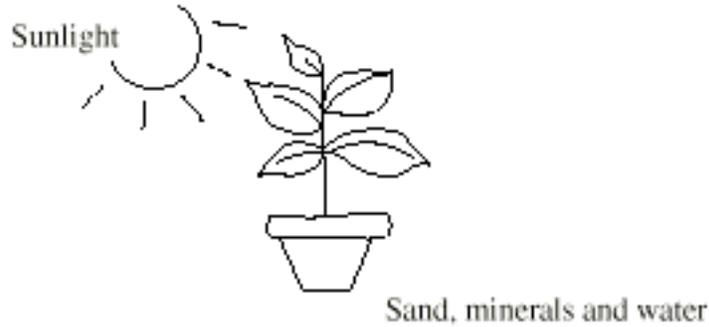
17. What result of your test (mentioned in #16 above) would show that your explanation is probably wrong?
- A. The water rises the same as it did before.
 - B. The water rises less than it did before.
 - C. The balloon expands out.
 - D. The balloon is sucked in.
18. Imagine that you could put popcorn kernels into an airtight popcorn popper and measure the mass of the popper with the kernels. After the popcorn has popped, the mass of the popper and the popcorn will be:
- A. less than the original mass because popped corn is less dense than the kernels are.
 - B. equal to the original mass because the container is airtight.
 - C. greater than the original mass because the volume of the popped corn is greater than that of the kernels.
 - D. impossible to determine accurately without weighing each piece of popcorn immediately.
19. Fossil fuels were formed from:
- A. uranium.
 - B. sea water.
 - C. sand and gravel.
 - D. dead plants and animals.

20. The drawing to the right shows an apple falling to the ground. In which of the three positions does gravity act on the apple?

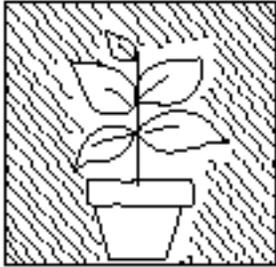
- A. Position 2 only
- B. Position 1 and Position 2 only
- C. Position 1 and Position 3 only
- D. Position 1, Position 2, and Position 3

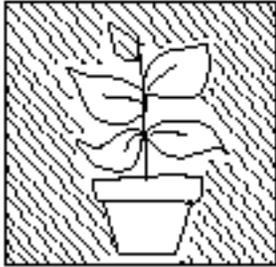


21. A girl had an idea that plants needed minerals from the soil for healthy growth. She placed a plant in the Sun, as shown in the diagram below.



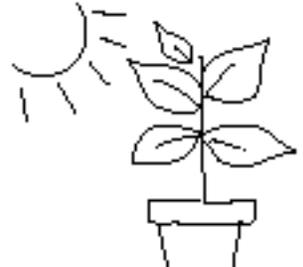
In order to check her idea she also needed to use another plant. Which of the following should she use?

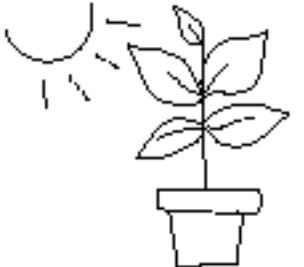
A. Dark cupboard

Sand, minerals and water

B. Dark cupboard

Sand and water

C. Sunlight

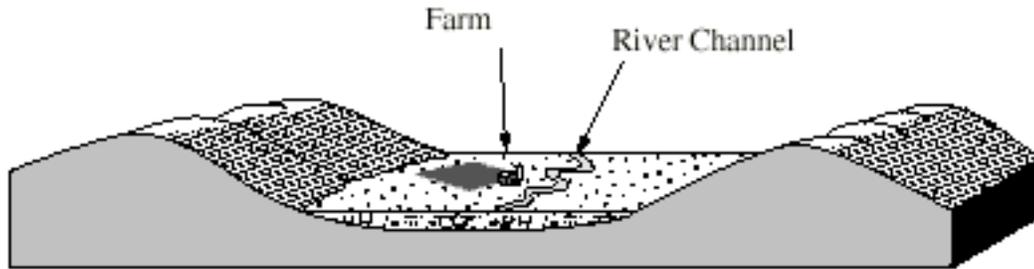
Sand only

D. Sunlight

Sand and water

E. Sunlight

Sand and minerals

22. Whenever scientists carefully measure any quantity many times, they expect that:
- A. all of the measurements will be exactly the same.
 - B. only two of the measurements will be exactly the same.
 - C. all but one of the measurements will be exactly the same.
 - D. most of the measurements will be close but not exactly the same.
23. How would you explain the phases of the moon?
- A. The apparent size of the moon changes.
 - B. The part of the lighted side of the moon that we see changes.
 - C. The shadow of the earth falls on the moon.
 - D. The amount of light falling on the moon changes.
24. What's the reason for your answer in question #23:
- A. The distance from the earth to the moon changes.
 - B. The earth comes between the sun and the moon.
 - C. The position of the moon, earth and sun changes.
 - D. The distance from the sun to the moon changes.
25. Maria collected the gas given off by a glowing piece of charcoal. The gas was then bubbled through a small amount of colorless limewater. Part of Maria's report stated, "After the gas was put into the jar, the limewater gradually changed to a milky white color." This statement is:
- A. an observation.
 - B. a conclusion.
 - C. an assumption of the investigation.
 - D. a hypothesis.

26. The diagram shows a river flowing through a wide plain. The plain is covered with several layers of soil and sediment.



- A. On the blank sheet given to you, write down one reason why this plain is a good place for farming.

please do not write in this space

- B. On the blank sheet given to you, write down one reason why this plain is NOT a good place for farming.

please do not write in this space

27. Machine A and Machine B are each used to clear a field. The table shows how large an area each cleared in 1 hour and how much gasoline each used. Which machine is more efficient in converting the energy in gasoline to work?

	Area of field cleared in 1 hour	Gasoline used in 1 hour
Machine A	2 hectares	3/4 liter
Machine B	1 hectare	1/2 liter

On the blank sheet given to you, explain your answer.

please do not write in this space