

Teaching Guide to *Shortcuts* by Jeff Harris

Introduction

Shortcuts by Jeff Harris is a beautifully illustrated, fact-packed page that makes learning fun. Each week, *Shortcuts'* multicultural cast (Juanita, K., Roland, Junior and James) offers facts, riddles, jokes and puzzles to help kids learn about science, geography, animals, food, history and holidays.

Each teaching guide provides ideas for expanding the lesson and creating discussion and learning activities for your students. The grade level for the guides is usually 3rd to 4th, but they can be adapted for use at other levels. The guides are broken down into four areas:

1. Questions for Discussion and Further Study

Designed to help students think and research, not just give one-word answers

2. Activity Ideas

Designed to allow students to be creative and teach themselves

3. Use the News

Designed to have students use the news in studying each topic

4. Quick Quiz

Designed to be adaptable to several grade levels, evaluate students' comprehension and build vocabulary and math skills

You might use the teaching guides in the following ways:

Questions for Discussion and Further Study: Engage the entire class by asking each question aloud and listing the students' answers on the board. Or have them use reference resources to give their own answers to the questions. Allow them to discuss other students' answers after they've researched the topics. Key words or phrases that can help students search for more information are italicized.

Activity Ideas: Give the students a time limit to research their projects, using library or study time. By having the students cite their resources you can check their work; or, alternatively, tell them which resource(s) you prefer them to use.

Use the News: These can be worked on individually but we suggest they work in groups to learn teamwork skills.

- **Quick Quiz:** We suggest you review the quizzes ahead of time and change the phrasing or difficulty level based on the students' abilities.

Shortcuts: THINKING ABOUT ARCHIMEDES

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Objective: After completing the exercises, students should have a better understanding of Archimedes.

Subject Areas: The following information about Archimedes will be discussed:

- Compound pulleys
- Archimedes' inventions
- Archimedes' fields of study

Evaluation: Students may be evaluated using the following point scale:

Four points: Information is accurate, organized, shows creative thought/use of materials

Three points: Information is accurate and organized

Two points: Information is mostly accurate; organization needs some work

One point: Significant inaccuracies; lacks organization

Topics for Discussion and Further Study

1. How does a compound pulley work?
2. Why doesn't a crane tip over when it lifts a heavy object?

Activity Ideas

- Archimedes designed many inventions and tools. Research and report on one of them. What was it called? How did it work? What was it used for? Draw and label a diagram to show what you learned about it.
- Archimedes was a mathematician, physicist, mechanical engineer, astronomer and inventor. You're probably familiar with what an inventor, mathematician, and even an astronomer does, but what about physicists and mechanical engineers? Research and describe what they do. Include a real example.

Use the News

- Archimedes could do many different things. How many professions, careers, skills, etc can you identify from the newspaper? Scan through the paper to find and list as many as you can find.

Answers to the Quiz

1.) a, 2.) b, 3.) b, 4.) d, 5.) a, 6.) c , 7.) Eureka, 8.) screw, 9.) 25.12 cm, 10.) 3 ft

Quick Quiz — Archimedes

1. Archimedes reportedly said he could move Earth if he had a big enough lever.
a. True b. False
2. He calculated the value of _____.
a. infinity b. pi c. omega d. alpha
3. Archimedes usually first worked out his math problems on a small chalkboard.
a. True b. False
4. Archimedes invented several weapons of war such as a _____.
a. rifle b. bomb c. boat d. crane
5. Archimedes was able to lift an entire ship by himself with the help of some pulleys.
a. True b. False
6. Archimedes invented a system of _____ to burn enemy ships.
a. fires b. torches c. lenses d. mirrors

Vocabulary Comprehension

7. “_____” is Greek for “I have found it.”
8. The Archimedean _____ was a device used to raise water from a lower source into a higher irrigation canal.

Math Comprehension (subtraction, division, addition, fractions)

9. If $2 \times \pi (3.14) \times D$ (diameter) = C (circumference), what is the circumference of a circle whose diameter is 4 centimeters?
10. If a lever is 9 feet long and you put its fulcrum at $\frac{1}{3}$ of its length, how many feet from the end is that?