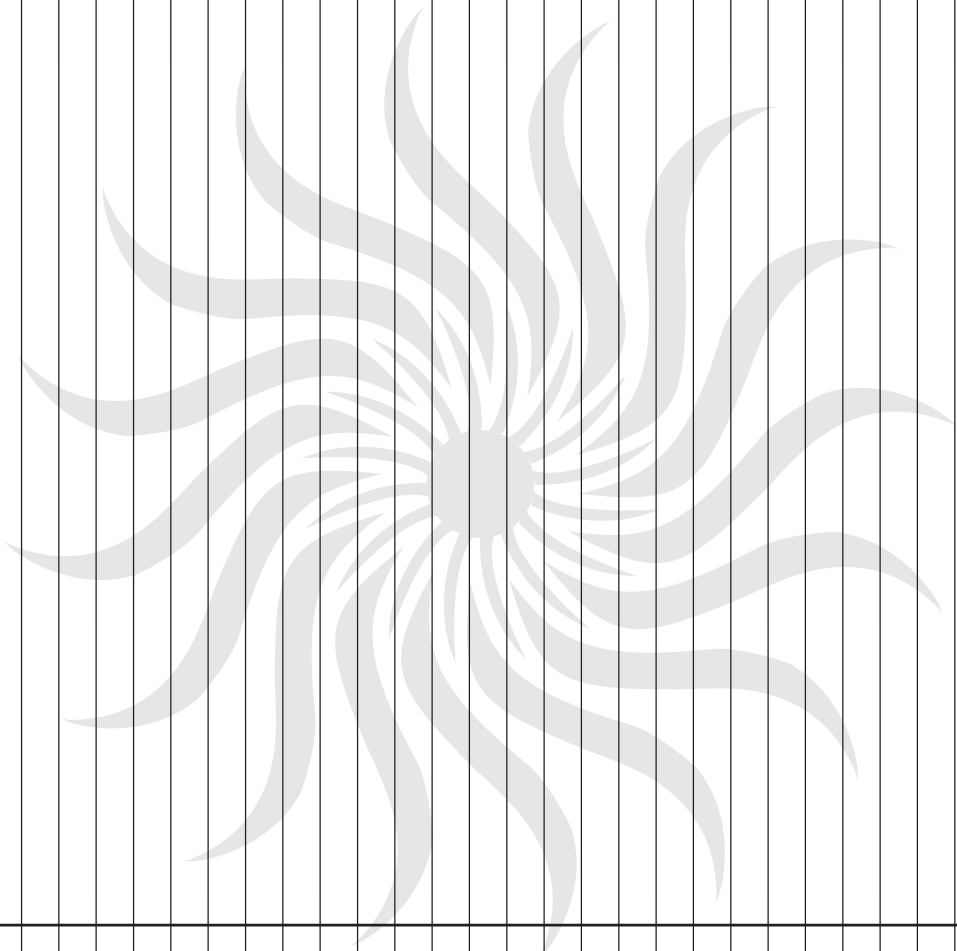


ASSESSMENT CHART FOR INVESTIGATION 1

SWINGERS

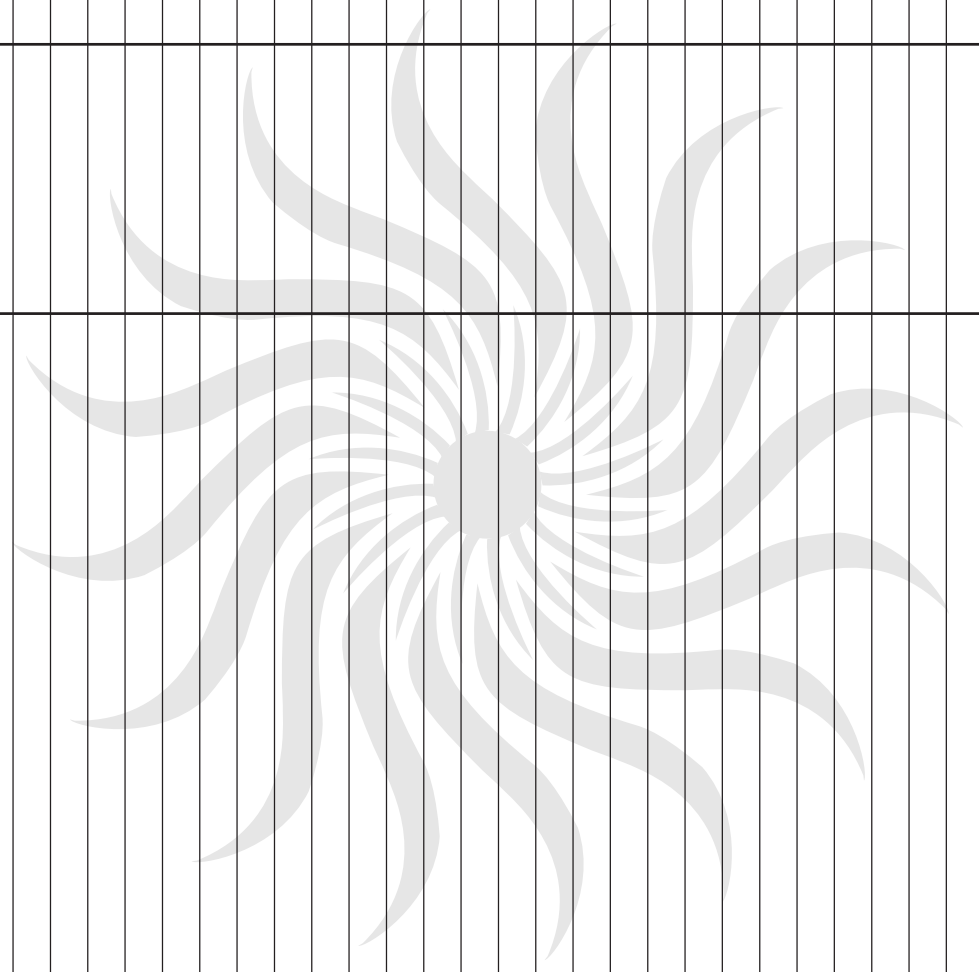
STUDENT NAME	PART 1		PART 2	PART 3
	Teacher Observation		Response Sheet— Swingers	Teacher Observation
	informal notes		experimental design	predicts from graph
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ASSESSMENT CHART FOR INVESTIGATION 2

LIFEBOATS

STUDENT NAME	PART 1 Teacher Observation		PART 2 Response Sheet— Lifeboats		PART 3 Teacher Observation	
	informal notes		experimental design		makes predictions from graph	
1.						explains need for standard
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ASSESSMENT CHART FOR INVESTIGATION 3

PLANE SENSE

STUDENT NAME	PART 1		PART 2		PART 3		PART 4			
	Teacher Observation informal notes		Response Sheet— Plane Sense experimental design		Teacher Observation identifies variables		Teacher Observation identifies standard design		Student Sheet— Two-Coordinate Graph independently graphs data	
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ASSESSMENT CHART FOR INVESTIGATION 4

FLIPPERS

STUDENT NAME	PART 2	PART 3	PART 3	PART 4	PART 4	PART 4
	Response Sheet— Flippers experimental design	Teacher Observation— Two-Coordinate Graph organizes data on a graph	Teacher Observation defines system	Student Sheet— Project Proposal designs a controlled experiment	Teacher Observation research/inquiry skills	Teacher Observation presentation
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ASSESSMENT CHART FOR SUMMATIVE ASSESSMENT

STUDENT NAME	Performance variables	Multiple-Choice Assessment #1-10	Short-Answer #11-14	Narrative #15-16	Portfolio Assessment	Notes
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ASSESSMENT SCORING GUIDE

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4

The question or task is completed correctly and contains additional, unexpected, or outstanding features.

3

The question or task is completed correctly; there are no mistakes.

2

The answer or task is partly correct; it has no big mistakes.

1

The answer or task contains big mistakes, or does not answer the question that was asked, but gives information that is related.

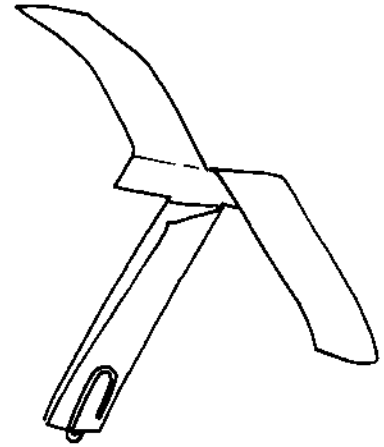
0

The student does not do the question or task, or gives an answer that has nothing to do with what was asked.

END-OF-MODULE ASSESSMENT for Variables

PERFORMANCE ASSESSMENT: VARIABLES

1. A twirly bird is a paper toy that twirls through the air as it falls (see the illustration).



Make a standard twirly bird by following these directions.

- Cut the twirly-bird sheet in two on the thickest black line. Save the grid paper for later.
- Take the piece that is labeled "Twirly Bird," and cut on the solid black lines.
- Fold the twirly bird on the dashed lines so it looks like the one in the illustration.
- Attach a paper clip to the bottom of the twirly bird.
- Fly the twirly bird by holding it above your head as high as you can, then letting it twirl to the floor.

2. What variables could you change that might affect how slowly the twirly bird falls? Make a list.

3. Construct a new twirly bird that you think might twirl more slowly than the standard one you have already made. Use the piece of grid paper you saved earlier.

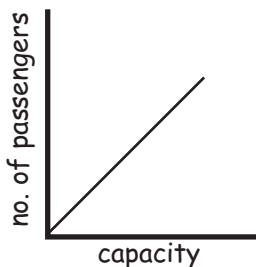
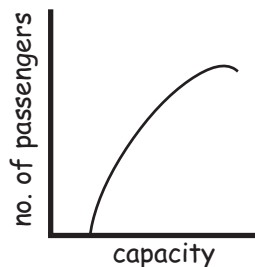
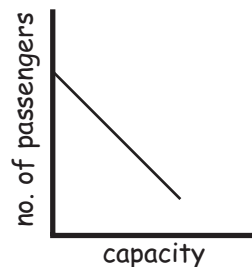
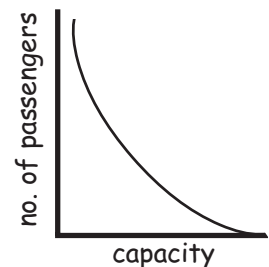
Explain what you varied, what you kept the same, and what you found out.

NOTE: Attach your twirly birds to this sheet with a paper clip before you turn it in.

END-OF-MODULE ASSESSMENT for Variables**MULTIPLE-CHOICE/SHORT-ANSWER ITEMS**

Directions: Circle the letter of the best answer for each of the items below.

- To *control variables* means to
 - measure properly.
 - repeat the experiment.
 - change one thing at a time.
 - test things out yourself.
- Which of these is NOT a variable in a pendulum system?
 - release position
 - time of day
 - mass at the end of the pendulum
 - length of the pendulum
- A grandfather clock uses a pendulum to keep it running on time. Lisa's grandfather clock is running too slowly all the time. What could she do to the pendulum in her clock so that it will keep time?
 - Make the pendulum lighter.
 - Make the pendulum heavier.
 - Lengthen the pendulum.
 - Shorten the pendulum.
- Which of these does NOT affect the number of pennies needed to sink the boat in the lifeboat experiment you did in class?
 - capacity of the boat
 - arrangement of the pennies
 - shape of the basin
 - size of the boat
- Which of these graphs shows a possible relationship between the number of pennies needed to sink a boat and the capacity of the boat, while other variables are controlled?

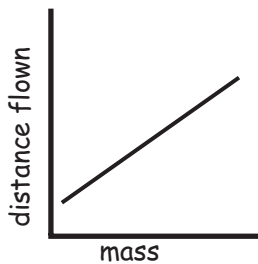
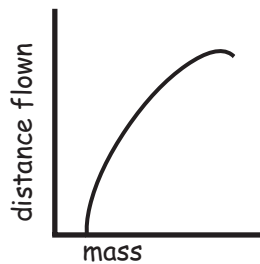
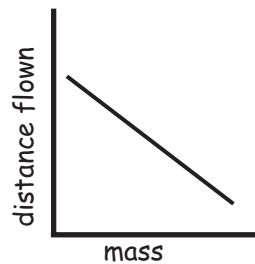
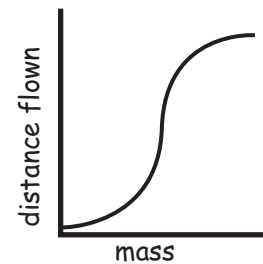
**A****B****C****D**

END-OF-MODULE ASSESSMENT for Variables**MULTIPLE-CHOICE/SHORT-ANSWER ITEMS**

6. In a controlled experiment to investigate what effect mass has on the distance a FOSS plane can fly, all of these variables should be controlled EXCEPT

- A. number of winds on the propeller.
- B. number of passengers.
- C. angle of the flight line.
- D. starting position.

7. Which of these graphs shows a possible relationship between the distance a model plane can fly and the mass of the plane, while other variables are controlled?

**A****B****C****D**

8. Joan set up a flipper system to investigate what effect the angle of launch has on how far she can flip an aluminum ball. Which of these angles would result in the greatest distance?

- A. 0°
- B. 30°
- C. 40°
- D. 90°

9. In an experiment, all of these can improve the accuracy of the results EXCEPT

- A. controlling all variables that are not under investigation.
- B. repeating the experiment.
- C. using smaller units to record the results.
- D. using larger units to record the results.

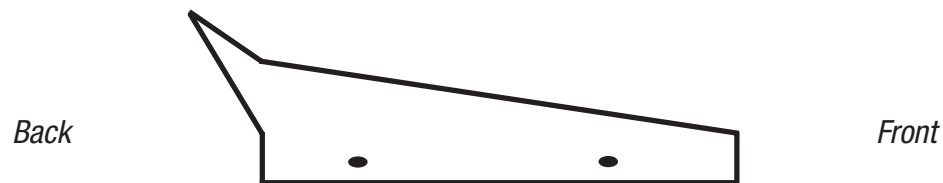
10. A pendulum system could be described as

- A. the string, the paper clip, the penny, the masking tape, and the pencil.
- B. the string, the paper clip, the penny, and the masking tape.
- C. the string, the paper clip, and the penny.
- D. the string, the paper clip, the penny, the pencil, and the clock.

11. **Directions:** Read the problem below, then answer the questions on the following page.

END-OF-MODULE ASSESSMENT for Variables**MULTIPLE-CHOICE/SHORT-ANSWER ITEMS****PROBLEM**


Kathy and Sue were making plans to enter a race-cart contest. The contest involves releasing race carts from the top of a ramp and seeing which one goes the farthest. The basic race-cart body looks like this.



The girls wanted to modify their race carts to go as far as possible. Sue thought the size of the back wheels might have an effect on the distance the cart would travel. Kathy thought the shape of the front of the race cart might have an effect on the distance the race cart would travel.

Below are pictures of the wheels and front ends available for the race carts.

11a. The girls built four race carts to test their ideas. Circle two race carts that Sue could

<i>Wheels</i>	<i>Front ends</i>
	

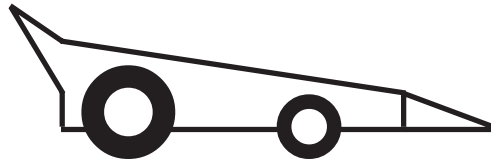
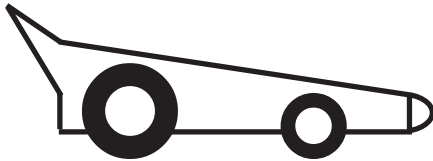
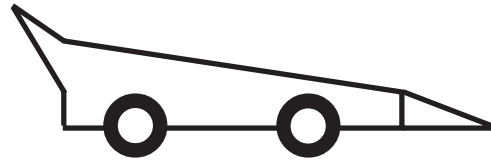
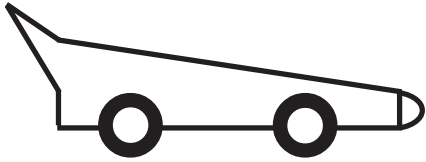
Name _____

Date _____

END-OF-MODULE ASSESSMENT for Variables

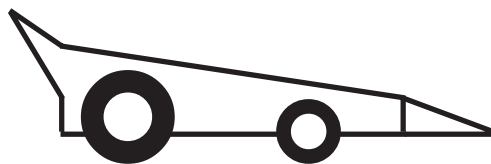
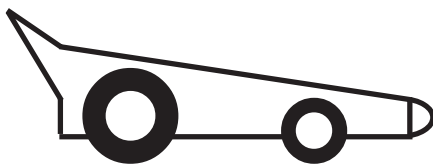
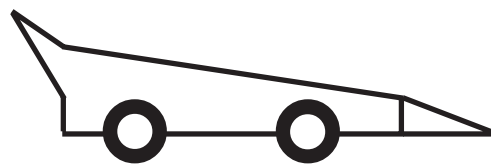
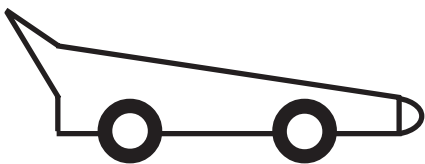
MULTIPLE-CHOICE/SHORT-ANSWER ITEMS

use to find out if wheel size makes a difference in the distance the race cart can travel.



Why did you circle those two race carts?

- b. Circle two race carts that Kathy could use to find out if a round front end or a pointed front end makes a difference in the distance the race cart can travel.



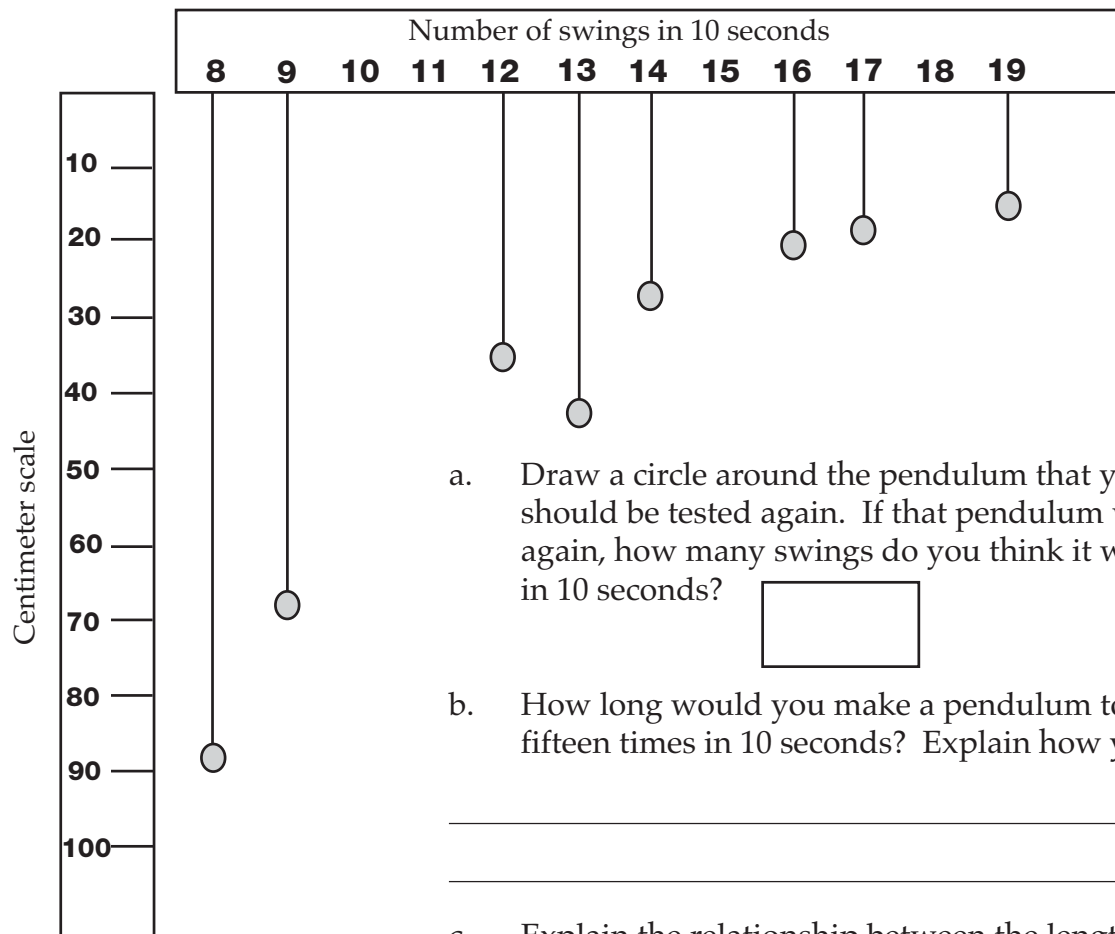
Why did you circle those two race carts?

END-OF-MODULE ASSESSMENT for Variables

MULTIPLE-CHOICE/SHORT-ANSWER ITEMS

12. **Directions:** Read the problem and look at the picture, then answer the questions.

A class made pendulums out of string. Each string was a different length. The students put the same mass on each string. They tested the pendulums to see how many swings each would make in 10 seconds. At the end the students hung the pendulums on a number line like this.



- a. Draw a circle around the pendulum that you think should be tested again. If that pendulum was tested again, how many swings do you think it would make in 10 seconds?

- b. How long would you make a pendulum to swing fifteen times in 10 seconds? Explain how you know.

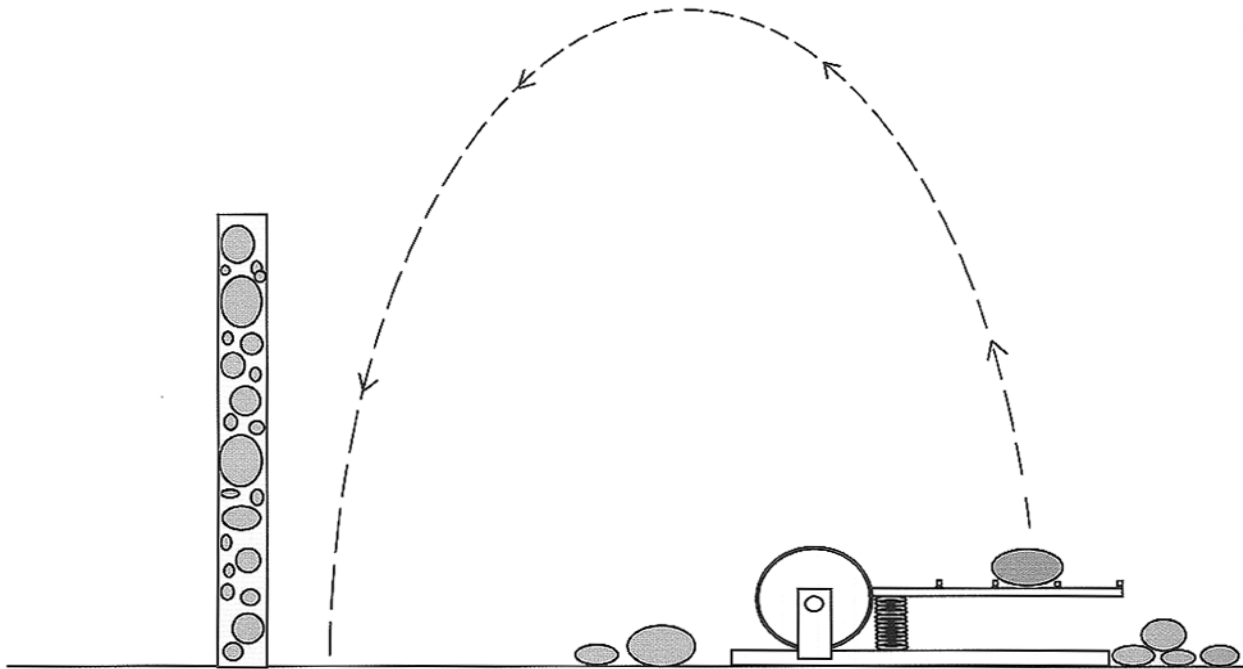
- c. Explain the relationship between the length of the strings and the number of swings a pendulum makes in 10 seconds.

END-OF-MODULE ASSESSMENT for Variables

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MULTIPLE-CHOICE/SHORT-ANSWER ITEMS

13. A stone was launched using the catapult shown below. The stone did not go over the wall.

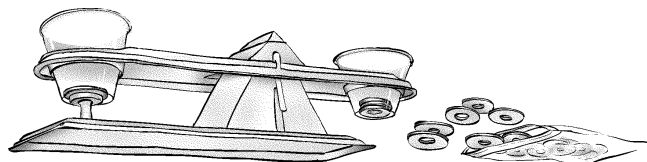


a. List all the things you might change so that a stone would go over the wall.

b. Name the parts of the catapult system.

END-OF-MODULE ASSESSMENT for Variables**MULTIPLE-CHOICE/SHORT-ANSWER ITEMS**

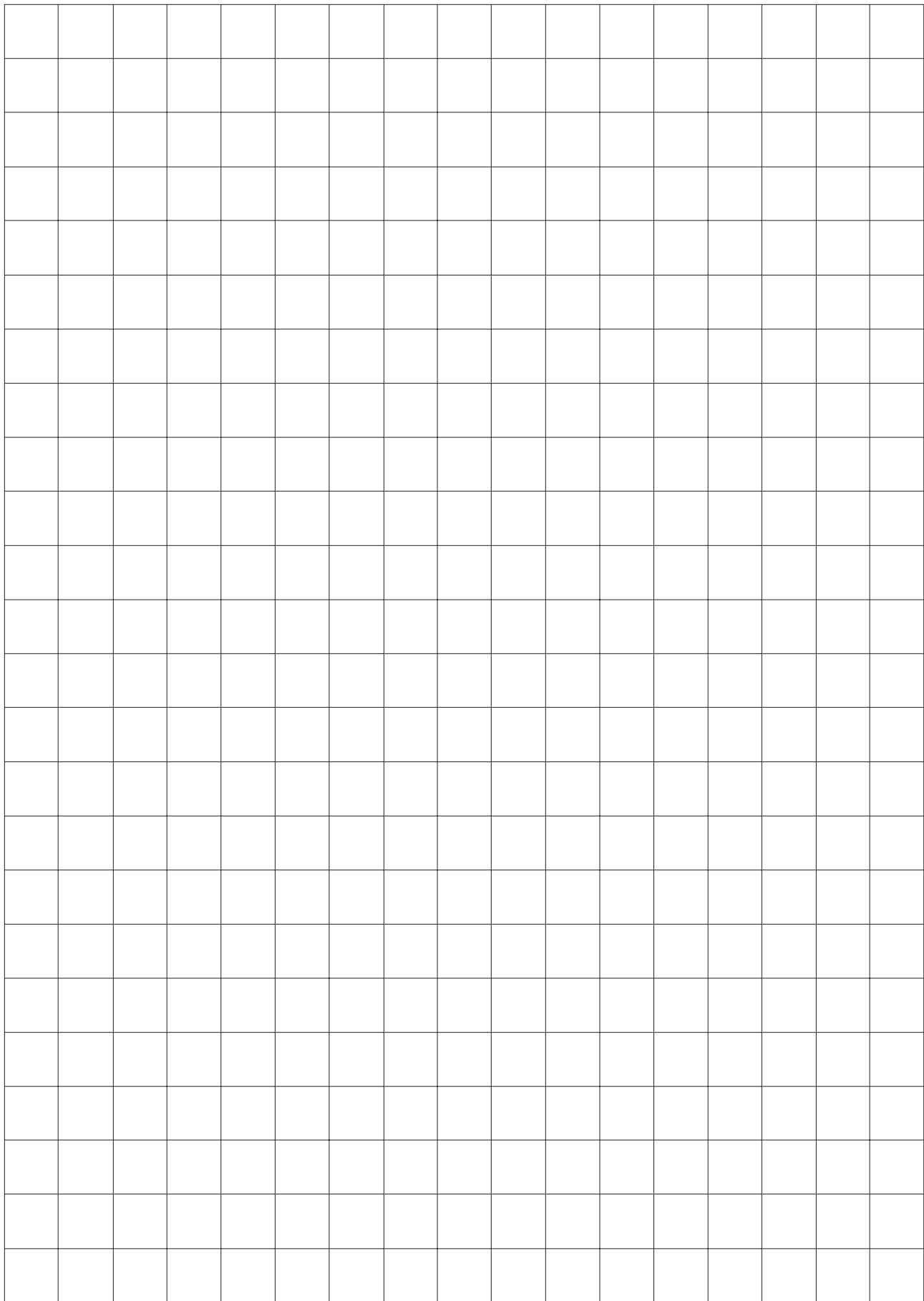
14. Some fourth graders wanted to know what would happen to the force of attraction between two magnets as the distance between the magnets increased. They set up an investigation like you see in the illustration. By putting plastic spacers between the magnet-on-a-post and a magnet in the plastic cup, they could increase the distance between them. To measure how much force it took to separate the magnet-on-the-post from the magnet in the cup, they placed washers in the cup on the other side of the balance.



No. of spacers	No. of washers
0	17
1	9
2	?
3	4
4	3
5	3
6	2

They made a T-chart of their results, but they weren't sure how to graph the data.

- a. Make a graph of the data on the grid paper on the next page, to show the fourth graders how to graph their data.
- b. What is the independent variable in this investigation?
-
- c. What is the dependent variable in this investigation?
-
- d. What is the relationship between distance (number of spacers) and force needed to pull the magnets apart (number of washers) shown by this graph?
-
-
- e. How many washers do you think it would take to break the force if two spacers were used?
-



END-OF-MODULE ASSESSMENT for Variables

NARRATIVE ITEMS

15. Three girls wanted to see who could throw a ball the farthest. Each girl brought her favorite ball to the park. Amy brought her basketball, Betty brought her football, and Cindy brought her baseball. They made a line on the playground, behind which they all threw the ball. Amy took two steps and threw her basketball. Betty stood still when she threw her football. Cindy got a running start and threw her baseball.

Cindy threw her ball the farthest.

a. What are the different variables in this contest?

b. Which variables did the girls control in the contest?

c. Explain what you would do to change this contest to determine better who throws the farthest.

Name _____

Date _____

END-OF-MODULE ASSESSMENT for Variables

NARRATIVE ITEMS

16. Mary wanted to find out what kind of cloth dries the fastest after it gets wet. She got a cotton scarf, a wool mitten, and a nylon shirt. She poured some water on all three and then put them out to dry. The next day she felt the three pieces of clothing and they felt dry. She concluded that all kinds of cloth dry at the same rate.

Leslie thought Mary's experiment didn't really prove that all kinds of material dry at the same rate. Describe at least two ways Mary could improve her experiment.

PORTFOLIO ASSESSMENT for Variables

PORTFOLIO CHECKLIST

Include a piece of work that shows...



Something you learned about pendulums.



Something you learned about lifeboats.



Something you learned about model planes.



Something you learned about catapults.



Something that shows you know how to do a controlled experiment.



Something that shows you know how to organize data to make a graph and can draw conclusions from the graph.



Something that uses what you know from another area of study (reading, writing, math).



Something that shows improvement.



Something that shows your best work.

