



Name: _____

Summer 2020

Designing a Course

Rising 8th Grade Mini-Project

Directions: Using your knowledge of what you have learned throughout the year, complete the following tasks that will result in you eventually designing your own race course!

Over the course of these tasks you will:

- Consider different ways to measure distances of various lengths and in which situations different methods might work better.
- Read about building a trundle wheel (also known as a surveyor wheel or measuring wheel) that is commonly used to measure walking distances.
- Design a walking course for a 5K race in your neighborhood. (The course should be one lap of about 500m. The actual race would go around the course multiple times.)
- Use your trundle wheel to measure the path of the walking course and make a scale drawing of the course on a map or satellite image of your neighborhood.

Parental Support: To assist your student in their work throughout the summer, visit www.openupresources.org and create a free account. View Grade 7, Unit 9, Lessons 10-13 to read a “teachers guide” to these tasks. These include task syntheses and anticipated student responses!

Table of Contents:

- Part 1 - Page 2
- Part 2 - Page 4
- Part 3 - Page 6
- Part 4 - Page 8

Part 1: Measuring Long Distances Over Uneven Terrain

1.1: How Far Is It?

How do people measure distances in different situations? What tools do they use? Come up with at least three different methods and situations where those methods are used.

1.2: Planning a 5K Course

The school is considering holding a 5K fundraising walk on the school grounds. Your class is supposed to design the course for the walk.

1. What will you need to do to design the course for the walk?

2. Come up with two methods to measure the course. Have someone review your plan for feedback.

1.3: Comparing Methods

Let's see how close different measuring methods are to each other. Choose a path outside your home that you can measure.

1. Use both methods to measure the length of the path at least two times each. Record your measurements.

2. Decide what distance you will report for each measurement.
3. Compare your results between the two different types of measurement. Express the differences between the measurements in terms of percentages.

4. Discuss the advantages and disadvantages of each measurement method.

Part 2: Building a Trundle Wheel

2.1: What Is a Trundle Wheel?

A Trundle Wheel is a tool that surveyors use to measure distances. You can learn more about Trundle Wheels by looking them up online.

1. How does a trundle wheel measure distance?

2. Why is this method of measuring distances better than the methods we used in part 1?

3. How could we construct a simple trundle wheel? What materials would we need?

2.2: Building a Trundle Wheel

Collect some supplies from around your house in order to construct a trundle wheel. Consider what you would use for the wheel, handle, and so forth. Suggested supplies include a paper plate, rulers, index cards, a metal paper fastener, etc. There are many ways to build a Trundle Wheel - get creative!

Once your Trundle Wheel is built, use it to measure the length of a room. Record:

1. The diameter of your trundle wheel.

2. The number of clicks across the room.

3. The length of the room (Be prepared to explain your reasoning.)

Part 3: Using a Trundle Wheel to Measure Distances

3.1: Measuring Distances with the Trundle Wheel

Interactive digital version available:

<https://a.openup.org/ms-math/en/s/ccss-7-9-12-1> (or Click [here](#) to access.)

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Earlier you made trundle wheels so that you can measure long distances. Recall the path you measured for Part 1 - you will be working with that same path.

1. Measure the path with your trundle wheel three times and calculate the distance. Record your results in the table below.

	Diameter	Number of Rotations	Computation	Distance
Trial 1				
Trial 2				
Trial 3				

2. Decide what distance you will report as your measurement of the path. Explain your reasoning.

3. Compare this distance with the distance you measured the other day for this same path. What do you notice? Express the differences between the measurements in terms of percentages.

Part 4: Designing a 5K Course

4.1: Make a Proposal

Find a map of your neighborhood. Ask an adult for support or use Google Maps and take a screenshot! You can print out your map or insert it here.

1. On the map, draw in the path you measured earlier with your trundle wheel and label its length.

(Insert image here)

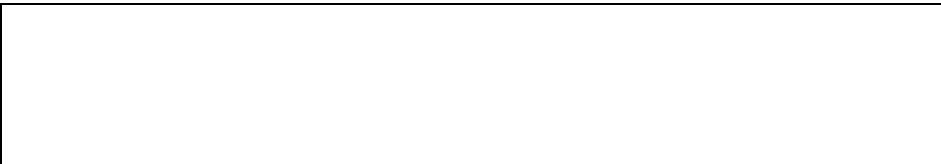


2. Invent another route for a walking course and draw it on your map. Estimate the length of the course you drew.

(Insert image here)



3. How many laps around your course must someone complete to walk 5 km? How do you know?



4.2: Measuring and Finalizing the Course

1. Measure your proposed race course with your trundle wheel at least two times.
Record your measurements below and decide what distance you will report.

2. Revise your course, if needed.
3. Create a visual display that includes:
 - A map of your final course
 - The starting and ending locations
 - The number of laps needed to walk 5 km
 - Any other information you think would be helpful to the race organizers

4. Ready for an extra challenge? Create a scale for the map of your neighborhood you've been using!