Station Activities

for Mathematics

Grade 6

WALCH EDUCATION

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Introduction

This book includes a collection of station-based activities to provide students with opportunities to practice and apply the mathematical skills and concepts they are learning. It contains five sets of activities for each of the four strands: Number and Operations; Geometry and Measurement; Algebra; and Data Analysis and Probability. You may use these activities in addition to the direct instruction lessons, or, especially if the pre-test or other formative assessment suggests it, instead of direct instruction in areas where students have the basic concepts but need practice. The debriefing discussions after each set of activities provide an important opportunity to help students reflect on their experiences and synthesize their thinking. It also provides an additional opportunity 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 or more 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.

Instruction

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 timeframe 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 below, 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.

Materials List

Class Sets

- calculators
- rulers
- protractors
- scissors

Station Sets

- fraction circles
- algebra tiles and equation mats
- counters (50–100 chips, counters, beans, pennies)
- tiles (+/– 25 of each of several colors)
- integer chips
- rectangular prism
- regular shapes (triangle, square, pentagon, hexagon, heptagon, octagon, nonagon, decagon, dodecagon)
- variety of round objects
- string
- box/container 2 in. × 4 in. × 8 in.
- 64 1-inch cubes
- cylinder
- geoboards and rubber bands
- spinners
- Unifix or other connecting cubes
- colored cubes
- bags (fabric or opaque paper)

Ongoing Use

- index cards (need to be prepared according to specifications in teacher notes for many of the station activities)
- graph paper
- pencils
- highlighters of several colors
- pencils/markers of several colors
- pennies
- number cubes

Other

- bags of fun-size M&Ms®
- boxes of toothpicks

Overhead Manipulatives (optional)

- clock
- algebra tiles
- geometric shapes
- protractor
- tiles
- fraction circles
- spinners

Number and Operations

Set 5: Problem Solving with Fractions, Decimals, and Percents

Instruction

Goal: To provide opportunities for students to solve problems involving fractions, decimals, and percents

NCTM Standards, Grades 6–8

Number and Operations

Understand numbers, ways of representing numbers, relationships among numbers, and number systems: work flexibly with fractions, decimals, and percents to solve problems.

Student Activities Overview and Answer Key

Station 1

Students work together to solve a problem involving fractions. Students can model the problem using physical objects such as chips or counters. They are encouraged to brainstorm appropriate problem-solving strategies, and to explain their solution process once all students in the group agree upon the solution.

Answers: [illegible]

Possible strategies: [illegible]

Possible steps: [illegible]

Station 2

Students work together to solve a real-world problem involving decimals. After reading the problem, students brainstorm possible problem-solving strategies. Students are encouraged to make sure everyone in the group agrees on the solution. Then students explain their solution process.

Answers: [illegible]

Possible strategies: [illegible]

Possible steps: [illegible]

Station 3

Students work together to solve a problem involving fractions. The problem lends itself especially well to making a table and looking for a pattern. Students can also model the problem using physical objects. Students brainstorm possible strategies, solve the problem, and explain the steps of their solution method.

Answers: At Stage 10, $\frac{1}{11}$ of the tiles are white and $\frac{10}{11}$ of the tiles are black.

Possible strategies: Make a table showing the number of the stage and the corresponding fraction of white tiles and black tiles; look for a pattern.

Possible steps: Look for patterns in the table. Extend the table to Stage 10. Alternatively, notice that the fraction of white tiles at Stage n is $\frac{1}{n+1}$, and recognize that the fraction of white tiles plus the fraction of black tiles must equal 1.

Station 4

Students are given problem about distances along a highway involving percents. Students work together to brainstorm strategies they can use to solve the problem. This problem lends itself well to drawing a diagram. After solving the problem, students explain the steps of their solution.

Answers: The distance is 66 miles.

Possible strategies: Draw a diagram.

Possible steps: The distance from Midville to Springfield is 30 miles. The distance from Linwood to Center City is 21 miles. The distance from Springfield to Linwood is 120 − (30 + 24) = 66 miles.

Materials List/Set Up

Station 1 about 50 small objects such as chips, counters, beans, or pennies

Station 2 none

Station 3 small black and white tiles, or small square pieces of paper in two colors

Station 4 none

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. What are some different problem-solving strategies you can use to help you solve real-world problems?
2. How do you know when you should use multiplication to solve a problem?
3. How do you know when you should use division to solve a problem?
4. How can you check your answer to a real-world problem?

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. Make a table, guess and check, look for a pattern, work backward, draw a diagram, use physical objects to model the problem, and so forth.
2. You use multiplication when equal groups of objects are being put together.
3. You use division when a set of objects is being separated into equal groups.
4. Reread the problem using the answer in place of the unknown quantity or quantities. Check to see if the numbers work out correctly throughout the problem.

Possible Misunderstandings/Mistakes

- Incorrectly multiplying or dividing fractions
- Incorrectly identifying, describing, or extending a number pattern in a list or table
- Drawing an inaccurate diagram to help solve a problem

Number and Operations

Set 5: Problem Solving with Fractions, Decimals, and Percents

Station 1

You will find some chips or counters at this station. Use them to help you solve this problem.

Three friends shared a basket of berries. Amy took $\frac{1}{2}$ of the berries. Then Jamal took $\frac{1}{3}$ of the remaining berries. Then Ernesto took $\frac{1}{4}$ of the remaining berries. There were 2 berries left in the basket. How many berries were in the basket at the beginning?

Discuss the problem with other students. Brainstorm strategies you might use to solve the problem. Write the strategies below.

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Solve the problem. When everyone agrees on the answer, write it below.

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Explain the steps you used to solve the problem.

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Station 2

At this station you will work with other students to solve this real-world problem.

> Alicia sells tickets to a school play. The tickets cost $6.50 for adults and $2.50 for children. She sells a total of 16 tickets and collects a total of $88. How many of each type of ticket does Alicia sell?

Discuss the problem with other students. Brainstorm strategies you might use to solve the problem. Write the strategies below.

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Solve the problem. When everyone agrees on the answer, write it below.

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Explain the steps you used to solve the problem.

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Number and Operations

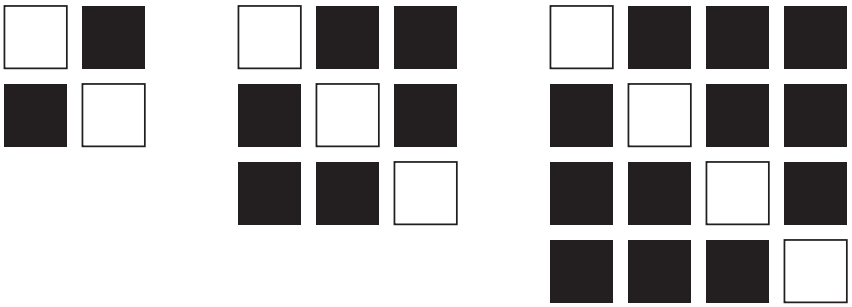
Set 5: Problem Solving with Fractions, Decimals, and Percents

Station 3

You will find a set of tiles at this station. Use them to help you solve this problem.

Mei is making a pattern of black and while tiles for the floor of a bathroom. The figures show the pattern at several stages. At Stage 10, what fraction of the tiles are white? What fraction of the tiles are black?

Stage 1 Stage 2 Stage 3



Discuss the problem with other students. Brainstorm strategies you might use to solve the problem. Write the strategies below.

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Solve the problem. When everyone agrees on the answer, write it below.

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Explain the steps you used to solve the problem.

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Number and Operations

Set 5: Problem Solving with Fractions, Decimals, and Percents

Station 4

At this station you will work with other students to solve this real-world problem.

> The distance along a straight highway from Midville to Center City is 120 miles. The distance along the highway from Midville to Springfield is 25 percent of the distance from Midville to Center City. The distance along the highway from Linwood to Center City is 20 percent of the distance from Midville to Center City. What is the distance from Springfield to Linwood?

Discuss the problem with other students. Brainstorm strategies you might use to solve the problem. Write the strategies below.

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Solve the problem. When everyone agrees on the answer, write it below.

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Explain the steps you used to solve the problem.

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