

SpringBoard recognizes that effective implementation of the Common Core requires powerful shifts in teaching, learning and assessment. We have focused our research-based strategies and pedagogy on these key shifts:

- Focus on fewer topics in greater depth
- Coherence to link major topics
- Rigor with balance – procedural fluency, conceptual understanding and proficiency with the mathematical practices

SpringBoard offers a flexible framework for teachers to successfully implement these shifts and build students’ college and career readiness.

Emphasis on Conceptual Understanding

To the Student		xi
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Multi-day Activities build content knowledge.

Embedded Assessments ask students to demonstrate understanding and mastery.

Deep Alignment to Common Core

Learning Targets present the standards in student-friendly language and outline the objectives.

Standards for Mathematical Practice are integrated into all activities, practice and formative assessments.

My Notes

MATH TERMS

A **proportion** is an equation stating that two ratios are equivalent.

Learning Targets:

- Determine whether quantities are in a proportional relationship.
- Solve problems involving proportional relationships.

SUGGESTED LEARNING STRATEGIES: Close Reading, Mark the Text, Predict and Confirm, Note Taking, Create Representations

As you read the following scenario, mark the text to identify key information and parts of sentences that help you make meaning from the text.

The fastest time for running a mile while balancing a baseball bat on a finger is 7 min 5 s. This record was set by Ashrita Furman on June 20, 2009. At that rate of speed, Meg predicts that it would take 1,275 seconds, or 21 min 15 s, for Ashrita to run 3 mi. Is she right?

You can write a proportion to find out. A **proportion** is an equation. It consists of two equivalent ratios.

Example: $\frac{2}{5} = \frac{4}{10}$

1. **Reason quantitatively.** Are there other ways to determine if Meg is right? Explain.
Yes; you can use mental math: since $1 \times 3 = 3$, then 1275 is correct because $3 \times 425 = 1275$
2. **Construct viable arguments.** Suppose a fast-running juggler beat Ashrita’s record by half a minute. Could that person, continuing at that new world-record rate of speed, run 2 mi while juggling in

Instructional Design

Learning Strategies

promote student ownership of learning.

Activity Focus Standards

connect the instruction to required knowledge and skills.

Learning Targets:

- Identify patterns in data.
- Use tables, graphs, and expressions to model situations.
- Use expressions to make predictions.

SUGGESTED LEARNING STRATEGIES: Sharing and Responding, Create Representations, Discussion Groups, Look for a Pattern, Interactive Word Wall

Mizing spent his summer vacation traveling cross-country with his family. Their first stop was Yellowstone National Park in Wyoming and Montana. Yellowstone is famous for its geysers, especially one commonly referred to as Old Faithful. A geyser is a spring that erupts intermittently, forcing a fountain of water and steam from a hole in the ground. Old Faithful can have particularly long and fairly predictable eruptions. As a matter of fact, park rangers have observed the geyser over many years and have developed patterns they use to predict the timing of the next eruption. Park rangers have recorded the information in the table below.

Length of Eruption (in minutes)	Approximate Time Until Next Eruption (in minutes)
1	46
2	58
3	70
4	82

CONNECT TO HISTORY
Yellowstone National Park was the first National Park. The park was established by Congress on March 1, 1872. President Woodrow Wilson signed the act creating the National Park Service on August 25, 1916.

Lesson 1-1

PLAN
Pacing: 1 class period
Chunking the Lesson
#1-3 #4-5 #6-7
#8-9 #10
Check Your Understanding
Lesson Practice

TEACH

Bell-Ringer Activity
Have students determine the relationship between the number of chairs in the classroom and the number of chair legs. Ask them to predict how the number of chair legs would change if 8 more chairs were brought into the room. Discuss with students how they made their predictions.

1-3 Look for a Pattern, Think-Pair-Share, Sharing and Responding
In this set of items, students identify patterns in a table and use the patterns to make predictions. As students investigate the patterns in the table, make sure they look for patterns both within each column and between the two columns. For example, most students should be able to see that the numbers in the first column increase by 1 and the numbers in the second column increase by 12. Together, these two patterns show that each increase of 1 minute in the length of the eruption results in an increase of 12 minutes in the approximate time until the next eruption. It is important for students to have an opportunity to share the patterns they recognize before moving on to the graph and the representation of the information in the table as a sequence later in the lesson. These three questions provide the teacher with valuable formative assessment information about the level of student thinking.

Common Core State Standards for Activity 1

HSN-GA.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

HSN-QA.2 Define appropriate quantities for the purpose of descriptive modeling.

HSA-SSE.A.1a Interpret parts of an expression, such as terms, factors, and coefficients.

HSF-BA.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*

Teacher's Edition lesson format consistent with AP Instructional Practices

Investigative, Guided and Directed Approaches

A Balance of Activities

encourages exploration, modeling, collaboration, practice and application.

Example
What is the **percent error** between the veterinarians' earlier estimate and the actual number?

Step 1: Find the absolute value of the difference between the estimate and the actual number.

$$540,000 - 570,000 = -30,000$$

$$|-30,000| = 30,000$$

Step 2: Divide this difference by the actual number.

$$\frac{30,000}{570,000} = 0.0526$$

Step 3: Multiply this value by 100 to make it a percent.

$$0.0526 \cdot 100 = 5.26\%$$

Solution: The percent error is 5.26%.

Try These
Work with your group.

a. A vet's assistant weighs a cat at 5.2 kg. The cat's actual weight is 4.8 kg. What is the percent error between the two weights?
8.33%

b. The vet estimated that the facility had kept 23 dogs in their overnight boarding. The actual number of dogs kept overnight was 18. What is the percent error between the vet's estimate and the actual number?
27.78%

MATH TERMS
Percent error is the amount of error between the assumed value and the actual value.

GROUP DISCUSSION TIPS
Summarize the information needed to create a reasonable solution. Be sure to describe the math concepts your group will use to solve.

Focus on purposeful conversation to develop problem solving, critical thinking and reasoning skills.