

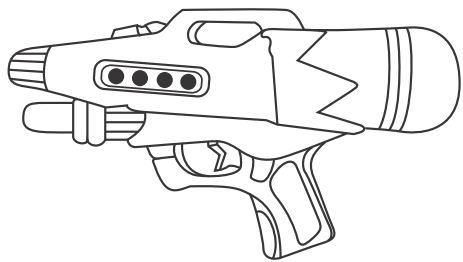
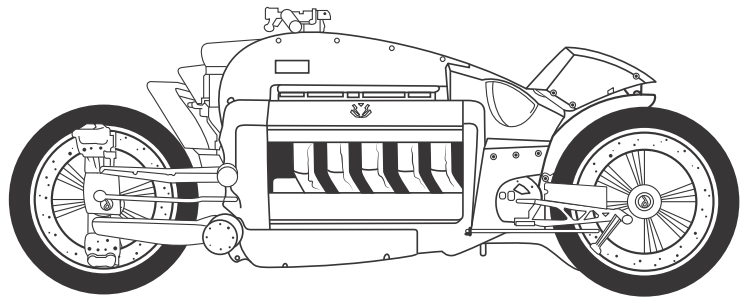
Name \_\_\_\_\_

Pick a Project

Project 9A

## Prototypes

A prototype is the first model of something. Sometimes a prototype is made just to get attention. The Dodge Tomahawk was a motorcycle-like vehicle shown at the 2003 North American International Auto Show. It had four wheels with each pair of wheels set only a few inches apart. Only ten Tomahawks were ever made.



Sometimes the idea for a prototype comes by accident. The Super Soaker® was invented by Lonnie Johnson, who was trying to make a better refrigerator. As he was shooting a stream of water from his bathroom sink into the bathtub, he realized he could make a great water gun. It took eight years until the toy was available in stores, but about 2 million of them sold in the first year.

### Your Project Build a Fraction-Division Prototype

Build a prototype that you can use to model the division of a whole number by a unit fraction.

Choose a way to represent the whole numbers. You might try shoeboxes, paper plates, or squares of cloth. Then, choose a way to divide the wholes into equal parts. Experiment with string, rulers, or other things with straight edges.

Start small. Make sure your model works with the whole numbers 1, 2, or 3 and the unit fractions  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ , or  $\frac{1}{5}$ .

Next, use your prototype to model a few problems. Can you show  $2 \div \frac{1}{3}$ ?  $3 \div \frac{1}{2}$ ?

Finally, decide how to use your model to show the answer. Then, write your own problems, use your prototype to solve them, and write the answers.

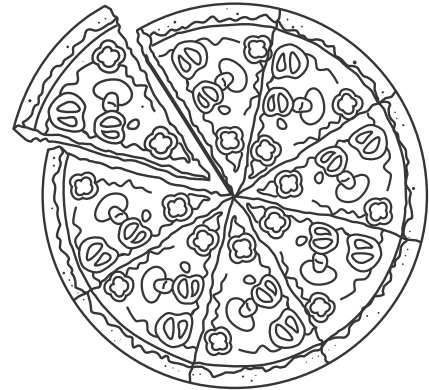
Name \_\_\_\_\_

Pick a Project

Project 9B

## Pizza and Fractions

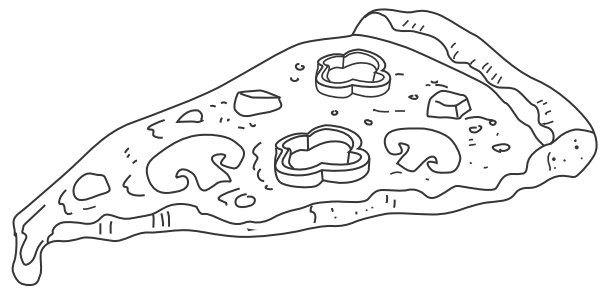
The idea of pizza is very old. The ancient Greeks ate flatbreads using garlic and onion as toppings 9,000 years ago. Pizza, much like the kind we eat today with garlic and cheese, was enjoyed by soldiers in the days of the early Roman Empire. In 1883, a special version of pizza was made in Naples to honor the Queen Consort of Italy (the wife of the King). The pizza was topped with mozzarella, tomatoes, and basil to resemble the national colors on the flag of Italy.



Italian pizza was brought to America by immigrants. It was sold as street food for 2¢ a slice. In 1905, the first pizzeria opened in New York City. After World War II, pizza became very popular with the suburban middle class, spreading out across the country. Around 3 billion pizzas are sold in the United States every year. The average American eats almost 2 pounds of pizza per month. Today pizza is one of our five top favorite foods. No wonder pizza shows up in so many math problems!

### Your Project Write a Skit About Pizza

Some of the most common problems used when teaching fractions are problems about pizza. Pizzas are usually round and can be divided easily, so they are great for math problems.



Work with your group to write a skit about fractions and pizza. Make props for your skit, most importantly the pizza slices you will need. Try to include problem solving using each of the four fraction operations—addition, subtract, multiplication, and division—as part of your skit. Share your skit with the class.

Name \_\_\_\_\_

Pick a Project

Project 9C

## Mnemonic Devices

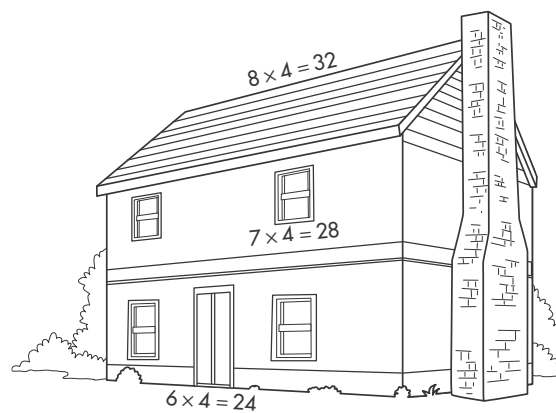
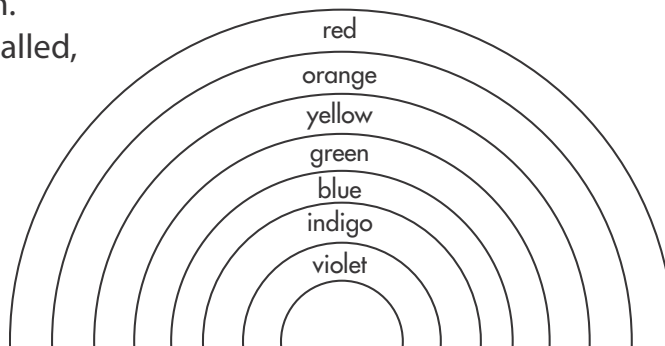
A mnemonic device is a tool or a shortcut you can use to help you remember information. Even if you did not know what they were called, you have probably used some mnemonic devices. For example, you may use the acronym *Every Good Boy Does Fine* to remember the order of the notes EGBDF on the lines of a musical staff.

Or you may remember the numbers of days in each month with the rhyme:

*Thirty days hath September,  
April, June, and November;  
All the rest have thirty-one,  
Save February, with twenty-eight days clear,  
And twenty-nine each leap year.*

Some mnemonic devices are very old. The ancient Greeks linked words or concepts with familiar locations. Usually they chose a large house that they know well and connected an image of each word or concept they wanted to remember to a different room, window, or piece of furniture in the house.

### Roy G. Biv



## Your Project Create a Mnemonic Device

Create a mnemonic device to help you remember the steps for dividing with fractions. First, list the steps. Have your teacher or other adult check to make sure the steps are correct.

Next, choose the kind of mnemonic device you will use. Acronyms, rhymes, music, and imagery or location are common types.

Finally, create your mnemonic device. A day or two later, write a division problem and see if you can solve it using the mnemonic device you created. If not, adjust it so your device is easier to remember and try again.

