

Predict Products of Fractions

Name _____

Review

One way to determine whether a product will be greater than or less than the starting value is to consider a product that you know.

Multiply by a whole number Example $\times 5$	John has 5 times as many points as Ed. John has more points.	The product will be greater than the starting amount.
Multiply by a fraction less than 1 Example $\times \frac{1}{2}$	John has half as many points as Ed. John has less points.	The product will be less than the starting amount.
Multiply by a fraction greater than 1 Example $\times \frac{3}{2}$ (or $1\frac{1}{2}$)	John has one and a half times as many points as Ed. John has more points.	The product will be more than the starting amount.

Which numbers will result in a product greater than the factor shown? Select all that are correct.

1. $2 \times$ _____

A. 1	D. 5
B. $\frac{4}{3}$	E. $\frac{5}{7}$
C. $\frac{1}{2}$	F. 0

2. $\frac{5}{3} \times$ _____

A. 1	D. 3
B. $\frac{3}{5}$	E. $\frac{1}{3}$
C. $\frac{8}{3}$	F. $\frac{8}{5}$

Which numbers will result in a product less than the factor shown? Select all that are correct.

3. $1\frac{2}{3} \times$ _____

A. 1	D. 0
B. 2	E. $\frac{2}{3}$
C. $\frac{5}{2}$	F. $\frac{3}{5}$

4. $\frac{6}{7} \times$ _____

A. $\frac{6}{7}$	D. $\frac{7}{6}$
B. 1	E. $\frac{9}{5}$
C. $\frac{3}{4}$	F. $\frac{3}{2}$

Additional Practice

Name _____

Review

You can predict whether a product will be greater or less than one of the factors without performing the multiplication.

The rosebush is 2 feet tall. The sunflower is $1\frac{1}{2}$ times as tall as the rosebush. The tulip is $\frac{7}{8}$ the height of the rosebush. What is the order of the flowers from shortest to tallest?

Flower	Height	
Rosebush	2 feet	
Sunflower	$2 \times 1\frac{1}{2}$; taller than rosebush	When multiplying by a factor greater than 1, such as $1\frac{1}{2}$, the answer will be greater than the factor.
Tulip	$2 \times \frac{7}{8}$; shorter than rosebush	When multiplying by a factor less than 1, such as $\frac{7}{8}$, the answer will be less than the factor.
From shortest to tallest, the order of the flowers is tulip, rosebush, and sunflower.		

1. Which expressions have a value greater than 38? Choose all that apply.

A. $38 \times \frac{3}{2}$

B. $38 \times \frac{4}{3}$

C. $38 \times \frac{5}{8}$

D. $38 \times \frac{5}{2}$

E. $38 \times \frac{10}{6}$

F. $38 \times \frac{3}{7}$

Circle the lesser expression.

2. $7 \times \frac{9}{10}$ or $7 \times \frac{5}{2}$

3. $15 \times \frac{6}{5}$ or $15 \times \frac{5}{6}$

4. $\frac{1}{3} \times 2$ or $\frac{7}{5} \times 2$

5. $\frac{15}{4} \times 20$ or $\frac{12}{15} \times 20$

Write a fraction that makes each sentence true.

6. $\frac{1}{2} \times \underline{\hspace{1cm}} < \frac{1}{2}$

7. $\frac{8}{13} \times \underline{\hspace{1cm}} > \frac{8}{13}$

8. $\frac{15}{6} \times \underline{\hspace{1cm}} > \frac{15}{6}$

9. $\frac{7}{9} \times \underline{\hspace{1cm}} < \frac{7}{9}$

10. On Monday, Willie ran $3\frac{1}{2}$ miles. On Wednesday, he ran $\frac{3}{5}$ that distance. On Friday, he ran $1\frac{3}{5}$ times that distance. What is the order of the days from shortest run to longest run?



With your child, practice predicting whether a product will be greater than or less than a certain factor. For example, if the distance from your home to school is 2 miles, and your child's friend lives $\frac{1}{2}$ the distance from the school, have your child determine who lives farther from the school.

Represent Multiplication of a Fraction by a Fraction

Name _____

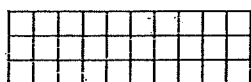
Review

To find a fraction of a fraction use an area model and partition the whole using each denominator.

Consider the product $\frac{2}{3} \times \frac{7}{10}$.

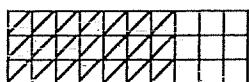
STEP 1:

Make a 3 by 10 rectangle.



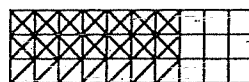
STEP 2:

Shade 7 out of the 10 columns.



STEP 3:

Shade 2 out of the 3 shaded rows.



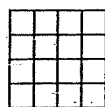
From the representation, we see $\frac{2}{3} \times \frac{7}{10} = \frac{14}{30}$.

What is the product? Fill in the area model to show your work. Then write the product.

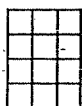
1. $\frac{2}{3} \times \frac{2}{5} =$ _____



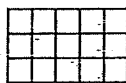
4. $\frac{3}{4} \times \frac{3}{4} =$ _____



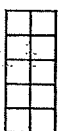
2. $\frac{3}{4} \times \frac{2}{3} =$ _____



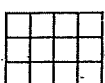
5. $\frac{1}{3} \times \frac{4}{5} =$ _____



3. $\frac{3}{5} \times \frac{1}{2} =$ _____



6. $\frac{1}{3} \times \frac{3}{4} =$ _____



What is the product? Use a representation to solve.

3. $\frac{1}{3} \times \frac{4}{7} =$ _____

4. $\frac{2}{5} \times \frac{3}{4} =$ _____

5. $\frac{1}{2} \times \frac{2}{3} =$ _____

6. $\frac{5}{8} \times \frac{1}{3} =$ _____

7. $\frac{2}{5} \times \frac{3}{5} =$ _____

8. $\frac{5}{6} \times \frac{3}{5} =$ _____

9. Marlene has $\frac{3}{5}$ yard of string. She uses $\frac{2}{3}$ of the string for a project. What fraction of a yard of string does Marlene use?

_____ yard

10. Erica has $\frac{7}{8}$ gallon of water. She needs $\frac{3}{4}$ of the water to water her houseplant. What fraction of a gallon of water does Erica need for her houseplant?

_____ gallon



Cut out several paper squares. Write a fraction on each square. Turn the squares facedown and have your child select two of the squares. Have your child use a representation to multiply the two fractions, explaining to you how they made the representation and how it shows the result. Then return the squares to the pile and select two more. Repeat as time allows. Keep your representations and equations for the next lesson.

Additional Practice

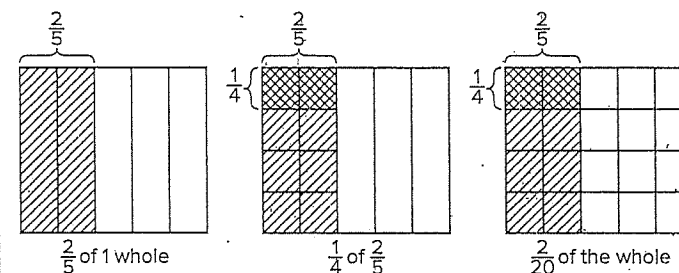
Name _____

Review

You can use an area model to multiply a fraction by a fraction. Use each denominator to partition the whole.

Find the product $\frac{1}{4} \times \frac{2}{5}$.

Partition the whole into fifths, and shade 2 of the fifths to show $\frac{2}{5}$. Then partition the shaded fifths into fourths, and shade 1 of the fourths. To make all of the pieces equal size, also partition the unshaded fifths into fourths. The double-shaded part of the area model is the product.



So $\frac{1}{4} \times \frac{2}{5} = \frac{2}{20}$.

What is the product? Use a representation to solve.

1. $\frac{3}{4} \times \frac{1}{2} =$ _____

2. $\frac{2}{3} \times \frac{5}{6} =$ _____

Water, Water Everywhere

Cross-Curricular Focus: Earth Science



Water is probably Earth's most precious resource. After all, we can't live without it. Earth is the only known planet to have water. Our entire planet is covered in water, with little pieces of land called continents here and there. Our oceans are not the only places we have water. It is also present under the ground and as vapor in the air. Clouds formed by the vapor ensure that water falls back down to Earth as rain, sleet, snow or hail.

So with so much water all around us, why do we hear so much about the need to conserve water? It has to do with the water's salinity, or saltiness. Ocean water has too much salt in it for us to drink. Much of the water that falls back to Earth in one form or another becomes **runoff**. It travels some distance over land before making its way back to one of Earth's oceans. As it travels over land, the water picks up salts and minerals from the rocks and soil and washes them into the ocean. The deposits have built up over many years. That is why ocean water is so salty.

Approximately 97% of Earth's water is salt water. The process of **desalination**, or removing salt from water, is expensive. That leaves only about 3% that is freshwater for meeting the needs of people, plants and animals. This is why there is concern for protecting this rare and critical resource. Unfortunately, only about a third of our freshwater is even available for us to use. The rest is frozen solid in glaciers, in the snow on high mountaintops and in the polar ice caps. So the end result is that we have only about 1% of all the water on Earth that we can use.

The freshwater we use comes from surface water and **groundwater**. Surface water, just as it sounds, is water we can see in ponds, rivers, lakes and streams. Groundwater is water that seeps down into the ground and collects in the spaces between rocks and soil underground. You can find water just about anywhere on Earth if you dig far enough into the ground.

It is important to protect our water supplies from pollution. Once the water becomes polluted, it can be difficult or even impossible to clean. Chemicals, like cleaning supplies, paints and other toxins, can seep into the ground and make the water unusable. People must dispose of their waste products appropriately so we will have plenty of freshwater to go around.

Name: _____

Answer the following questions based on the reading passage. Don't forget to go back to the passage whenever necessary to find or confirm your answers.

1) With so much water all around us, why is there so little water for us to use?

2) What are the four forms that water takes when it returns to Earth from the clouds?

3) What is the main idea of this passage?

4) Where is groundwater found?

5) What type of substance can seep into groundwater and make it unusable?

Multiply a Fraction by a Fraction

Name _____

Review

We can multiply the numerators and multiply the denominators to find the product of two fractions.

Consider $\frac{3}{5} \times \frac{4}{7}$.

Multiply 3 times 4 to find the numerator.

Multiply 5 times 7 to find the denominator.

$$\frac{3}{5} \times \frac{4}{7} = \frac{3 \times 4}{5 \times 7}$$

As a result, $\frac{3}{5} \times \frac{4}{7} = \frac{12}{35}$.

What is the product?

1. $\frac{2}{9} \times \frac{5}{11} =$

5. $\frac{8}{9} \times \frac{3}{4} =$

2. $\frac{4}{7} \times \frac{4}{9} =$

6. $\frac{4}{9} \times \frac{4}{9} =$

3. $\frac{3}{4} \times \frac{2}{5} =$

7. $\frac{3}{5} \times \frac{7}{10} =$

4. $\frac{2}{11} \times \frac{1}{3} =$

8. $\frac{5}{6} \times \frac{3}{8} =$

What is the product?

5. $\frac{1}{4} \times \frac{2}{3} =$ _____

6. $\frac{3}{5} \times \frac{3}{4} =$ _____

7. $\frac{5}{7} \times \frac{5}{8} =$ _____

8. $\frac{4}{9} \times \frac{7}{9} =$ _____

9. $\frac{7}{10} \times \frac{2}{3} =$ _____

10. $\frac{4}{5} \times \frac{5}{6} =$ _____

11. A plant is $\frac{7}{8}$ foot tall. The plant next to it is $\frac{2}{3}$ as tall. How tall is the shorter plant?

_____ foot tall

12. Jessica has $\frac{5}{8}$ gallon of water. She drinks $\frac{2}{3}$ of it during a walk. How much water did Jessica drink?

_____ gallon



Use your models and equations from the previous lesson. Have your child multiply the fractions by multiplying the numerators and denominators. Compare the results to the previous results. Ask your child to explain what the product of the denominators represents (the total number of partitioned pieces) and what the product of the numerators represents (the number of double-shaded pieces).

Additional Practice

Name _____

Review

You can multiply a fraction by a fraction by multiplying the numerators and multiplying the denominators.

Allen lives $\frac{2}{5}$ mile from the park. He ran $\frac{3}{4}$ of the way to the park, then walked. How far did Allen run?

To solve, find $\frac{3}{4} \times \frac{2}{5}$.

Multiply the denominators of the factors to get the denominator of the product. Multiply the numerators of the factors to get the numerator of the product.

$$\frac{3}{4} \times \frac{2}{5} = \frac{3 \times 2}{4 \times 5} = \frac{6}{20}$$

Allen ran $\frac{6}{20}$ mile on the way to the park.

What is the product?

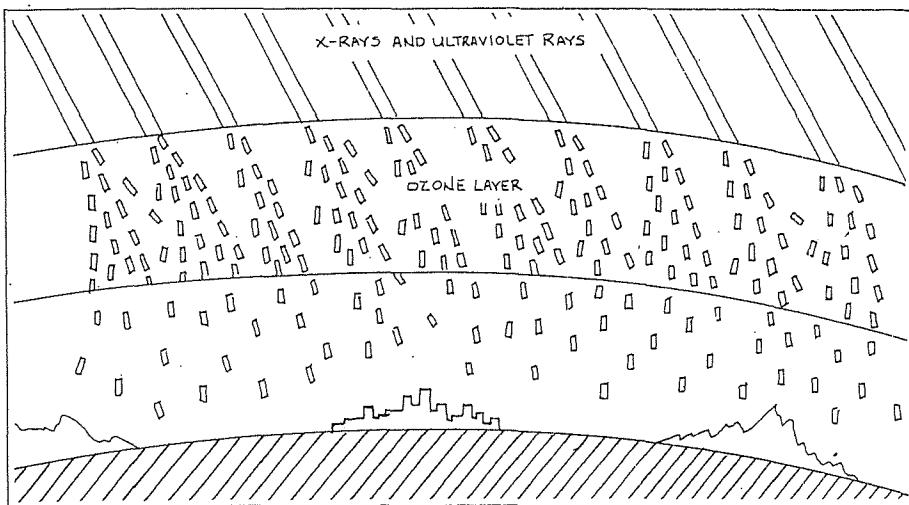
1. $\frac{2}{3} \times \frac{3}{5} =$ _____

2. $\frac{2}{4} \times \frac{5}{7} =$ _____

3. $\frac{4}{5} \times \frac{3}{7} =$ _____

4. $\frac{6}{11} \times \frac{5}{7} =$ _____

The Earth's Safety Blanket



A few years ago, whenever people used hair spray or insect spray or spray paint, they were destroying an important part of our world. Although no one knew it, the gases in spray cans were harming the ozone layer.

No one has ever seen the ozone layer because it isn't on the earth. It is part of the atmosphere, a thick blanket of air that covers the world. The atmosphere is made up of many gases, especially nitrogen and oxygen. Close to the earth, the atmosphere is thick and heavy, but as it gets farther away from the earth, the atmosphere gets thin. There, the energy from the sun changes the way the gases behave. For instance, oxygen atoms usually travel in the air connected together in pairs. But high in the atmosphere, the sun's energy causes three oxygen atoms to connect together instead of two. These groups of three oxygen atoms are called ozone. And the place high in the air where regular oxygen changes to ozone is called the ozone layer.

The ozone layer is very important to life on earth even though it is far away. It soaks up dangerous rays from the sun that harm plants and animals. Even more important, the ozone layer helps keep the earth cool. Without it, the earth might become so hot that the icecaps would melt and flood much of the world. That is why scientists were worried when they found out that gases from spray cans were destroying the ozone layer. Now spray cans contain safe gases. So even though some of the ozone layer has been destroyed, it is no longer being harmed by people's spray cans.

Think About It

Besides not using spray cans, think of three other ways that we can protect life on earth.

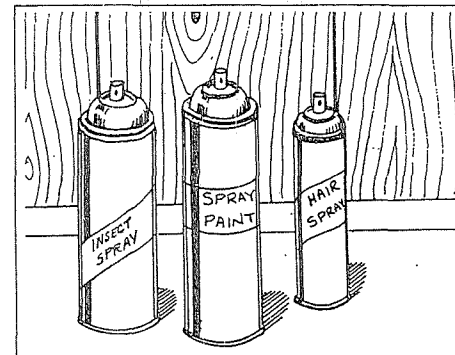
Name _____

The Earth's Safety Blanket

Main Idea

1. This story explains

- _____ the use of spray cans.
- _____ the ozone layer of the atmosphere.
- _____ the dangerous rays of the sun.



Sequencing

2. Number the events below in the order that they happened.

- _____ Spray cans were changed to contain safe gases.
- _____ Scientists became worried about the ozone layer.
- _____ People using spray cans were destroying the ozone layer.
- _____ The ozone layer was no longer being harmed by spray cans.

Reading for Details

3. Use the clues to answer these questions.

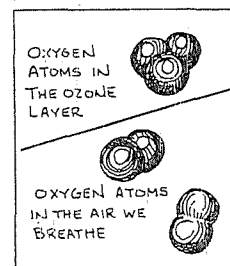
What is the atmosphere made of? (paragraph 2) _____

Where is the atmosphere thick and heavy? (paragraph 2) _____

Where is it thinner? (paragraph 2) _____

Why is the ozone layer important to the earth? (paragraph 3) _____

How was the ozone layer being harmed? (paragraph 1) _____



Reading for Understanding

4. Place the correct letter in the blank.

- | | |
|-------------------|---|
| _____ ozone layer | a. thick blanket of air that covers the earth |
| _____ atmosphere | b. groups of three oxygen atoms |
| _____ ozone | c. place high in the atmosphere where regular oxygen changes to ozone |
| _____ spray cans | d. used to contain harmful gases |

Multiply Mixed Numbers

Name _____

Review

To multiply mixed numbers, you can write the mixed numbers as fractions. Consider $2\frac{1}{6} \times 3\frac{2}{3}$.

$$2\frac{1}{6} \rightarrow 2 \times 6 = 12 + 1 = 13 \rightarrow \frac{13}{6}$$

$$3\frac{2}{3} \rightarrow 3 \times 3 = 9 + 2 = 11 \rightarrow \frac{11}{3}$$

$$\frac{13}{6} \times \frac{11}{3} = \frac{143}{18} = 7\frac{17}{18}$$

As a result, $2\frac{1}{6} \times 3\frac{2}{3} = 7\frac{17}{18}$.

What is the product? Write your answer as a mixed number.

1. $5\frac{1}{2} \times 3\frac{3}{4} =$

2. $2\frac{1}{5} \times 4\frac{2}{3} =$

3. $3\frac{3}{5} \times 3\frac{3}{5} =$

4. $1\frac{5}{7} \times 2\frac{1}{3} =$

5. $6\frac{1}{4} \times 2\frac{3}{4} =$

6. $1\frac{9}{10} \times 1\frac{2}{5} =$

7. $3\frac{1}{2} \times 5\frac{1}{2} =$

8. $2\frac{3}{5} \times 4\frac{1}{6} =$

Additional Practice

Name _____

Review

You can multiply mixed numbers by rewriting each mixed number as a fraction greater than 1.

A rectangular garden is $3\frac{1}{2}$ yards long and $2\frac{1}{4}$ yards wide. What is the area of the garden?

To solve, find the product of $3\frac{1}{2} \times 2\frac{1}{4}$.

Write each mixed number as a fraction greater than 1.

$$3\frac{1}{2} = \frac{7}{2} \text{ and } 2\frac{1}{4} = \frac{9}{4}$$

Multiply the fractions and write the answer as a mixed number.

$$\frac{7}{2} \times \frac{9}{4} = \frac{63}{8} = 7\frac{7}{8}$$

The area of the garden is $7\frac{7}{8}$ square yards.

What is the product?

1. $3\frac{1}{2} \times 1\frac{1}{2} =$ _____

2. $1\frac{5}{8} \times 2\frac{2}{3} =$ _____

3. $1\frac{3}{5} \times 1\frac{1}{3} =$ _____

4. $4\frac{3}{4} \times 5\frac{2}{5} =$ _____

5. $4\frac{1}{2} \times 2\frac{4}{5} =$ _____

6. $2\frac{1}{3} \times 2\frac{2}{3} =$ _____

7. Walter ran $3\frac{2}{5}$ miles yesterday. Today he ran $1\frac{1}{2}$ times as far. How many miles did Walt run today?

_____ miles

8. Wanda bought a plant that was $1\frac{1}{4}$ inches tall. After two weeks, the plant was $2\frac{1}{2}$ times as tall. How tall was the plant after two weeks?

_____ inches

9. Jodie's backpack weighs $2\frac{3}{8}$ pounds. Jeff's backpack weighs $1\frac{3}{4}$ times as much as Jodie's backpack. How much does Jeff's backpack weigh?

_____ pounds

10. Kyla lives $1\frac{2}{3}$ miles from the park. The library is $2\frac{1}{3}$ times as far from Kyla's house. How far is the library from Kyla's house?

_____ miles



With your child, create a set of 9 number cards, each with one of the digits 1 through 9. Turn them facedown and have your child select 6 of the cards. Use the digits to form two mixed numbers. Write the mixed numbers as fractions greater than 1 and multiply. Try to get a product that is as great as possible and then rearrange the numbers to get a product that is as low as possible. Then replace the cards and repeat the activity.