

Activity 4

**Coast to Coast
with Alice****Concepts/Skills**

- ◆ Multiplication
- ◆ Division
- ◆ Ratio
- ◆ Measurement
- ◆ Problem-solving

Materials

- ◆ TI-15 calculators
- ◆ *Coast to Coast with Alice* by Patricia Rusch Hyatt, Carolrhoda Books, Inc., 1995, ISBN 1-57505-074-9
- ◆ United States road maps
- ◆ Paper, pencils

Overview

Students will work in cooperative groups to solve a real-world problem comparing automobile travel in the early 1900's and travel today. Each group's final product will include a marked map, a graphic showing the results of the group investigation, an oral presentation about the group's solution to the problem, and individual written explanations about the processes used by the group to reach a solution.

Focus

Read the book *Coast to Coast with Alice* by Patricia Rusch Hyatt to the students. Show the map at the end of the book. Discuss with the students the use of scale to calculate actual distances from a map. (Note: the map in the book does not contain a scale. Students will need a United States road map with a scale to solve the problem.)

Presenting the Problem

1. Review the four steps of problem solving with the students:
 - understanding the problem
 - making a plan
 - carrying out the plan
 - evaluating the solution

Have the students read *The Problem* page and paraphrase the problem. Make sure the students are clear on what the problem asks.

2. Discuss the information on *The Problem* page with the students. For ease of calculations and comparisons, have the students use an 8-hour day for traveling. If desired, students could include other modes of travel for comparison purposes. If other comparisons are to be made, students should research the average speed for buses, trains, or planes. Students could also investigate the routes taken by these other modes of travel. Have students answer the questions:
 - ◆ *Could you follow Alice's route exactly by these other modes of travel? Why?*
3. If groups have difficulty with the problem, use the *Things to Consider* page. This page provides guiding questions to help the students complete the problem-solving steps.
4. In the presentation, students should show the marked map and any graphics they created to solve the problem.

Evaluating the Results

1. After the presentations are made, have students examine the various solutions presented.
 - ◆ *How are the presentations similar?*
 - ◆ *How are the presentations different?*
2. Ask students to compare the numbers used.
 - ◆ *Did all groups use the same numbers?*
 - ◆ *Why do you think this is so?*
3. Ask students to determine the reasonableness of the results.
 - ◆ *Did each group answer the question?*
 - ◆ *Do the numbers used make sense?*
 - ◆ *Did all of the groups consider all of the variables?*
4. Ask students to compare how they used the calculator. As different uses are described, ask students to analyze the results for reasonableness.
5. Ask students to extend their thinking. If you wanted to follow Alice's route, which mode of travel would be the best?

Additional Information

Another book, *Alice Ramsey's Grand Adventure* by Don Brown (Houghton Mifflin Company, Boston, 1997, ISBN: 0-395-70127-9) also presents this story.



Name _____

Date _____

Activity 4

Coast to Coast with Alice

The Problem: How long would Alice Ramsey's trip take today?

Your friend's eccentric great-aunt was born in 1909, the year Alice Ramsey took her trip. She wants to follow Alice Ramsey's route from New York City to San Francisco but she doesn't have 59 days for travel. Your team needs to determine how long the trip would take today, using a current model automobile.

The Facts

- ◆ Alice Ramsey drove a 1909 Maxwell touring car to make the trip.
- ◆ Alice made the trip with her friend Hermine and her sisters-in-law Nettie and Margaret.
- ◆ They visited 31 cities on the trip, starting with New York City and ending in San Francisco.
- ◆ The trip took 59 days.
- ◆ The Maxwell car that Alice drove could travel at a maximum of 40 miles per hour.
- ◆ For this problem, assume that Alice and her friends drove about 8 hours each day.
- ◆ Many US highways now have a speed limit of 70 miles per hour.
- ◆ Because of stops for food and rest, most drivers average 55 miles per hour on road trips.

The Task

1. Your team will create a display showing the following information:
 - ◆ The actual route Alice Ramsey followed, marked on a highway map
 - ◆ The mileage for each portion of her trip (city-to-city mileage)
 - ◆ The total mileage for the trip
 - ◆ The average speed Alice traveled on each portion of her trip
 - ◆ The average speed for her entire trip
 - ◆ The amount of time it would take to drive the same trip today

2. Each person on the team will write an explanation of the team's solution. This explanation will answer these questions:
- ◆ How did you calculate the mileage for Alice's trip?
 - ◆ How did you calculate the average speed for the trip?
 - ◆ Compare the trip in 1909 to the same trip taken today. Calculate how much faster the trip would be today. Explain why you believe your answer is correct.

Things to Consider

Understanding the Problem

Read the *Coast to Coast Problem* page, and then answer these questions.

- ◆ How many days did Alice and her friends take to travel from New York City to San Francisco?
- ◆ About how many hours of driving did the trip take? How do you know?
- ◆ How many miles did Alice and her friends travel? How do you know?
- ◆ Do you think Alice drove at the maximum speed for the whole trip? Why do you think so?

Making a Plan

Before you make your plan, answer these questions.

- ◆ If you followed Alice's route today, would it be about the same distance? How do you know?
- ◆ Would you travel at the same speed that Alice did? How do you know?
- ◆ Would you drive about the same number of hours each day that Alice drove? How do you know?

Carrying Out the Plan

Before you begin planning your presentation, answer these questions.

- ◆ What does your presentation have to include? Do you have all of the necessary information? What other calculations do you need to make?
- ◆ How will you display your information? How could you use the map to show each day's travel in 1909 and today? What other ways could you show the information?
- ◆ If your group decided to include other travel modes, how will you include them in your presentation?

Evaluating the Solution

- ◆ Did you answer the question? How do you know?
- ◆ Does your answer make sense? If you travel faster, will it take more or less time to complete the trip? How do you know?
- ◆ Did everyone in the group write an explanation?



Using the Calculator

Name _____

Date _____

Coast to Coast with Alice: Using stored operations with a constant

Solve this problem with the calculator.

- Ms. Harris, the principal, is going to give each student in the fifth grade 4 new pencils. She has asked the secretary, Mr. Gonzales, to put the pencils in bundles for each teacher. There are six sections of fifth grade. The number of students in the sections are 22, 25, 24, 27, 23, and 26. How many pencils will go in each bundle?

Since the number of pencils to be given is constant, you can use the stored operations with a constant function on the calculator.

Press:	The display shows:
Op1 \times 4 Op1 (This stores "multiply by four".)	
22 Op1	
25 Op1	
24 Op1	
27 Op1	
23 Op1	
26 Op1	

Note: To clear Op1, press Mode $\leftarrow \leftarrow$ Enter.

2. Little Emily Beth has trouble keeping up with her father when they go for a walk. She has to take 3 steps for each step her father takes. On Monday, Emily Beth took 234 steps on their walk together. On Tuesday, she took 300 steps. On Wednesday, she took 186 steps. On Thursday, she took 459 steps. How many steps did her father take on each day?

Again, there is a constant involved. This time, division will be used to divide Emily Beth's steps into groups of 3.

Press:	The display shows:
$\boxed{0pl} \boxed{\div} 3 \boxed{0pl}$ (The constant of "divide by three" is stored.)	
234 $\boxed{0pl}$	

Continue with the rest of the data.