



# Sixth Grade Math

Name \_\_\_\_\_

# Use Rate Reasoning to Convert Between Measurement Systems

**I Can** write and use equivalent ratios or conversion factors to convert units between measurement systems.

## Spark Your Learning



At Winnie’s restaurant, one serving of chicken soup is  $1\frac{1}{2}$  cups. The chef makes 48 cups of soup each night. How many servings of chicken soup are in 48 cups? Explain how you know.



$\frac{1}{2}$     $\frac{1}{2}$

$\frac{1}{2}$



**Turn and Talk** How is dividing fractions related to multiplying fractions?

Name \_\_\_\_\_

## Use Rate Reasoning to Convert Between Measurement Systems

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### Spark Your Learning

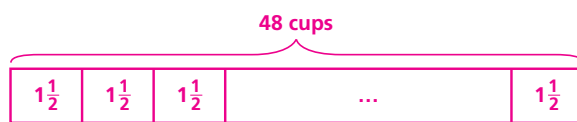
At Winnie's restaurant, one serving of chicken soup is  $1\frac{1}{2}$  cups. The chef makes 48 cups of soup each night. How many servings of chicken soup are in 48 cups? Explain how you know.



32 servings; Possible answers: Use fraction operations:

$$48 \div 1\frac{1}{2} = 48 \div \frac{3}{2} = 48 \times \frac{2}{3} = 32$$

Use a bar model:



There are 32 groups of  $1\frac{1}{2}$  cups.

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**Turn and Talk** How is dividing fractions related to multiplying fractions?

See possible answer to the right.

## 1 Spark Your Learning

### MOTIVATE

Introduce the problem. **Ask students:** What they know about serving sizes in a recipe. Have them share some of their experiences with the class.



### SUPPORT SENSE-MAKING Three Reads

Have students read the problem three times. Use the questions in the Three Reads box below for a different focus each time.

### PERSEVERE

If students need support, guide them by asking:

- Q Advancing • Use Tools** Which tool could you use to solve the problem? Why is this tool more strategic?  
*Students' choices of strategies and tools will vary.*
- Q Assessing** What does it mean when a serving size is  $1\frac{1}{2}$  cups and there are 48 total cups? *Possible answer: It means that the 48 cups need to be divided into parts that measure  $1\frac{1}{2}$  cups each.*
- Q Advancing** Could you use fraction operations to solve the problem? *yes; I could divide 48 cups by  $1\frac{1}{2}$  cups per serving.*



**Turn and Talk** If students are having a difficult time seeing the connection between fraction multiplication and fraction division, ask students to think about how they solved fraction multiplication problems in previous lessons. *Possible answer: Dividing and multiplying are related because they are inverse operations. Dividing by a fraction is the same as multiplying by its reciprocal.*



## SUPPORT SENSE-MAKING • Three Reads

Tell students to read the question stem three times and prompt them with a different question each time.

- 1** What is the situation about?  
*Possible answer: The number of servings that can be made from a batch of chicken soup*
- 2** What are the quantities in the situation?  
*48,  $1\frac{1}{2}$*
- 3** What are possible mathematical questions that you could ask for this situation?  
*Possible questions: What is the quotient of  $48 \div 1\frac{1}{2}$ ? How can you use subtraction to find the number of servings? How can you use addition to check your answer?*

### BUILD SHARED UNDERSTANDING

Select students who used various strategies and tools to share with the class how they solved the problem. Have students discuss why they chose a specific strategy or tool.

**UNIT**  
**3****Proportionality: Ratios and Rates****Performance Task**

1. Jorge planted flowers in his garden. He planted one row of 12 tulips and one row of 36 daisies. What is the ratio of tulips to daisies that Jorge planted? Express the ratio as a fraction and as a decimal.

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2. One of the plants in Jorge's garden grows at the rate of 2 inches in 3 months. A second plant grows at the rate of 3 inches in 2 months. Which plant grows at the faster rate? Explain.

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3. Jorge's friend Anna planted a garden with the same ratio of tulips to daisies. Anna's garden has 48 tulips. How many total flowers are in Anna's garden?

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4. Jorge's friend Kylie has a garden with 75 flowers in it. Kylie's garden only contains tulips and daisies. Is it possible for Kylie's garden to have the same ratio of tulips to daisies as Jorge's garden? Explain why or why not.

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5. Jorge wants the ratio of tulips to daisies in his garden to be 2 to 5. He does not want to take any flowers out of his garden. How many of what type of flower should he plant in order to get the desired ratio?

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6. Jorge wrote the following key for a scale drawing of his garden:

$$1 \text{ cm} = 2 \text{ ft}$$

Express this scale as inches to feet.

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UNIT  
3

Proportionality: Ratios and Rates

Performance Task

1. Jorge planted flowers in his garden. He planted one row of 12 tulips and one row of 36 daisies. What is the ratio of tulips to daisies that Jorge planted? Express the ratio as a fraction and as a decimal.

$\frac{12 \text{ tulips}}{36 \text{ daisies}} = \frac{1 \text{ tulip}}{3 \text{ daisies}}$  or 0.33 tulips to daisies.

2. One of the plants in Jorge's garden grows at the rate of 2 inches in 3 months. A second plant grows at the rate of 3 inches in 2 months. Which plant grows at the faster rate? Explain.

Plant 1  $\frac{2 \text{ in}}{3 \text{ m}} = \frac{4 \text{ in}}{6 \text{ m}}$  Plant 2 grows faster. In 6 months, it will be 9 inches tall!

Plant 2  $\frac{3 \text{ in}}{2 \text{ m}} = \frac{9 \text{ in}}{6 \text{ m}}$

3. Jorge's friend Anna planted a garden with the same ratio of tulips to daisies. Anna's garden has 48 tulips. How many total flowers are in Anna's garden?

$\frac{1 \text{ tulip}}{3 \text{ daisies}} = \frac{48 \text{ tulips}}{144 \text{ daisies}}$   $144 + 48 = 192$  total flowers.

4. Jorge's friend Kylie has a garden with 75 flowers in it. Kylie's garden only contains tulips and daisies. Is it possible for Kylie's garden to have the same ratio of tulips to daisies as Jorge's garden? Explain why or why not.

No. Jorge has a 1:3 ratio of tulips to daisies, with a total of 4 flowers. Because 4 is not a factor of 75, you cannot scale evenly and keep the same ratio relationship. However, you can scale to a total of 72 flowers with

5. Jorge wants the ratio of tulips to daisies in his garden to be 2 to 5. He does not want to take any flowers out of his garden. How many of what type of flower should he plant in order to get the desired ratio?

Jorge can add 12 tulips and 36 daisies to get a new ratio of  $\frac{24 \text{ tulips}}{60 \text{ daisies}}$ . He should plant 24 tulips and 60 daisies. a ratio of  $\frac{18 \text{ tulips}}{54 \text{ daisies}}$ .

$\frac{24 \text{ tulips}}{60 \text{ daisies}} = \frac{2 \text{ t}}{5 \text{ d}}$

Need:

1 inch = 2.54 cm

6. Jorge wrote the following key for a scale drawing of his garden:  
1 cm = 2 ft

Express this scale as inches to feet.

$\frac{1 \text{ cm} \times 2.54}{2 \text{ ft} \times 2.54} = \frac{2.54 \text{ cm}}{5.08 \text{ ft}} = \frac{1 \text{ in}}{5.08 \text{ ft}}$  1 in = 5.08 ft.

I substituted 2.54 cm for 1 inch in order to scale up to 5.08 ft.





# Sixth Grade Social Studies

# Gifts of Ancient China

Do you enjoy fireworks or playing with a yo-yo? Thank the Chinese for these inventions! As you hold this edition of Studies Weekly, you should know the Chinese first developed paper and block printing. People in other cultures were using clay tablets and woven papyrus reeds. And, if they wanted to copy something, they did it by hand. Chinese block printing made books easier to print. Do you use a toothbrush or like playing soccer? Scientists think these originated in China thousands of years ago, too.

The Chinese gave the world many gifts. Paper money, eyeglasses, umbrellas, waterproof clothing and the harness and stirrup were all Chinese inventions. The ancient Chinese were the first to use coal for heating and made cloth from the cocoons of silkworms. They used kites as a form of communication, not just as something to do on a windy day. The Chinese made the first compasses using lodestone. They invented gunpowder for firecrackers, not weapons. Some people also say the Chinese, not the Dutch, made the first windmills. In this issue, we will learn more about the ancient Chinese and their contributions to the world.

What do you know about the country of China? Ever hear of the Great Wall, the Forbidden City or Confucius? China is part of Asia and is the fourth-largest country in the world. People have lived in China since 5000 B.C., which makes it one of the world's oldest civilizations.

When you think of mummies, or preserved bodies, you probably think of the ancient Egyptians - but the Chinese have mummies, too. In the 1980s, the world learned about wonderfully preserved mummies from northwestern China. The Takla Makan mummies, as they are called, are more than

4,000 years old. That makes them hundreds of years older than the Egyptian mummy of King Tut. Archaeologists have found more than 100 mummies in China. One of the mummies is six feet, six inches tall. That's tall, even today. With long, reddish hair, this mummy has a purple-red suit and horizontally striped stockings of red, yellow and blue - pretty colorful. He also was found with not one, but 10 hats. Archaeologists also found a baby girl with red wool in her nostrils and little blue stones covering her eye sockets. She was buried with a cow-horn cup and a bottle.

What makes these mummies even more unusual is that they are not Chinese - they share features commonly associated with Europeans today. How on Earth did these mummies with their pointed noses, blonde and red hair and deep-set eyes find their way into China thousands of years ago? No one knows!

1. The earliest documentation of fireworks dates back to 7th century China.
2. World's oldest paper book, dating to A.D. 256
3. A Han Dynasty (206 B.C. - A.D. 220) early compass
4. A Silk court robe from the 1890s
5. A Qing Dynasty banknote



**1** **The Chinese were great ancient \_\_\_\_\_.** x10

archeologists	horse racers
inventors	firemen

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**2** **Just as they have found them in the ancient country of Egypt, scientists have also found many wonderfully preserved \_\_\_\_\_ in China.** x10

trees	mummies
landscapes	dolls

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**3** **Why is it historically important to discuss the discovery of mummies in China?** x10

The Chinese mummies were better mummified than the mummies found in Egypt.	The Chinese mummies were much older mummies than those in Egypt, suggesting earlier civilizations there.
The Chinese mummies were found near water.	The Chinese mummies were wrapped in palm leaves.

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# Sixth Grade

## ELA

## Grade 6. ELA. Week 2

### Molly the dog, hit by a train makes a remarkable recovery at BARCS

Excerpt from the *Baltimore Sun* article by Mary Carole McCauley originally published January 26, 2016

Nearly one week after she was struck by an Amtrak train, Molly the pit bull is hopping happily around on her remaining three legs and licking every human face her tongue can reach.

"People can't believe she's the same dog who was hit last week by a train," says Bailey Deacon, communications director for the Baltimore Animal Rescue & Care Shelter, Inc -- commonly known as BARCS -- where Molly is recuperating.

Molly's ordeal began Wednesday night when the stray darted into an Amtrak tunnel in Baltimore and into the path of an oncoming train.

"The train conductor saw her run into the tunnel to his horror," Deacon says. "He knew he could not stop the train. There was absolutely nothing he could do."

Amtrak Police Officer Kevin McMullen, who works with service dogs, climbed down onto the track to try to help the frightened and bloody animal.

"Molly's left hind leg had been cut completely off all the way to her hip," Deacon says. "She had severed an artery, and she had lost more than half of her blood. She lost the end of her tail, and she had very large lacerations on her face and her side. It's a miracle she survived."

The pup sensed that McMullen was trying to help her.

"He picked her up in his arms," Deacon says. "As soon as he got her off the tracks, she began licking his face. She's such a sweet dog." Molly was taken to BARCS. The staff immediately scheduled the dog for surgery the following morning, even though the medical procedure was extremely expensive and there was a significant risk that Molly would die on the operating table.

"She had fought so much that we had to give her a chance," Deacon says. "As soon as we got her to the ER, she was trying to kiss everybody."

"Miracle Molly," the pit bull went to live on Valentine's Day with the police officer who rescued her and his girlfriend. "She's been curled up on my lap since we got her home yesterday," Amtrak Police Officer Kevin McMullen said. "I have three other dogs, and they're all big. Right now, I've just got a tiny little section of the couch to myself."

### Writing Prompts

This assignment is based on the article about 'Miracle Molly' and last week's story, "The Market Square Dog," by James Herriot. The story can be found inside the week one student resources on the [knoxschools.org](http://knoxschools.org) website or by visiting [commonlit.org](http://commonlit.org).

**Directions:** Choose **one** of the following prompts and write a complete essay or short story.

**Argument** - If the original owner of 'Miracle Molly' stepped forward to claim her, who would have more right to keep the dog? Should the dog be given to her former owner or stay with the police officer, Kevin McMullen, who rescued her on the train tracks?

**Expository** - Explain the way humans were motivated to care for stray dogs in both the fictional story "The Market Square Dog," and the news article about 'Miracle Molly'. Be sure to include details from both the article and the story in your response.

**Narrative** - Continue the fictional story, "The Market Square Dog," and describe what happens next or rewrite the story from the dog's point of view. Be sure to include the characters and setting from the original story.

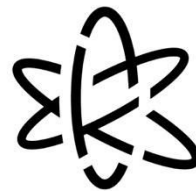
**KCS  home**

# **Sixth Grade Science**



# 6th Grade Science: Week 2 April 13

## Energy Transfer - Design Your Own Rube Goldberg Machine

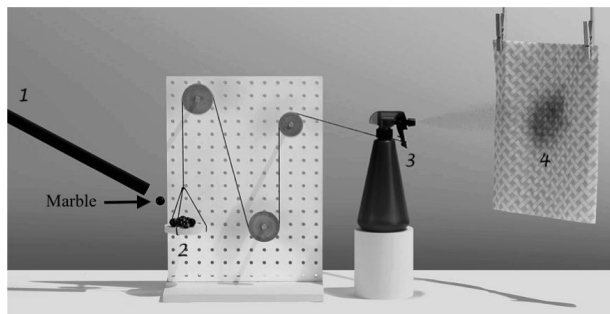
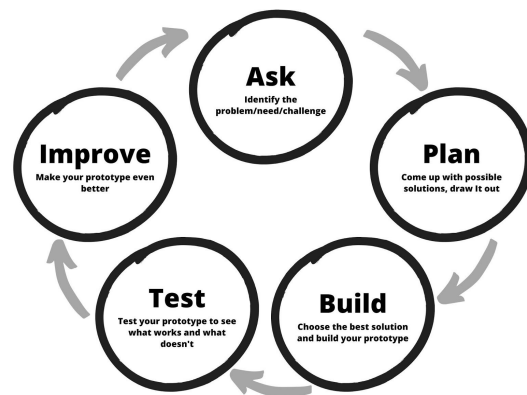


### Vocabulary:

- **energy**- the ability to do work
- **potential energy**- stored energy Examples: gravitational, chemical, elastic
- **kinetic energy**- energy in motion Examples: electrical, thermal, light, sound, mechanical
- **energy transfer**- energy converting from one type of energy to another
- **Law of Conservation of Energy**- energy cannot be created or destroyed, only converted from one type of energy to another.
- **engineering design process**- series of steps used to solve a problem

**Background Information:** Engineer and cartoonist Rube Goldberg is famous for his crazy machines that accomplish everyday tasks in an overly complicated way. His cartoon “inventions” drawn for pleasure can actually work. He believed that most people preferred doing things the hard way. The inventions that he designed are collections of bits and pieces that can do work in a creative and unusual way.

A Rube Goldberg Machine is a great way to show how energy can be transferred from potential to kinetic and kinetic back to potential. You can use the engineering design process to plan, build, test, and improve your machine.



"Complex Simplicity" by Jonathan Knowles is licensed under CC BY-NC-ND 4.0

Using this example, we can show several types of **energy conversions**. Before the marble is released, it has **gravitational potential energy**. As it moves through the tube, it has **mechanical energy** because it is moving. When the marble hits the tray, then falls down, it has **gravitational potential**. The string pulling the spring in the handle of the spray bottle is an example of **elastic potential**. You can also hear energy. **Sound energy**, a type of kinetic energy, can

be heard when the spray bottle releases the cleaning solutions. Keep in mind that each time energy is converted, there is also **thermal energy** being released due to friction.

**Problem/Need/Challenge:** Design and build a Rube Goldberg machine using the Engineering Design Process to complete a task that has at least 4 energy transfers using materials you have in your home.

**Procedure:**

**Step 1: Ask** *What is the problem/need/challenge?*

- What is the simple task that you are going to make complicated?

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- What chain reactions do you want your machine to do to show energy transfer?

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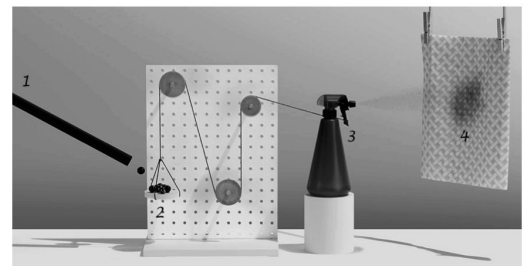
- Where can you build this?

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**Step 2(a): Plan** *Make a list of all your ideas for the parts you want in this machine. You can use anything in your home or outside, as long as you have permission. Don't use anything that is breakable or flammable. Examples of materials you can use: Dominos, paper tubes, string, marbles, egg cartons, cardboard, rubber bands, books, straws, bouncy balls, etc.*

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**Step 2(b): Plan** *Select the best ideas from your brainstorming. Draw the idea below and label all the parts of your machine. Be sure to number your chain reactions in the order that they would occur. Ex: 1) Drop or release the marble down the tube. 2) Marble rolls down the tube onto the tray. 3) The tray lowers down pulling the handle on the spray bottle. 4) The spray bottle then releases the cleaning solution.*



"Complex Simplicity" by Jonathan Knowles is licensed under CC BY-NC-ND 4.0

Use another sheet of paper if you need more room.

**Step 3: Build your Prototype.** *Build your Rube Goldberg machine.*

As you build consider, then answer the following questions:

1. Explain at least four of your energy transfers.

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2. How does your machine demonstrate the Law of Conservation of Energy?

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3. In what ways are you transforming potential energy into kinetic energy, then back to potential energy?

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4. What types of energy can be seen? (gravitational potential, elastic potential, chemical potential, light, sound, electrical, mechanical, thermal)

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**Step 4: Test your Prototype.** Test your machine 3 times. Don't change anything about your machine while we are testing. Record your results below. What happened each time you tried your machine? What needs to change?

Trail #	Results
EX:	<i>the marble is shooting over the landing spot so the tray is not dropping (see picture on page 1)</i>
1	
2	
3	

**Step 5: Improve your design.** *(Here is where the design cycle is great..... once you notice the improvements that need to be made, you have started the design cycle all over again!)* Draw or explain what your modifications were below.

Use another sheet of paper if you need more room.

**Now, repeat steps 4 and 5 as many times as you want!**

**Reflection:**

1. What energy transformations were taking place in your machine?

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2. Explain how you went through the steps of the design cycle again after finding ways to improve your design.

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3. What would you do differently if you had unlimited supplies to create a new machine?

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4. What did you learn about energy and energy transformations while completing this activity?

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5. If you could build another Rube Goldberg machine to complete a daily task, what would you want to create and why?

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