Mathematics Station Activities

for Common Core State Standards

Grade 6

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Introduction

This revised edition of the *Mathematics Station Activities for Common Core State Standards, Grade 6* includes a collection of updated and improved station-based activities to provide students with opportunities to practice and apply the mathematical skills and concepts they are learning. It contains sets of activities that are tightly aligned to both the Mathematical Practices and the five Grade 6 Common Core Mathematics domains: Ratios and Proportional Relationships; The Number System; Expressions and Equations; Geometry; and Statistics and Probability. These enhancements have been carried out based on continuing refinement of Common Core implementation. You may use these activities in addition to direct instruction, or instead of direct instruction in areas where students understand the basic concepts but need practice. The Discussion Guide included with each set of activities provides an important opportunity to help students reflect on their experiences and synthesize their thinking. It also provides guidance for ongoing, informal assessment to inform instructional planning.

Implementation Guide

The following guidelines will help you prepare for and use the activity sets in this book.

Setting Up the Stations

Each activity set consists of four stations. Set up each station at a desk, or at several desks pushed together, with enough chairs for a small group of students. Place a card with the number of the station on the desk. Each station should also contain the materials specified in the teacher's notes, and a stack of student activity sheets (one copy per student). Place the required materials (as listed) at each station.

When a group of students arrives at a station, each student should take one of the activity sheets to record the group's work. Although students should work together to develop one set of answers for the entire group, each student should record the answers on his or her own activity sheet. This helps keep students engaged in the activity and gives each student a record of the activity for future reference.

Forming Groups of Students

All activity sets consist of four stations. You might divide the class into four groups by having students count off from 1 to 4. If you have a large class and want to have students working in small groups, you might set up two identical sets of stations, labeled A and B. In this way, the class can be divided into eight groups, with each group of students rotating through the "A" stations or "B" stations.

Assigning Roles to Students

Students often work most productively in groups when each student has an assigned role. You may want to assign roles to students when they are assigned to groups and change the roles occasionally. Some possible roles are as follows:

- Reader—reads the steps of the activity aloud
- Facilitator—makes sure that each student in the group has a chance to speak and pose questions; also makes sure that each student agrees on each answer before it is written down
- Materials Manager—handles the materials at the station and makes sure the materials are put back in place at the end of the activity
- Timekeeper—tracks the group's progress to ensure that the activity is completed in the allotted time
- Spokesperson—speaks for the group during the debriefing session after the activities

Timing the Activities

The activities in this book are designed to take approximately 15 minutes per station. Therefore, you might plan on having groups change stations every 15 minutes, with a two-minute interval for moving from one station to the next. It is helpful to give students a "5-minute warning" before it is time to change stations.

Since the activity sets consist of four stations, the above time frame means that it will take about an hour and 10 minutes for groups to work through all stations. If this is followed by a 20-minute class discussion as described on the next page, an entire activity set can be completed in about 90 minutes.

Guidelines for Students

Before starting the first activity set, you may want to review the following "ground rules" with students. You might also post the rules in the classroom.

- All students in a group should agree on each answer before it is written down. If there is a disagreement within the group, discuss it with one another.
- You can ask your teacher a question only if everyone in the group has the same question.
- If you finish early, work together to write problems of your own that are similar to the ones on the student activity sheet.
- Leave the station exactly as you found it. All materials should be in the same place and in the same condition as when you arrived.

Debriefing the Activities

After each group has rotated through every station, bring students together for a brief class discussion. At this time, you might have the groups' spokespersons pose any questions they had about the activities. Before responding, ask if students in other groups encountered the same difficulty or if they have a response to the question. The class discussion is also a good time to reinforce the essential ideas of the activities. The questions that are provided in the teacher's notes for each activity set can serve as a guide to initiating this type of discussion.

You may want to collect the student activity sheets before beginning the class discussion. However, it can be beneficial to collect the sheets afterward so that students can refer to them during the discussion. This also gives students a chance to revisit and refine their work based on the debriefing session.

Standards Correlations

The standards correlations below and on the next page support the implementation of the Common Core State Standards. This book includes station activity sets for the Common Core domains of Ratios and Proportional Relationships; The Number System; Expressions and Equations; Geometry; and Statistics and Probability. This table provides a listing of the available station activities organized by Common Core standard.

The left column lists the standard codes. The first number of the code represents the grade level. The grade number is followed by the initials of the Common Core domain name, which is then followed by the standard number. The middle column of the table lists the title of the station activity set that corresponds to the standard(s), and the right column lists the page number where the station activity set can be found.

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Standards Correlations

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6.SP.5.	Using Tables and Graphs	104
6.SP.5.	Analyzing Data Using Graphs	127

Materials List

Class Sets

- calculators
- protractors
- rulers

Station Sets

- 3 paper cups
- 12 counters or other small objects (e.g., pennies, beans)
- algebra tiles
- bags of fun-size M&Ms® (plain); 1 per group member
- bags of fun-size Skittles® (original fruit flavor); 1 per group member
- equation mat
- highlighters (1 each of yellow and blue)
- newspaper article—150 words or less in length
- rectangular strips of paper or adding machine tape, about 1 inch wide and 1 foot long
- red and blue pencils
- set of at least 5 congruent triangles
- straightedge
- tiles or small pieces of paper (several small square tiles; 12 small red tiles; 18 small blue tiles)
- variety of items that are rectangular prisms
- yardsticks (at least 2)

Ongoing Use

- graph paper
- index cards (prepared according to specifications in teacher notes for many of the station activities)
- number cubes (numbered 1–6)
- pencils
- pennies
- white paper

Ratios and Proportional Relationships

Set 1: Ratio, Proportion, and Scale

Instruction

Goal: To provide opportunities for students to develop concepts and skills related to demonstrating the relationship between similar plane figures using ratio, proportion, and scale factor

Common Core State Standards

Ratios and Proportional Relationships

Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Student Activities Overview and Answer Key

Station 1

Students construct their own triangles with given angle measurements. They then compare their triangles and explore what similarity means with respect to triangles.

Answers

The ratios are the same; yes, because the ratios are the same and the angles are the same

Station 2

Students will use a drawing of a room and the scale to determine the dimensions of an actual room. They then explain their strategy for successfully completing the activity.

Answers

$1\ {}^{9}/_{16}$ in $\times$ $2\ {}^{1}/_{8}$ in; 15.625 ft $\times$ 21.25 ft; many possible answers—set up a proportion, etc.

Station 3

Students apply scale factor and draw a larger picture using this concept. They then reflect on their strategies for successfully completing the task.

Answers

Answers will vary—setting up proportions, etc.

Station 4

Students have two quadrilaterals that they work with to determine scale factor. They measure each corresponding side and find the ratio. They then reflect on the task.

Answers

$^5/_4$; that is the ratio you need to multiply the length of the sides of the smaller quadrilateral by in order to get the larger quadrilateral

Materials List/Setup

Station 1 pencils, protractors, rulers, and calculators for all group members

Station 2 rulers and calculators for all group members

Station 3 protractors, rulers, and calculators for all group members

Station 4 protractors, rulers, and calculators for all group members

Instruction

Discussion Guide

To support students in reflecting on the activities, and to gather formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the station activities.

Prompts/Questions

1. If you had a figure and wanted to construct a similar figure, what information would be important to know?
2. When is scale factor important in real life?
3. How do proportions help you when working with scale factor?
4. When do we use similar figures in real life?

Think, Pair, Share

Have students jot down their own responses to questions, discuss their responses with a partner (who was not in their station group), and then discuss as a whole class.

Suggested Appropriate Responses

1. the angles, proportion of the sides
2. Many possibilities—in blueprints
3. We can set up a proportion to find the new dimensions if we know the scale factor, or we can set up a proportion to find the scale factor if we know our new dimensions.
4. Many possibilities—different size plates—dinner plate vs. bread plate, etc.

Possible Misunderstandings/Mistakes

- Not accurately measuring angles, which will change the ratios
- Not accurately measuring with a ruler, which will change the ratios

Ratios and Proportional Relationships

Set 1: Ratio, Proportion, and Scale

Station 1

At this station you will find rulers, pencils, calculators, and protractors. You will be using these materials to draw a triangle and make observations.

Each group member should draw a triangle in the space below. The angles of the triangle should be 90°, 30°, and 60°. The 90° angle is angle *A*; the 30° angle is angle *B*; the 60° angle is angle *C*.

Each person should measure the sides of his/her triangle. Compile your data in the table below.

Group Member	Length *AB* (cm)	Length *BC* (cm)	Length *AC* (cm)	*AB/BC*	*BC/AC*	*AB/AC*

What do you notice about the ratio of the sides? _____

_____

_____

Triangles are said to be **similar** when their corresponding angles are congruent and the measures of their corresponding sides are proportional, or have a constant ratio. Are the triangles similar? How do you know? _____

_____

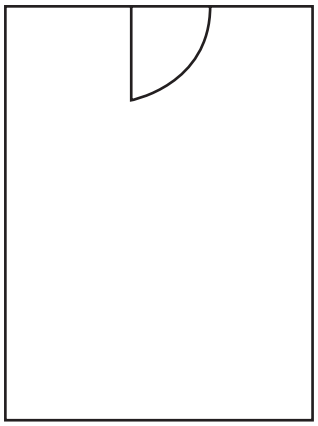
_____

Station 2

At this station, you will take on the role of an architect. You will find rulers and calculators to help you with this role.

Below is a diagram of a room in a house. You need to figure out the dimensions of the actual room in the house. For every inch in the diagram, the real room is 10 feet.

Hint: You should use your ruler to find the dimensions of the diagram.



What are the dimensions? _____

What are the dimensions of the actual room? _____

What was your strategy for figuring out the actual dimensions? _____

_____

_____

_____

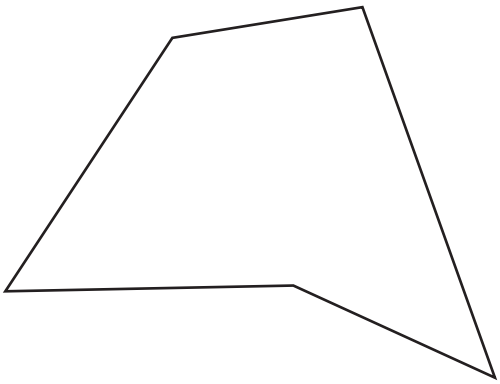
Ratios and Proportional Relationships

Set 1: Ratio, Proportion, and Scale

Station 3

At this station, you will find enough rulers and calculators for all group members.

Your job is to redraw the following shape at a scale factor 3 times larger than what it is now.



What was your strategy for successfully completing this task? _____

_____

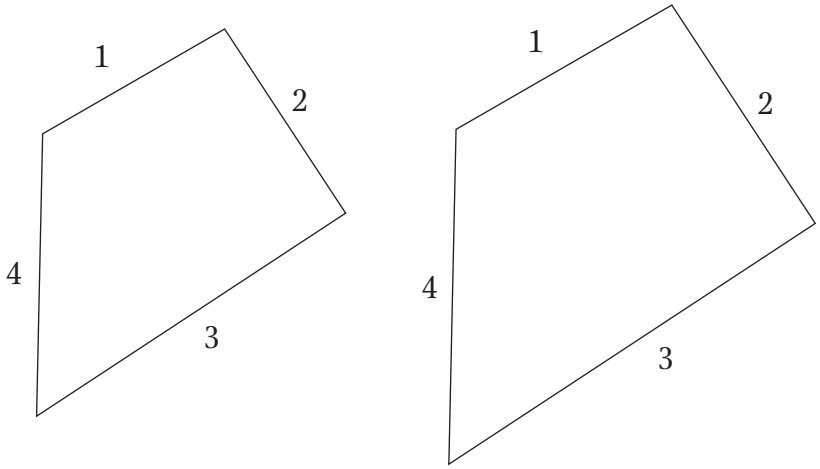
_____

_____

Station 4

At this station, you will find rulers and calculators to help you find the scale factor between two figures.

Look at the two figures below. They are similar. Your job is to determine the scale factor used to go from the first figure to the second figure.



First, measure the corresponding sides.

Side	Quadrilateral 1	Quadrilateral 2
1		
2		
3		
4		

Use this information to determine the scale factor.

What is the scale factor? _____

How do you know? _____

_____

_____