

## Mapping Fractions

Grade Level: Fifth

Standards: CA Mathematics Standards

Number Sense 1.1, 2.1, 2.2, 2.3, 2.4, Measurement and Geometry 1.4, Mathematical Reasoning 1.2, 2.1, 2.5, 2.6

Objectives:

Students will use the concept of scale, and the tool of a ruler, to determine fractional distances between locations on maps.

Student Grouping:

Lesson begins whole-class. Students will work individually with linear measurement, then in pairs and in partnerships for the map activity.

Background:

Students have explored the meaning of the numerator and denominator of a fraction through tangrams. Students have compared fractions of unlike denominators. Students have used number lines to place fractions.

Materials:

Index cards

Rulers

Highlighters

Assortment of maps (at least one map per student)

Direct Instruction:

Teacher recalls prior lessons and activities involving fractions. Teacher hands out rulers and refers to them as “math tools”. Students are invited to examine these tools and comment on what they notice about them (they have whole numbers labeled, they have centimeters on one side, they have lines denoting different lengths, etc.).

Students use index cards to mark any two places with large dots. Teacher reminds students that linear measurement with a ruler begins with the ruler at “0”. Students use their rulers and measure and record the distances between the two dots. Student volunteer is asked to go to the board and give his/her example. Teacher checks for understanding by looking at labeled index cards on desks. Teacher makes the point that the distances must be labeled in units used (centimeters, inches).

Teacher asks students why maps are useful (idea of scale). Student ideas and explanations shared. What would happen if we did not have maps and/or our maps were not made to scale? (Usefulness, accuracy).

Explanation of Mapping Activity:

Teacher models sequence of map activity. A poster of steps is hung for student reference during the activity.

1. Select a map

2. Locate and record the scale (attention to customary or metric units)
3. Pick any two places on the map
4. Measure the distance between the two places and record that on your index card
5. Convert this distance to miles or kilometers
6. Find the halfway ( $\frac{1}{2}$ ) point. Label with the name of the place and the distance
7. Extension: Find the  $\frac{1}{4}$  point or use a different map and repeat the steps above

**Activity:**

Students select their maps and spread them out with their index cards and rulers. Students are encouraged to discuss their locations, measurements, conversions with each other.

Discussion throughout of geographical features we notice, whether scales are in metric or customary, how we convert inches/centimeters to miles/kilometers.

Students are reminded to show their steps and record their work. Teacher remains involved in assisting students as individual and small groups in their questions regarding converting, rounding, multiplying by fractions (or dividing the distance into two equal parts).

**Differentiation:**

Students may choose to exchange maps with more difficult scales for those with easier scales and vice-versa. Depending upon readiness level, students are encouraged to multiply fractions, multiply fractions and whole numbers, or use their rulers as concrete determiners of halfway mark. Students who are ready and interested in determining other fractional distances (other denominators are assisted in doing so. Students work with other students to ask questions, demonstrate methods, or share their results.

**During the Activity/Embedded Assessment:**

Students share procedural, reasoning, and computational strategies with other and with the teacher. Students share with the teacher and each other the places they are locating, their measured distances, their converted distances, and their halfway points. When their cards are completed, students display these by taping them on the whiteboard. Students gather to view and discuss each other's work.

**Follow Up:**

Students are asked to use a map or atlas they have at home to replicate the steps they did in class. They may choose to follow the route of a trip they or their parents have recently taken. They are encouraged to measure and record actual stopping places along their trip route. What fractions were these distances of their total traveled route? Students are asked to bring in the maps/atlas they used the next day. Students will check each other's measurements and conversions.

**Related Work:**

See Mapping Fractions 2

See Resort Mapping