

Student Guide


Which Picks Up More? (SG pp. 102–103)
Questions 1–4

- 1.* The brand of paper towel that picks up the most water will be the better “picker upper.”
2. **A.** Answers will vary. The sheets may differ in size and thickness.
B.* Predictions will vary.
3. Probably not.
4. **A.*** Answers will vary. He could measure the length and/or width of the spot. He could cut the spot out, trace it on cm grid paper, and find the area by counting square centimeters.
B.* area

Which Picks Up More?

Professor Peabody Searches for the Better “Picker Upper”

While working in his lab, Professor Peabody knocked over a graduated cylinder filled with water. He grabbed a roll of paper towels and used several sheets to clean up the spill. Professor Peabody thought, “These paper towels don’t soak up very much water. The brand I use at home works better.”



Professor Peabody decided to investigate different brands of paper towels to find the one that picks up the most water. He wants to find the better “picker upper.”

Discuss

1. What does it mean to be the better “picker upper”?

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The next day Professor Peabody brought two different brands of paper towels to the lab. He wanted to compare these two with the roll he had in his lab. He tore off one sheet from each roll and compared them.

2. Your teacher has three different brands of paper towels. Look carefully at each brand of paper towel. Compare the three brands.
 - A.** How are they alike? How are they different?
 - B.** Which do you think will pick up the most water? Show or tell how you decided.

Professor Peabody investigated further by dropping 5 drops of water on a sheet of each brand of paper towel.

3. Will the spots be the same size?
4. **A.** How can he measure the size of the spots?
B. Which variable will give the best measure of the size: length, width, or area?



Professor Peabody used the TIMS Laboratory Method to find which paper towel picks up the most water. You will do a similar experiment.

Use *The Better “Picker Upper” Lab* pages in the *Student Activity Book* to compare different brands of paper towels to determine which picks up the most water.

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*Answers and/or discussion are included in the lesson.

Student Activity Book

The Better “Picker Upper” Lab
(SAB pp. 159–166)

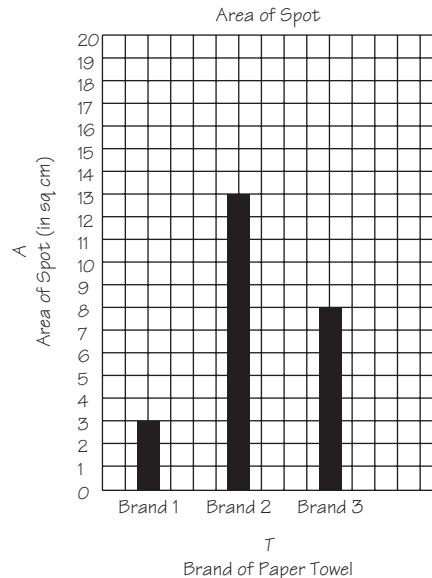
Questions 1–16

- The two primary variables are Brand of Paper Towel and Area of Spot.
- * Among the fixed variables are the number of drops placed on each spot; the type of liquid used (water); the size of each drop (as controlled by the eyedropper); and certain elements of the procedure (e.g., keeping the paper towel off the table, dropping drops into the center of each spot).
- * Sample data table:

Area of Spot vs. Brand of Paper Towel

T Brand of Paper Towel	A Area of Spot (in sq cm)			
	Trial 1	Trial 2	Trial 3	Median
Brand 1	3	2	3	3 sq cm
Brand 2	11	13	13	13 sq cm
Brand 3	11	8	6	8 sq cm

- * Sample graph:



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Name _____ Date _____

The Better “Picker Upper” Lab



Draw a picture of what you are going to do to compare paper towel brands. Label the variables in your picture.

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- What variables will you study in this lab?
- What variables should be fixed or should not change in this lab? Tell why.

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Name _____ Date _____



- Work with your partners to do the lab and record your data on the data table.
 - Label each brand of paper towel.
 - Put your name on the paper towels.

Area of Spot vs. Brand of Paper Towel

T Brand of Paper Towel	A Area of Spot (in sq cm)			
	Trial 1	Trial 2	Trial 3	Median

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- Graph the median area for each brand of paper towel on *Centimeter Graph Paper*.
 - Label the horizontal axis Brand of Paper Towel (T).
 - Label the vertical axis Area of Spot (A). Include the units.
 - Choose an appropriate scale for the vertical axis.
 - Title the graph “Area of Spot”.

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*Answers and/or discussion are included in the lesson.

Answers to *Questions 5–8* are based on the sample data and graph in Figures 4 and 5 in Lesson 4.

5. Brand 2, 13 sq cm
6. Brand 1, 3 sq cm
7. 10 sq cm. Some students may write a number sentence (e.g., $13 - 3 = 10$ sq cm). Others will explain with words or draw a picture.
8. Answers and explanations will vary. Student might predict that the bars would get bigger. They would approximately double. For example, the bar for Brand 1 would go to 6 sq cm rather than 3 sq cm. Some students may want to do some additional experimentation. Encourage students to sketch a graph.
- 9.* Answers and strategies will vary. A typical class discussion is given in Lesson 4 Sample Dialog. Discussion should lead to the idea that the towel with the shortest bar is the better “picker upper.” On this towel, the five drops of water are concentrated in the smallest area, leaving more of the paper towel to soak up more water.
- 10.* Answers may vary, but Professor Peabody is incorrect. Students may say that Brand C is not the better “picker upper” because its spot is so big, there is not as much dry space left to pick up more water. Brand A is the better “picker upper.”

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Name _____ Date _____



Use your graph to find answers to the following questions.

5. Which paper towel had the spot with the largest area? What was the area of the spot?
6. Which paper towel had the spot with the smallest area? What was the area of the spot?
7. How much larger was the larger spot than the smallest spot? Explain how you found your answer.
8. How would the graph look if you dropped twice as many drops on each paper towel?
9. Look at your graph. Which towel do you think picks up the most water? Show or tell how you decided.

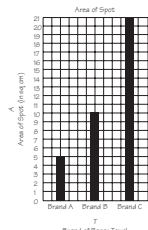
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Name _____ Date _____

10. Professor Peabody decided that Brand C is the better “picker upper” or the one that picks up the most water. Do you agree with Professor Peabody? Why or why not?



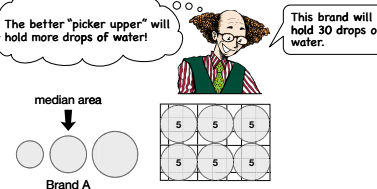
I think Brand C will pick up the most water because it had the spot with the largest area.

Professor Peabody Makes Another Model

After looking at the area of the spots made, Professor Peabody was still not sure which paper towel was the better “picker upper.” He decided to make a different model. He went back to his data to make a new model.

The better “picker upper” will hold more drops of water!

This brand will hold 30 drops of water.




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*Answers and/or discussion are included in the lesson.

Name _____ Date _____




11. Work with your partners to find out how many drops of water each brand of paper towel can pick up.
For each brand:

- Label a sheet of copy paper with the paper towel brand's name.
- Choose the median paper towel spot.
- Trace the median spot onto the sheet of paper as many times as it will fit.
- Find the number of drops that can be picked up by each brand of towel.
- Record the data on the data table below.

Number of Drops vs. Brand of Paper Towel

T Brand of Paper Towel	N Number of Drops



12. Graph your data on a piece of *Centimeter Graph Paper*.


- Label the horizontal axis Brand of Paper Towel (T).
- Label the vertical axis Number of Drops (N), include units.
- Choose an appropriate scale for the vertical axis.
- Title the graph "Number of Drops".

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Name _____ Date _____



13. Which brand of paper towel had the tallest bar on your Number of Drops graph?

14. Did this same brand of paper towel have the tallest bar on your Area of Spot graph? Predict why.

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*Answers and/or discussion are included in the lesson.

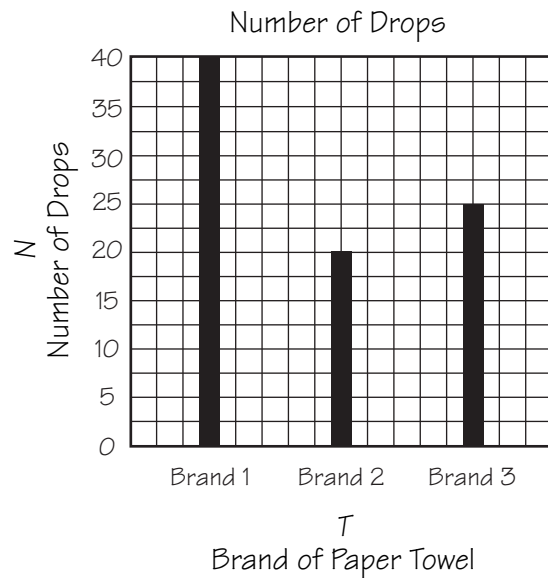
Answers to *Questions 11–14* are based on the sample data table and graph in Questions 11–12.

11.* Sample data table:

Number of Drops

T Type of Towel	N Number of Drops
Brand 1	40
Brand 2	20
Brand 3	25

12.* Sample graph:



13. Brand 1

14. No. The brand of paper towel with the tallest bar on the Number of Drops graph had the shortest bar on the Area of Spot graph. Predictions will vary. The towel with the spot with the smallest area of concentration (shortest bar on Area of Spot graph) should be able to pick up the most drops of water (tallest bar of Number of Drops graph).

15.* Answers may vary but students should justify their answers.

Yes. The brand of paper towel with the tallest bar on the Number of Drops graph, Brand B, is the better “picker upper” because it can pick up the most water.

No. If Brand A was the same size as Brand B it would hold about 60 drops which is much more than Brand B holds.

16.* Answers will vary. See Lesson Guide 4. The brand with the shortest bar on the Area of Spot graph should have the tallest bar on the Number of Drops graph. That brand should be the better “picker upper.”

Name _____ Date _____

15. Professor Peabody made the models below to compare the paper towel brands. He traced the spots on a full sheet of each brand of paper towel.

Brand A

Brand B

Brand C

He graphed the number of drops that each paper towel could pick up.

He decided the Brand B was the better “picker upper” because the paper towel could hold the most drops of water.

Do you agree with Professor Peabody? Why or why not?

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Name _____ Date _____

16. Compare your graphs and diagrams. Which towel do you think is the better “picker upper”? Show or tell how you decided.

The Better “Picker Upper” Lab Feedback Box	Expectation	Check In	Comments
Find the area of shapes with curved sides by counting square centimeters. [Q# 3]	E3		
Make a scaled bar graph using numerical data. [Q# 4 and 12]	E5		
Read a graph to find information about a data set. [Q# 5–7 and 13–14]	E6		
Find the median of a data set. [Q# 3]	E7		
Make predictions and generalizations about a data set using data tables, graphs, and diagrams. [Q# 8–10 and 15–16]	E8		

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*Answers and/or discussion are included in the lesson.

Teacher Guide

Lori's Questions (TG pp. 1–3)
Questions 1–4

- Generic
- School towels—The area of the spot is about the same as the area of the school towels shown on the graph (approximately 6 sq cm).
- The area of the spot is about 11, 12, or 13 sq cm. The area of the towel is 120 sq cm. About ten spots will cover the towel ($120 \div 12$). Since each spot contains 5 drops, it would take about 50 drops to cover the towel.

Some students may solve the problem by “covering” the towel with replications of the spot. About 6–9 spots can be placed on the towel using this method. Depending on how the students compensate for uncovered spaces on the towel, answers between 33 and 50 drops are acceptable. Other reasonable strategies are possible.

- Thirsty. Explanations will vary. Thirsty’s spot’s area is small and it can pick up the greatest number of drops, so it will pick up the most water.

Name _____ Date _____

Lori's Questions

Lori did *The Better “Picker Upper” Lab* using four different brands of paper towels. She dropped two drops of water on each of the paper towels. Her graph is shown below.

Brand of Paper Towel	Area of Spot (in sq cm)
Ace	11
Sippy	4
Generic	10
School Towels	6

- Which paper towel had a spot with an area of 10 sq cm? _____
- This is one of Lori's spots. She forgot to label it. Which paper towel is this spot from? Show or tell how you decided.

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Assessment Master TG • Grade 3 • Unit 5 • Lesson 4 |

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Name _____ Date _____

- Lori did the experiment again, but this time she dropped five drops of water on a small paper towel. The picture on the right shows Lori's spot on her paper towel. How many drops of water do you think it would take to cover this towel completely? Show or tell how you decided.

Lori Paper Towel (actual size)

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Name _____ Date _____

- Lori's mother wanted to know which of three brands of paper towels picked up the most water. Lori did *The Better “Picker Upper” Lab* experiment at home on the three paper towels. She used the same size paper models to find the number of drops. Her data is below.

T Brand of Towel	Area of Spot				Number of Drops	
	A Area of Spot (in sq cm)				N Type of Towel	Number of Drops
	Trial 1	Trial 2	Trial 3	Median		
Soak-Em	10	11	11	11	Soak-Em	20
Sippy Basic	8	10	9	9	Sippy Basic	25
Thirsty	5	4	5	5	Thirsty	40

Which paper towel should Lori recommend that her mother buy? Explain.

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