Science Attitudes, Skills, & Knowledge Survey (SASKS)
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. 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 – 10.

A. strongly agree B. agree C. don't know D. disagree E. strongly disagree

4. I am good at science.

5. Science is useful for everyday problems.

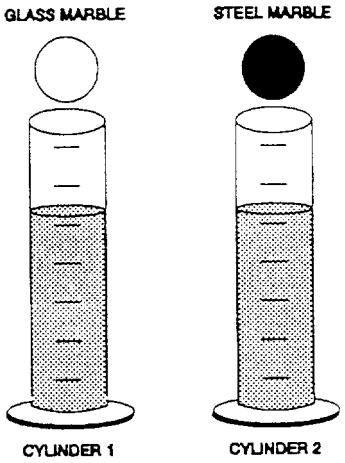
6. Hypotheses/theories can not be proved to be true beyond any doubt.

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.

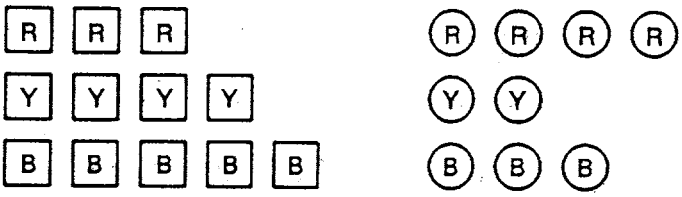
When the glass marble is put into Cylinder 1 it sinks to the bottom and the water level rises to the 6th mark. If we put the steel marble into Cylinder 2, the water will rise

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 (Na+ and 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. An insulated bottle keeps a cold liquid in the bottle cold by

A. destroying any heat that enters the bottle
B. keeping cold energy within the bottle
C. trapping dissolved air in the liquid
D. slowing the transfer of heat into the bottle

17. A certain organism has many cells, each containing a nucleus. If the organism makes its own food, it would be classified as:

A. a bacterium
B. a fungus
C. a plant
D. an animal

18. Three students added equal volumes of pond water to each of four beakers (I-IV) and placed each in a different constant temperature bath, maintained at 5ºC, 15ºC, 25ºC, and 35ºC, respectively. The students then added 6 water fleas to each of four beakers and recorded the time in each case. After 1 hour, the students removed 3 water fleas from each beaker and each student immediately observed the water fleas under a microscope. Heart rates were recorded as beats per minute. The results of the experiment are summarized below.

	Beaker Temp	Time Water Fleas Added	Time Water Fleas Removed	Beats/minute (average of 3 Water Fleas)
I	5ºC	2:00 pm	3:00 pm	41
II	15ºC	2:10 pm	3:10 pm	119
III	25ºC	2:20 pm	3:20 pm	202
IV	35ºC	2:30 pm	3:30 pm	281

The data obtained in this experiment lend support to which of the following statements?

A. At 45ºC the heart rate of water fleas would be 320 beats/minute.
B. Water fleas swim more slowly at high temperature.
C. Metabolic rate in water fleas is directly proportional to water temperature.
D. Heart rate in water fleas is inversely proportional to water temperature.
E. Between 0ºC and 5ºC, the heart rate of water fleas would remain constant.

19. Despite a very strong wind, a tennis player manages to hit a tennis ball with her racquet so that the ball passes over the net and lands in her opponent's court. Consider the following forces:

i. a downward force of gravity
ii. a force by the "hit"
iii. a force exerted by the air

Which of the above forces is (are) acting on the tennis ball after it has left contact with the racquet and before it touches the ground?

A. i only
B. i and ii
C. i and iii
D. ii and iii
E. i, ii, and iii

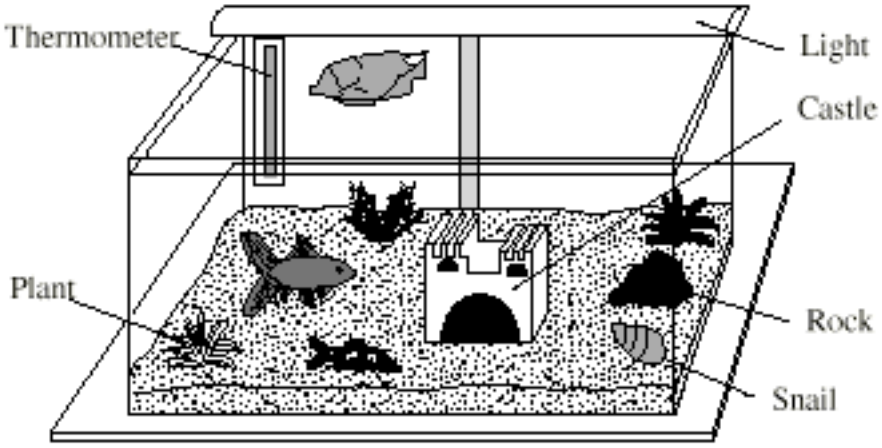
20. A. A space station is to be located between the Earth and the Moon at the place where the Earth's gravitational pull is equal to the Moon's gravitational pull. On the blank sheet given to you, write the letter indicating the approximate location of the space station.

please do not write in this space

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

please do not write in this space

21. In the picture of an aquarium, six items are labeled.



On the blank sheet given to you, explain why each of the following is important in maintaining the ecosystem in the aquarium.

A. the plant

please do not write in this space

B. the light

please do not write in this space