



Name: _____ Date: _____

Student Exploration: Toy Factory

Vocabulary: denominator, equivalent, fraction, numerator, simplify

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

Look at the set of stuffed animals shown to the right.



1. Grace says half the toys are giraffes. Is she correct? _____

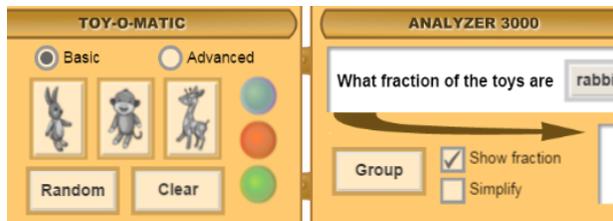
Explain. _____

2. Bobby says that half the toys are monkeys. Is he correct? _____ Explain. _____

3. Louis says that half the toys are red. Is he correct? _____ Explain. _____

Gizmo Warm-up

Welcome to the *Toy Factory* Gizmo! Using the brand-new **TOY-O-MATIC** machine, you can create stuffed monkeys, rabbits, and giraffes by clicking the buttons. The **ANALYZER 3000** tells you what fraction of each toy you have.



Click each animal button once to produce a set of toys: one monkey, one rabbit, and one giraffe.

1. How many toys are there, total? _____

2. How many toys are monkeys? _____

3. A **fraction** shows how a part of a set is related to the whole set. Check that the **ANALYZER 3000** is set to “What fraction of the toys are **monkeys**?”

Check that **Show fraction** is on. What fraction of the toys are monkeys? _____



Activity A: Monkey business	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Click Clear. • Check that Show fraction is turned on. 	
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You've just been hired to manage the Gizmo Toy Company's new factory. Your first job is to learn to use the equipment: the **TOY-O-MATIC** and the **ANALYZER 3000**.

1. On the **TOY-O-MATIC**, click the three animal buttons to create a set of toys. Make sure there is at least one of each kind. Record how many of each kind you have in your set.

Monkeys: _____ Rabbits: _____ Giraffes: _____ Total: _____

2. On the **ANALYZER 3000**, check that "What fraction of the toys are **monkeys**?" is selected.

A. What fraction of the toys are monkeys? _____

B. The **numerator** is the top number of a fraction. Place the cursor on the numerator.

What does the numerator refer to? _____

C. The **denominator** is the bottom number of a fraction. Place the cursor on the

denominator. What does the denominator refer to? _____

3. Turn off **Show fraction**. Write down the fractions of rabbits and giraffes in your set below.

Fraction of rabbits: _____

Fraction of giraffes: _____

Turn on **Show fraction** to check your answers. (Set the **ANALYZER 3000** to "What fraction of the toys are **rabbits**?" and to "What fraction of the toys are **giraffes**?")

4. Turn off **Show fraction** and click **Random**. Fill in the first two columns of the table below with the numbers and fractions.

Toy	Number	Fraction	Correct?
Monkey			
Rabbit			
Giraffe			
Total animals			

Use the **ANALYZER 3000** to check your answers. Correct your answers if necessary.



<p>Activity B: Bunny fractions</p>	<p><u>Get the Gizmo ready:</u></p> <ul style="list-style-type: none"> • Click Clear. • Turn off Show fraction. 	
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At the factory, you receive an order for 8 toys. The order also says that three-quarters ($\frac{3}{4}$) of the toys must be rabbits. How can this be done?

1. Create a set of 8 toys. Drag the toys so there are 4 equally-sized groups.

How many toys are in each group? _____

2. If $\frac{3}{4}$ of the toys are rabbits, then you should be able to make 3 groups of just rabbits and 1 group with no rabbits. Add and remove rabbits and rearrange the toys until you have this.

A. How many rabbits are there, total? _____

B. Turn on **Show fraction**. What fraction of the toys are rabbits? _____

3. Turn on **Simplify**. A **simplified** fraction is **equivalent** (equal) to another fraction but uses smaller numbers. What do you get when you simplify $\frac{6}{8}$? _____

4. Turn off **Show fraction** and **Simplify**. Click **Clear**. Create the following set: 2 monkeys, 4 rabbits, and 6 giraffes. Write the fraction of each kind of toy.

Monkeys: _____

Rabbits: _____

Giraffes: _____

5. Set the **ANALYZER 3000** to “What fraction of the toys are **monkeys**?” Turn on **Simplify**.

A. Click **Group**. How many equally-sized groups are there? _____

B. How many of the groups have only monkeys? _____

C. Turn on **Show fraction**. What is the simplified fraction of monkeys? _____

6. Turn off **Show fraction**. Using the same toys, find the simplified fractions of rabbits and giraffes. Write the original and simplified fractions. (The monkey fractions are done for you.)

Monkeys: $\frac{2}{12} = \frac{1}{6}$

Rabbits: _____ = _____

Giraffes: _____ = _____



<p>Activity C: Special orders</p>	<p><u>Get the Gizmo ready:</u></p> <ul style="list-style-type: none"> • Click Clear. • Choose the Advanced TOY-O-MATIC. 	
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With the new advanced **TOY-O-MATIC**, you can create colored toys by clicking a color and then clicking a toy. That's a good thing, because special orders are pouring in!

Describe a set of toys that would fill each special order. If you like, click the camera to take a snapshot of each order, and then paste the image into a blank document.

1. Ray's Toys wants 6 toys: $\frac{1}{3}$ of the toys should be red, and $\frac{1}{2}$ of the toys should be green.

Description: _____

2. Hilldale Toy World wants 8 toys: $\frac{3}{4}$ of the toys should be blue, $\frac{1}{4}$ of the toys should be giraffes, and there should be at least 4 monkeys.

Description: _____

3. Ye Olde Toy Shoppe wants a set of toys: $\frac{1}{4}$ of the toys should be blue, and $\frac{1}{2}$ of the toys should be green. $\frac{2}{3}$ of the toys should be giraffes, and $\frac{1}{4}$ of the toys should be monkeys.

Description: _____

4. The Spring Grove Drugstore wants 9 toys: $\frac{1}{2}$ of the giraffes should be green, $\frac{1}{4}$ of the monkeys should be blue, and $\frac{2}{3}$ of the rabbits should be red.

Description: _____

