

NTTI Media-Rich Lesson

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NAME

TRIPPING WITH TRIPLETS (THE THREE MATHKETEERS)

LESSON TITLE

6TH Grade

GRADE LEVEL

1 Hour - 1 class period

TIME ALLOTMENT

OVERVIEW

In grades 6-8, students should deepen their understanding of fractions, decimals, percents, and integers and they should become proficient in using them to solve problems. By solving problems that require multiplicative comparisons (e.g., “How many times as many?” or “How many per?”), students will gain extensive experience with ratios, rates, and percents, which helps form a solid foundation for their understanding of, and facility with proportionality. The study of rational numbers in the middle grades should build on students’ prior knowledge of whole-number concepts and skills and their encounters with fractions, decimals, and percents in lower grades and in everyday life. Students’ facility with rational numbers and proportionality can be developed in concert with their study of many topics in the middle grades curriculum. For example, students can use fractions and decimals to report measurements, to compare survey responses from samples of unequal size, to express probabilities, to indicate scale factors for similarity, and to represent constant rate of change in a problem or slope in a graph of a linear function.

The activities will review prior knowledge of fractions, decimals and percents. The activities will build on and extend students’ experience to become facile in using fractions, decimals, and percents meaningfully. Students will develop a deep understanding of rational numbers through experiences with a variety of models, such as fraction strips, number lines, 10 x10 grids, area models, and objects. These models will offer students concrete representations of abstract ideas and support students’



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meaningful use of representations and their flexible movement among them to solve problems. After exploring activities using fractions, decimals and percents, students will demonstrate what they have learned by participating in a mock trial as the culminating activity

SUBJECT MATTER

Mathematics, Language Arts, Science

LEARNING OBJECTIVES

Student will be able to:

- Use and recognize the fundamental characteristics of numbers and number systems including ordering, using number lines, and their relationship to fractional and decimal parts; understands development and use of place value in the base 10 system; and uses and recognizes the general descriptive properties of numbers.

Examples include: identifying, representing, naming, writing, comparing, and ordering numbers (whole, fractions, and decimals); understanding basic arithmetic operations; classifying and sorting numbers by their basic characteristics; recognizing place value and notation; and rounding and estimating numbers.

Standards

National Council of Mathematics Grades K-12

<http://www.nctm.org/standards/standards.htm>

Georgia Quality Core Curriculum (QCC)

<http://www.glc.k12.atlanta.ga.us>

Standard 29

Standard 35

Problem solving

30 **Topic:** Equivalent Representations

Standard: Uses fractions, decimals, and percents interchangeably (e.g., $\frac{1}{4}$, .25, 25%).

Communication

- *Organize and consolidate mathematical thinking through communication*



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- *Communicate mathematical thinking coherently and clearly to peers, teachers and others*
 - *Analyze and evaluate the mathematical thinking and strategies of others*
 - *Use the language of mathematics to express mathematical ideas precisely*
-

Video: Eddie Files #104 Fractions Anyway You Slice It #104

Video: [Eddie Files](#) [Take a Bite](#)

<http://peachstar.unitedstreaming.com> – [Mathematical Eye: Fractions and percentages](#)

MEDIA COMPONENTS

Websites

http://nssdc.gsfc.nasa.gov/planetary_factsheet/index.html

Title: Decimals, Graphs, and Grooves

Individual or small group online activity. Students tally data at a Web site, use data to create a graph, write fractions using the raw or graphed data, and represent fractions as decimals. Student worksheet and answer key provided.

MATERIALS FOR LEARNING ACTIVITIES

Student Journal

Fraction pies

Equivalent fraction worksheet

Career Worksheet

Fraction – Decimal – Percent Worksheet

Science Fact Worksheet

PREP FOR TEACHERS

Make sure that all Websites are book marked on all the computers in the room. Make sure all links are still valid. Cue your videotape to the first segment you are going to use in the learning activity.



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Make sure you have all materials for each activity

Introductory Activity

Step 1

In these activities you will record notes in your journal. You will learn how to write and apply fractions as decimals and percents. The activities will prompt you to calculate ratios in different combinations to develop understanding of how ratios and proportions are related. As students enter the class, they are told to take out their journal and prepare to view the video clip. Ask students if they can give you a fraction and second fraction that is equivalent to the first fraction. Write the fractions on their paper and why they think that the fractions are equivalent. Ask students for the fraction and equivalent fraction they have put on their paper. Write it on the overhead. Listen to the explanation for the response. Continue to write fractions and equivalent fractions on the board until you have six different ones on the board. **Check for understanding by** asking students if one fraction from a set is equivalent to a fraction in another set. How do we compare fractions? Provide **FOCUS FOR MEDIA INTERACTION by** asking the students to log on to the internet at <http://peachstar.unitedstreaming.com> and click on Mathematical Eye; Fractions and Percentages. View the video and see if they can find the answer to the question as they complete the worksheet. They will listen for equivalent fractions and write them in the appropriate spaces on their worksheet. **Stop** the video after Uncle Uso solves the problem. Ask students to write the answer to how Uncle Uso solves the problem. Discuss the equivalent fractions that were given in the clip. Write these on the overhead if they were different from the ones that are on the overhead. Tell the students that the equivalent fractions you have written are called proportions. If a ratio (the fraction) is equivalent to another ratio (fraction) they are said to be proportional. Ask students to look at the equivalent fractions that have been written and see if they can come up with a method for a relationship. Look at $2/6 = 1/3$; $3/6 = _$ (If you multiply $2 \times 3 = 1 \times 6$ and $3 \times 2 = 1 \times 6$. If no one says that this is cross product then you will show them this on the overhead and draw circles around the numbers being multiplied . To check for understanding ask students to Think pair share. One student writes a fraction and another student write the equivalent fraction and they both check each others work using cross product.

Step 2

Students will learn that the key to solving proportions is multiplication. Ask if $_ = 5/6$ Students should multiply 3×6 and 4×5 . the products should be 18 and 20 . Ask students is $18 = 20$? They should answer no and answer that 18 is less than 20. Can we say that $_$ is less than $5/6$? Listen to students respond. There should be circle fraction sections, fraction strips on the desk for students who may need to touch and feel to understand. Check for understanding by asking questions . Suppose I had a ratio and I only had a numerator or denominator on this side could I use what I have



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learned to find the missing numerator or denominator? Write these fraction for students to work. Show me in your journal what process was used.

$\frac{3}{5} = \frac{n}{10}$ and $\frac{3}{4} = \frac{6}{n}$ Walk around and look at students work. Check your neighbor's problem when you have finished. Did you and your neighbor have the same answer? Did everyone have the same answer? Let's do an application using higher order thinking skills.

If 3 cases of soda cost \$12.50; how much does 5 cases of soda cost?

Students should write 3 for 12.50 = 5 for ?(n)

Solving this we get $\frac{3}{12.50} = \frac{5}{n}$

$$3 \times n = 12.50 \times 5$$

$$3n = 62.50$$

$$\frac{3n}{3} = \frac{62.50}{3}$$

$$n = 20.8$$

Remember that you divide by 3 on both side

3s divide out

and remainder $\frac{1}{3}$ and the store gets the penny

so 5 cases of soda cost \$20.81 not 20.9. Why (because this is money 20.8 is \$20.80). You see how important ratios are? What careers can you think of that use fractions? Allow students to write in their journals as you prepare the next video clip.

Insert the video "Anyway you slice it " and fast forward to Sal Pizza and say "We are going to view a video about how people use fractions in their work."

STEP 3

Students will see how certain careers use fractions in their work. Provide a **FOCUS FOR MEDIA INTERACTION**, asking students to listen for the careers and how knowledge of fractions is important to each career. Complete the listening activity sheet. Students will hear about the careers of Pizza maker, Chief Cook, Photographer, (male and female photographer) and Drummer. Pause the video between the careers to allow students a chance to complete the writing assignment on each career.

Step 4

Say now that we know how to determine when a fraction is equivalent, less than or greater than can you tell me another representation of a fraction. How can I write an equivalent expression for $\frac{1}{2}$, $\frac{_}{_}$ or $\frac{1}{5}$? Write your answer down in your journal.

Students will see fractions written as decimals and percents

Insert the video "Take A Bite". Cue the tape to the lady in the painters outfit, mixing colors in solutions.

Provide your students with a **FOCUS FOR MEDIA INTERACTION**

Students are asked to view the video and write in their journal the definition of "percent" that is used in the clip and the use of percents in real world connections.



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. Stop the video after fractions, decimals and percents have been shown in real world connection. Students will complete the worksheet. What is a percent? Percent means something out of one hundred. The symbol for percent %. 20 out of a hundred is 20/100. How can you write this as a decimal? .20 You can represent 20/100 as a fraction and as a decimal and as a percent. Put this in your journal and draw a rectangle around it.

FRACTION 20/100 = 1/5 DECIMAL .20 PERCENT 20%
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Culminating Activity

Students will apply skills learned in the lessons by solving problems in planetary Science. This is a **Cooperative Learning Activity**.

The class will examine the weight of the Three Mathsketeers (.1, 1/10, 10%). These triplets weigh 170 lbs on earth and the class will take a Moon Walk and compute the weight of the Three Mathsketeers on the Moon. Set the stage by asking the students the following questions.

Have you seen the astronauts in space?

How do earth compare to out in space? There is no gravity

What is gravity? (the force that pushes a body down toward earth)

Is that why astronauts have been seen floating in space (yes)

What is weight? (The pull of gravity on the mass of an object)

What is the relationship of gravity to weight? (If you double the gravity, you double the weight.)

Does earth have more or less gravity than the moon?

Provide your students with a **FOCUS FOR MEDIA INTERACTION**. They will find the answer to these questions on the Moonwalk worksheet and handout.

Ask students to find the gravity of the moon and earth and write it on the Moon Walk Worksheet. And answer the questions . Have students log on to NASA's National Space Science Data Center Fact Sheet at <http://nssdc.gsfc.nasa.gov/planetary/factsheet/index.html>.

Ask students what is earth's gravity (9.8m/s²)

What is the Moons gravity? (1.6m/s²)

Write a proportion using the gravity facts to help calculate the weight of each triplet on the Moon. ($170/9.8 = n/1.60$, where n represents the weight of one triplet on the moon.

Check for understanding. Walk around and look at students' work.

Equal ratios make a proportion, only if they are written in the same comparative order, remember 4/6 does not equal or is not equivalent to 6/4

Calculate the weight to the nearest tenth of a pound, nearest whole pound



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What would a triplet weigh on Mars?

Extended Activity

Draw a circle and answer the questions/statements

1. Identify the center of the circle by drawing a line segment from one side through the center to the other side. What is this line called (diameter)
2. Write the planets with the diameter larger than earth (Jupiter, Uranus, Saturn, Neptune)
3. Write the planets with diameter smaller than earth (Mercury, Mars, Pluto, Venus)
4. Is there a relationship between the diameter and gravity?

CROSS-CURRICULAR EXTENSIONS

Science – National space Science Data Center Fact sheet at
<http://nssdc.gsfc.nasa.gov/planetary/factsheet/index.html>
Language Arts

COMMUNITY CONNECTIONS

Students may look in newspaper and find articles, advertisements that used percents and represent them as a decimal and a fraction. For additional insight into community-based projects, go to the *Making Family and Community Connections* site at www.thirteen.org/edonline/conceDt2class/month9.



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EQUIVALENT FRACTION WORKSHEET

MEDIA CLIP: FINDING FRACTIONS OF A WHOLE

When cutting a cake you want to cut the slices equally. Look at the clip and complete the table.

Number of slices	Number of people	Fraction per slice	Fraction	Eguivalent Fraction
2	2	1/2		

What happens if the fractions don't add up so easily. Watch the clip and answer the questions.

The Arab's will stated that his 19 camels should be divided as stated among his three sons.

Ali gets _ of the camels

Faruk get one quarter of the camels

Mustaffo, his younger son gets 1/5 of the camels . How can you help them solve this problem? Talk about it in your group. Write in your journal. Select a reporter to report out on your group's solution.

We will continue to view the video clip and compare our solutions.

How did Uncle Uso solve the problem?

Why didn't the fractions add up without the other camel?



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REPRESENTING FRACTIONS, DECIMALS AND PERCENTS

Listen to the video and complete the worksheet.

1. If you are going to mix colors, the key is having the right - _____.
 2. What is a percent?
 3. How do we write 20% as a fraction? _____
 4. How do we write 20% as a decimal? _____
 5. When we talk about percents we are dealing with _____
 6. Where do we see percents in the real world? Write about how percents are used in the real world.
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WHAT FRACTIONS GOT TO DO WITH IT?

CAREER	HOW DO YOU USE FRACTIONS?
Pizza Maker	
Chief Cook	<u>Too much or not enough</u>
Photographer	<u>Sharp</u> <u>Blurred</u>
Musician	<u>Notes</u>

Extension: What is the ratio of cuts in a pizza to the number of slices in a pizza?

Number of cuts	Number of slices
1	
2	
3	
4	
5	

What can you conclude?



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Planetary Fact Sheet - Metric

	<u>MERCURY</u>	<u>VENUS</u>	<u>EARTH</u>	<u>MOON</u>	<u>MARS</u>	<u>JUPITER</u>	<u>SATURN</u>	<u>URANUS</u>	<u>NEPTUNE</u>	<u>PLUTO</u>
<u>Mass</u> (10^{24} kg)	0.330	4.87	5.97	0.073	0.642	1899	568	86.8	102	0.0125
<u>Diameter</u> (km)	4879	12,104	12,756	3475	6794	142,984	120,536	51,118	49,528	2390
<u>Density</u> (kg/m ³)	5427	5243	5515	3340	3933	1326	687	1270	1638	1750
<u>Gravity</u> (m/s ²)	3.7	8.9	9.8	1.6	3.7	23.1	9.0	8.7	11.0	0.6
<u>Escape Velocity</u> (km/s)	4.3	10.4	11.2	2.4	5.0	59.5	35.5	21.3	23.5	1.1
<u>Rotation Period</u> (hours)	1407.6	-5832.5	23.9	655.7	24.6	9.9	10.7	-17.2	16.1	-153.3
<u>Length of Day</u> (hours)	4222.6	2802.0	24.0	708.7	24.7	9.9	10.7	17.2	16.1	153.3
<u>Distance from Sun</u> (10^6 km)	57.9	108.2	149.6	0.384*	227.9	778.6	1433.5	2872.5	4495.1	5870.0
<u>Perihelion</u> (10^6 km)	46.0	107.5	147.1	0.363*	206.6	740.5	1352.6	2741.3	4444.5	4435.0
<u>Aphelion</u> (10^6 km)	69.8	108.9	152.1	0.406*	249.2	816.6	1514.5	3003.6	4545.7	7304.3
<u>Orbital Period</u> (days)	88.0	224.7	365.2	27.3	687.0	4331	10,747	30,589	59,800	90,588
<u>Orbital Velocity</u> (km/s)	47.9	35.0	29.8	1.0	24.1	13.1	9.7	6.8	5.4	4.7
<u>Orbital Inclination</u> (degrees)	7.0	3.4	0.0	5.1	1.9	1.3	2.5	0.8	1.8	17.2
<u>Orbital Eccentricity</u>	0.205	0.007	0.017	0.055	0.094	0.049	0.057	0.046	0.011	0.244
<u>Axial Tilt</u> (degrees)	0.01	177.4	23.5	6.7	25.2	3.1	26.7	97.8	28.3	122.5



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Mean Temperature (C)	167	464	15	-20	-65	-110	-140	-195	-200	-225
Surface Pressure (bars)	0	92	1	0	0.01	Unknown*	Unknown*	Unknown*	Unknown*	0
Number of Moons	0	0	1	0	2	60	31	21	11	1
Ring System?	No	No	No	No	No	Yes	Yes	Yes	Yes	No
Global Magnetic Field?	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Unknown
	MERCURY	VENUS	EARTH	MOON	MARS	JUPITER	SATURN	URANUS	NEPTUNE	PLUTO

* - See the [Fact Sheet Notes](#).

[Planetary Fact Sheet in U.S. Units](#)

[Planetary Fact Sheet - Values compared to Earth](#)

[Index of Planetary Fact Sheets](#) - More detailed fact sheets for each planet

[Notes on the Fact Sheets](#) - Explanations of the values and headings in the fact sheet

[Schoolyard Solar System](#) - Demonstration scale model of the solar system for the classroom

[NSSDC Planetary Home Page](#)

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TRIPLET INFORMATION

CHANGING FRACTION, DECIMAL AND PERCENT

FRACTION	DECIMAL	PERCENT
<i>To change to a decimal:</i> Divide numerator by the denominator	<i>To change to a percent:</i> Shift the decimal point two places to the right and affix a percent symbol.	<i>To change to a decimal:</i> Shift decimal point two places to the left and delete the percent symbol.
<i>To change a percent;</i> First change to a decimal. Then shift the decimal point two places to the right and affix a percent symbol.	<i>To change a terminating decimal to a fraction:</i> <ul style="list-style-type: none"> a. Name the decimal position of the last digit. b. Multiply the digits by the decimal name of the last digit and reduce. 	<i>To change to a fraction:</i> Write as a ratio of the given number to 100 and reduce the fraction. If the percent involves a decimal, first write the decimal, first write the decimal in fractional form; then write as a ratio.

When you solve a percent problem, write a proportion using the three steps below:

1. Identify the percent first – it will be followed by the symbol % or the word percent. Write it as a fraction:

$$P/100$$

2. Identify the whole quantity next – it is preceded by the word of. It is the denominator of the second fraction in the proportion:

$$P/100 = N/W$$

3. The remaining number is the partial amount - it is the numerator of the second fraction in the proportion:



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Assessment

	Fraction	Decimal	Percent		Fraction	Decimal	Percent
1.					$\frac{1}{2}$		
2.		.75				.85	
3.			65%				45%
4.			120%				250%
5.		.7				.9	
6.	$\frac{1}{3}$				$\frac{2}{3}$		
7.	$\frac{1}{5}$				$\frac{2}{5}$		
8.		.05				.025	
9.			4%				8%
10.			6.5%				12.5%
11.		.375				.875	
12.	$\frac{3}{20}$				$\frac{1}{12}$		
13.	$\frac{13}{6}$				$\frac{14}{8}$		
14.		1.1				2.8	
15.			9.52%				6.38%

MOON WALK WORKSHEET

Directions: Log on to the NASA National Space Science Data Center fact sheet at <http://nssdc.gsfc.nasa.gov/planetary/factsheet/index.html>. Use the fact sheet and a calculator to answer the following questions.

1. Gravity of the moon : _____-/m²

2.Gravity of the Moon: _____/m²

3.How would you calculate the weight of a 170 lb. mathketeer on the Moon

4. Solve the proportion and write the answer in pounds

5. Calculate the weight of the mathketeer (170 pound) on

Mars

Jupiter

6. Use NSSDC fact sheet, list those planets that have a diameter smaller and larger than Earth
