

Spirit Lesson 1

Lesson Title: Meter Marker Mania

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Algebra Topic: Real Numbers, Decimals (tenths)

Grade Level: Upper Elementary

Cartoon Idea: Robot on highway with mile markers

Lesson Outline:

Content:

- Measurement and construction of whole number/ decimal number lines
- Application of positive and negative movement on a number line (forward and backward)
- Addition and subtraction of decimals
- Compare decimals to determine greater and lesser amounts

Context:

- Students will create roads marked off in tenths of a meter (minimum length of 3 meters)
- The classroom robot travels various distances forward and backwards on a number line
- Students will add and subtract distances traveled
- Students will compare distances traveled for two or more robot journeys

Activity Description:

Students will use masking tape and a meter stick to make a 3 meter course for the robot to travel. They will mark and label the course in increments of $1/10^{\text{th}}$ of a meter.

Using Worksheet #1, the students will complete the activities with the robot on the course and record their answers. Student activities will include: locating points on a number line, moving the robot forward and backward on the course, adding and subtracting decimal numbers, and comparing distances.

Standards:

Math: A1, B3, D2, E1

Science: B1, E1

Technology: B4, D2

Material List:

Classroom Robots
Meter Sticks
Fine-tipped marker
Masking Tape

Worksheet #1
Pencil
Paper
Pictures or Powerpoint slides
showing road mile markers

Asking Questions (Meter Marker Mania)

Summary: Ask questions to introduce and generate interest in using mile markers as a tool for calculating distances.

Outline:

Show pictures/slides of mile markers along highways.

Discuss the information markers provide and how they are used.

Discuss number systems that can be used to create mile markers.

Activity:

Show examples of road markers using Powerpoint slides. Ask questions and discuss their use to build knowledge and experience with using road markers to locate position and calculate distances. Discuss the real numbers that are used and could be used on markers. Practice distance calculations using pictures.

Questions	Possible Answers
What are mile markers, where would you see them and what information is given?	Small signs placed at equal increments along a roadway that mark the distance from one point to another.
How can mile markers be useful for people traveling the road?	Can be used to mark a specific point. Calculations can be done to determine distance between markers.
What types of numbers are most often used on road markers?	Positive integers.
What are some other real numbers that could be used?	Decimals, fractions, whole

Image Idea: Picture of mile markers along roads

Exploring Concepts (Meter Marker Mania)

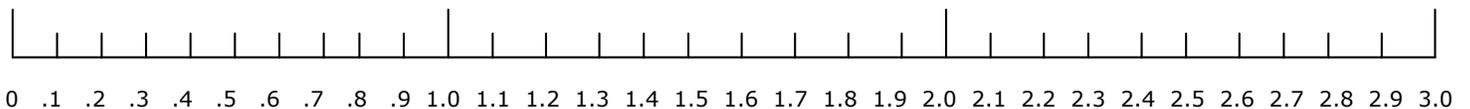
Summary: Students will explore finding decimal positions, adding and subtracting decimals by moving the classroom robot on a course divided into tenths of a meter.

Outline:

- Students create a 3 meter road with markings showing tenths of meter increments.
- Students drive the robot to the positions and distances noted on Worksheet #1.
- Students will use the information gathered to help solve the problems on the worksheet.

Activity:

In groups of 2-3, students will first set up a 3 meter road on the floor with masking tape. They will measure and mark the road in tenths of meter increments.



Give each group a copy of Worksheet #1 that has position and distance problems to solve. Students will drive the classroom robot to positions, using the given distances to gather information needed to solve the problems.

Video Idea: Clip of robot of students moving the robot along the road.

Organizing Learning (Meter Marker Mania)

Summary: – Students use the information gathered on the practice worksheet (1-8) to create a chart showing each distance the robot traveled.

Outline:

- Use data from Worksheet #1 (1-8) to determine distances traveled.
- Create and organize a chart showing these distances.
- Use the chart to find the total distance the robot traveled.

Activity:

Students continue to work in their groups of 2-3 to organize the distances the robot traveled along their 3 meter course from the problems on Worksheet 1. The group will draw a chart that shows the distance traveled on each problem. (see sample chart). Students use the information on the chart to calculate the total distance the robot traveled.

Sample Chart:

Problem No.	Distance the Robot Traveled
1	1.7 meters
2	1.1 meters
3	1.6 meters
4	0.8 meters
5	1.2 meters
6	1.4 meters

Total	7.8 meters
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Understanding Learning (Meter Marker Mania)

Summary: Groups hand in their completed Worksheet #1 for group assessment and each student completes an Individual Assessment Sheet to show their understanding of placement and location of decimals to tenths on a number line, addition, subtraction, and comparison of tenths decimals, and making a chart to show information.

Outline:

Group: Use Group Worksheet to assess

- Participation
- Concepts: location, addition, subtraction, and comparison of decimal numbers to the tenths of a meter

Individual: Use Individual Worksheet to assess each student's understanding of:

- location, addition, subtraction, and comparison of decimal numbers to the tenths of a meter
- using information to create a chart

Activity:

Each group will hand in their completed Group Worksheet to be assessed on: Correctness of problem-solving, Group Participation, Chart Accuracy and Clarity.

Each student will be individually assessed using the Individual Assessment sheet. The student demonstrates his/her understanding of placement and location of decimals to tenths on a number line, addition, subtraction and comparison of decimals, and making a chart to show data. The completed assessment may be evaluated on: Accuracy of decimal labels on number line, Correctness of problem-solving, Chart Accuracy and Clarity.

Meter Marker Mania
Group Worksheet

Put the robot on the road you made at mile marker '0'. Read and complete each of the following instructions. Write the answer to each question.

1. Starting at mile marker '0', drive the robot forward 0.8 meters. Continue going forward 0.9 meters. What mark is the robot on?

Answer _____ (1.7)

2. Now drive the robot backwards 1.1 meters. What mark is the robot on?

Answer _____ (0.6)

3. From where the robot is now, drive it to mile marker 2.2. How far did the robot travel?

Answer _____ (1.6)

4. Drive to the end of the course. (3.0) How far the robot travel?

Answer _____ (0.8)

5. Starting at the end of the course (3.0), drive the robot to 1.8. How far did it go?

Answer _____ (1.2)

6. From 1.8, drive to marker 0.4. What was the distance that the robot traveled?

Answer _____ (1.4)

7. Compare the distance the robot traveled in #5 to the distance traveled in #6. Which is greater?

Answer _____ (#6, 1.4)

8. What was the total distance the robot traveled in #5 and #6?

Answer _____ (2.6)

9. On the back, make a chart to show each distance the robot traveled. What was the total distance the robot traveled?

Answer _____ (7.8 meters)

Meter Marker Mania
Individual Assessment

Roger the robot traveled back and forth on a 3-meter course marked and labeled in tenths of a meter. Follow the directions below to draw the road, show Roger's movements, and calculate distances.

1. Label the line showing a 3 meter road divided into tenths of a meter.

Show Roger's movements on the road and solve each problem below.

2. Roger started at the beginning of the road, traveled 0.6 meters and 1.4 meters. Where is Roger now? _____ (2 meters)

3. Roger dropped a part at marker 1.3. How far does he have to go back to get his part? _____ (0.7 meters)

4. Starting at marker 1.3, Roger travels to marker 1.9. How far did he travel this time? _____ (0.6 meters)

5. Roger traveled to the end of the course (3.0). How far did he go? _____ (1.4 meters)

6. Compare the distance the robot traveled in #3 to the distance traveled in #4. Which is greater? _____ (#3)
How much greater? _____ (0.1 meter)

7. What was the total distance that Roger traveled on his journeys? _____ (4.7 meters)

8. On the back of this sheet, make a chart showing the distance Roger traveled for each problems 1-5 and the total.

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