



## ***Chocolate Passion: Not just about Chocolate!*** **Dividing Fractions by Fractions (6<sup>th</sup> Grade Math) WebQuest**

### **Introduction**

Chocolate, chocolate, chocolate! You and your two partners love to eat chocolate! Milk chocolate, dark chocolate, white chocolate . . . you enjoy them all! As a business team, you decide that you want to share your chocolate passion with the rest of the world. You develop scrumptious recipes to make the finest chocolates. Word gets out and your business begins . . . the orders are pouring in! You name the business *Chocolate Passion*.

### **Task**

Wow! You are overwhelmed! While taking orders, making recipes and packaging shipments, you and your partners realize that the mathematical skills needed to run the business efficiently are missing. In particular, knowing how to divide fractions by fractions and when to do so is essential for survival! Your team realizes that there is more to running a business than just loving to munch on chocolate. Help!

**Roles:** You and your partners realize that you must act quickly to keep *Chocolate Passion's* customers satisfied. You must divide (ha!) and conquer! The team creates three, equally important, roles: Order Specialist (in charge of incoming orders), Recipe Analyst (in charge of making sure that ingredient amounts are correct), and the Packaging Supervisor (in charge of packaging for shipment).

### **Process**

Each business partner is assigned a role and completes the below tasks for his/her particular role.



### Order Specialist:

1. Complete all of the [ixl.com/math/grade-6](http://ixl.com/math/grade-6) links below to master the skills of knowing how and when to divide by fractions.
2. Prepare three word problems involving the use of fraction division related to processing orders. Create eight PowerPoint slides. Each slide must contain at least one graphic. The slides will be in the following format:  
Slide 1: Introduction (example: I am the Order Specialist for *Chocolate Passion*. Let's Learn How to Place Orders using Fraction Division!)  
Slide 2: Problem 1  
Slide 3: Problem 2  
Slide 4: Problem 3  
Slide 5: Solution to Problem 1 (show work!)  
Slide 6: Solution to Problem 2 (show work!)  
Slide 7: Solution to Problem 3 (show work!)  
Slide 8: Conclusion (be creative!)
3. Have your partners complete the problems to help them to understand the ordering process part of the business and to prove that your math skills have improved! They must complete your problems and show their work on paper and turn in to you before you reveal the solutions.

#### Example Problem:

Amy is placing an order and only has enough money to pay for  $\frac{7}{8}$  of a pound of dark chocolate. Amy wants each of her friends to get  $\frac{1}{3}$  pound of dark chocolate. How many friends can Amy send dark chocolate to?

#### Example Solution:

$(\frac{7}{8}) \div (\frac{1}{3}) = (\frac{7}{8}) \times (\frac{3}{1}) = \frac{21}{8} = 2 \frac{5}{8}$ . Amy can only order dark chocolate for 2 friends.



### Recipe Analyst:

1. Visit the sight, [webquest.internet4classrooms.com](http://webquest.internet4classrooms.com), and explore the various links. Complete the necessary activities until you have a good understanding of how and when to divide using fractions.
2. Prepare three word problems involving the use of fraction division related to adjusting the ingredient amounts of recipes. Create eight PowerPoint slides. Each slide must contain at least one graphic. The slides will be in the following format:
  - Slide 1: Introduction (example: I am the Recipe Analyst for *Chocolate Passion*. Let's Learn How to Adjust Recipes using Fraction Division!)
  - Slide 2: Problem 1
  - Slide 3: Problem 2
  - Slide 4: Problem 3
  - Slide 5: Solution to Problem 1 (show work!)
  - Slide 6: Solution to Problem 2 (show work!)
  - Slide 7: Solution to Problem 3 (show work!)
  - Slide 8: Conclusion (be creative!)
3. Have your partners complete the problems to help them to understand recipe adjusting and to prove that your math skills are sharp! They must complete your problems and show their work on paper and turn in to you before you reveal the solutions.

#### Example Problem:

Eddie, the chocolate master is having trouble keeping up with all the orders he has to fill. He is becoming flustered and has somehow misplaced all of the measuring cups except for the measuring cup that measures  $\frac{2}{3}$  cup. The recipe for milk chocolate teddy bears calls for  $1\frac{1}{2}$  cups of cream. How many times will Eddie have to fill up the  $\frac{2}{3}$  cup to have the correct amount of cream for the recipe?

#### Example Solution:

$(1\frac{1}{2}) \div (\frac{2}{3}) = (\frac{3}{2}) \div (\frac{2}{3}) = (\frac{3}{2}) \times (\frac{3}{2}) = \frac{9}{4} = 2\frac{1}{4}$ . Eddie will have to fill the  $\frac{2}{3}$  measuring cup  $2\frac{1}{4}$  times to get the amount of cream needed.



### Packaging Supervisor:

1. Complete all of the Khan Academy links below to master the skills of knowing how and when to divide by fractions.
2. Prepare three word problems involving the use of fraction division related to packaging orders. Create eight PowerPoint slides. Each slide must contain at least one graphic. The slides will be in the following format:  
Slide 1: Introduction (example: I am the Packaging Supervisor for *Chocolate Passion*. Let's Learn How to Package our Delicious Chocolates using Fraction Division!)  
Slide 2: Problem 1  
Slide 3: Problem 2  
Slide 4: Problem 3  
Slide 5: Solution to Problem 1 (show work!)  
Slide 6: Solution to Problem 2 (show work!)  
Slide 7: Solution to Problem 3 (show work!)  
Slide 8: Conclusion (be creative!)
3. Have your partners complete the problems to help them to understand the business's packaging department and to prove that your math skills are up to par! They must complete your problems and show their work on paper and turn in to you before you reveal the solutions.

#### Example Problem:

A small box of assorted chocolates weighs  $\frac{3}{4}$  of a pound. XYZ Company has ordered 24 boxes to give to its customers as appreciation gifts. Each cardboard shipping box can hold up to  $4\frac{1}{2}$  pounds. How many shipping boxes are needed to send the 24 small boxes of assorted chocolates?

Example Solution:  $(4\frac{1}{2}) \div (\frac{3}{4}) = (\frac{9}{2}) \div (\frac{3}{4}) = (\frac{9}{2}) \times (\frac{4}{3}) = \frac{18}{3} = 6$ . 6 small boxes of assorted chocolates can fit into 1 shipping box. Since 24 small boxes of chocolates are being sent,  $24/6$  (or 4) shipping boxes are needed.

## Dividing by Fractions Skill Building Websites:

### **ixl.com/math/grade-6 (Order Specialist)**

<http://www.ixl.com/math/grade-6/divide-by-fractions-with-models>

<http://www.ixl.com/math/grade-6/reciprocals>

<http://www.ixl.com/math/grade-6/divide-fractions>

<http://www.ixl.com/math/grade-6/estimate-quotients-when-dividing-mixed-numbers>

<http://www.ixl.com/math/grade-6/divide-fractions-and-mixed-numbers>

<http://www.ixl.com/math/grade-6/divide-fractions-and-mixed-numbers-word-problems>

### **Internet4classrooms (Recipe Analyst)**

[http://webquest.internet4classrooms.com/skill\\_builders/divide\\_fractions\\_math\\_sixth\\_6th\\_grade.htm](http://webquest.internet4classrooms.com/skill_builders/divide_fractions_math_sixth_6th_grade.htm)

### **Khan Academy (Packaging Supervisor)**

[https://www.khanacademy.org/math/arithmetic/fractions/multiplying\\_and\\_dividing\\_fractions/v/dividing-fractions](https://www.khanacademy.org/math/arithmetic/fractions/multiplying_and_dividing_fractions/v/dividing-fractions)

[https://www.khanacademy.org/math/arithmetic/fractions/multiplying\\_and\\_dividing\\_fractions/v/dividing-fractions-example](https://www.khanacademy.org/math/arithmetic/fractions/multiplying_and_dividing_fractions/v/dividing-fractions-example)

[https://www.khanacademy.org/math/arithmetic/fractions/multiplying\\_and\\_dividing\\_fractions/e/dividing\\_fractions\\_0.5](https://www.khanacademy.org/math/arithmetic/fractions/multiplying_and_dividing_fractions/e/dividing_fractions_0.5)

[https://www.khanacademy.org/math/arithmetic/fractions/multiplying\\_and\\_dividing\\_fractions/e/dividing\\_fractions](https://www.khanacademy.org/math/arithmetic/fractions/multiplying_and_dividing_fractions/e/dividing_fractions)

[https://www.khanacademy.org/math/arithmetic/fractions/multiplying\\_and\\_dividing\\_fractions/v/dividing-fractions-word-problem](https://www.khanacademy.org/math/arithmetic/fractions/multiplying_and_dividing_fractions/v/dividing-fractions-word-problem)

[https://www.khanacademy.org/math/arithmetic/fractions/multiplying\\_and\\_dividing\\_fractions/e/dividing\\_fractions\\_word\\_problems](https://www.khanacademy.org/math/arithmetic/fractions/multiplying_and_dividing_fractions/e/dividing_fractions_word_problems)

## Evaluation

Although you are to work together as a team to complete this project, each *Chocolate Passion* team member will be evaluated individually using the rubric below. One grade will be given for the completed project.

The understanding of the underlying mathematical principals, the PowerPoint slides, teamwork, and project completion (steps are: 1. Role Assignment; 2. Engage in Skill Building Websites; 3. Prepare three Word Problems; 4. Create PowerPoint; 5. Present PowerPoint to Partners; 6. Complete six Partner-Created Problems) will all be scored.

## **Math - Dividing Fractions by Fractions** ***Chocolate Passion: Not Just about Chocolate!***

Student Name: \_\_\_\_\_

CATEGORY	4	3	2	1	Score
<b>Mathematical Concepts</b>	The 3 problems created show complete understanding of the mathematical concepts being taught.	The 3 problems created show substantial understanding of the mathematical concepts being taught.	The 3 problems created show some understanding of the mathematical concepts being taught.	The 3 problems created show very limited understanding of the underlying concepts being taught.	
<b>Mathematical Errors</b>	90-100% of the solutions for the 6 partner-created problems have no mathematical errors.	Almost all (85-89%) of the solutions for the 6 partner-created problems have no mathematical errors.	Most (75-84%) of the solutions for the 6 partner-created problems have no mathematical errors.	More than 75% of the solutions for the 6 partner-created problems have mathematical errors.	
<b>Working with Others</b>	Student was an engaged team member, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged team member, but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.	
<b>PowerPoint Slides</b>	The 8 PowerPoint slides created follow the proper format. All slides contain a graphic.	Most of the 8 PowerPoint slides (6 to 7 slides) created follow the proper format. Most slides contain a graphic.	Some of the 8 PowerPoint slides (4 to 5 slides) created follow the proper format. Some slides contain a graphic.	Few of the 8 PowerPoint slides (3 or fewer slides) created follow the proper format. Few slides contain a graphic.	
<b>Completion</b>	All steps are completed.	All but one of the steps are completed.	All but two of the steps are completed.	Several of the steps are not completed.	
<b>Total Score:</b>					

## Conclusion

Congratulations! With your mouth-watering recipes, chocolate enthusiasm, and development of strong math skills (in particular, the skills of knowing how and when to divide by fractions), *Chocolate Passion* is bound for success! Great work chocolatiers!



## Teacher's Page

### Objective

The objective of this **WebQuest** is to teach and review with students how and when to divide using fractions. Realizing that this is a difficult concept for students to grasp, understanding and knowing when and how to apply the concept of fraction division in real life situations is the meat of this project. Technology plays a key role to create and maintain student engagement. Students use technology for research and skill building as well as for presenting their work.

### Helpful Vocabulary

**Divide:** To divide is to split into equal parts or groups. It is "fair sharing."

**Divisor:** The number you divide by. (dividend  $\div$  divisor = quotient)

Example: in  $12 \div 3 = 4$ , 3 is the divisor

**Dividend:** The amount that you want to divide up. (dividend  $\div$  divisor = quotient)

Example: in  $12 \div 3 = 4$ , 12 is the dividend

**Multiplicative Inverse:** Another name for Reciprocal (see below for definition).

**Quotient:** The answer after you divide one number by another.

(dividend  $\div$  divisor = quotient)

Example: in  $12 \div 3 = 4$ , 4 is the quotient

**Fraction:** Part of a whole. The bottom number (the denominator) says how many parts the whole is divided into. The top number (the numerator) says how many you have.

**Reciprocal:** To get the reciprocal of a number, just divide 1 by the number.

Example: the reciprocal of 2 is  $\frac{1}{2}$ . Every number has a reciprocal except 0 ( $1/0$  is undefined). Another name for Multiplicative Inverse.



## Standards

### Common Core State Standards for Mathematics

#### The Number System 6.nS

*Apply and extend previous understandings of multiplication and division to divide fractions by fractions.*

1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for  $(2/3) \div (3/4)$  and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that  $(2/3) \div (3/4) = 8/9$  because  $3/4$  of  $8/9$  is  $2/3$ . (In general,  $(a/b) \div (c/d) = ad/bc$ .) How much chocolate will each person get if 3 people share  $1/2$  lb of chocolate equally? How many  $3/4$ -cup servings are in  $2/3$  of a cup of yogurt? How wide is a rectangular strip of land with length  $3/4$  mi and area  $1/2$  square mi?

### International Society for Technology in Education - National Education Technology Standards (iste.nets)

#### 1. Facilitate and Inspire Student Learning and Creativity

Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

- a. Promote, support, and model creative and innovative thinking and inventiveness
- b. Engage students in exploring real-world issues and solving authentic problems using digital tools and resources
- c. Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes
- d. Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments

#### 2. Design and Develop Digital Age Learning Experiences and Assessments

Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS·S.

- a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity

## Credits

Common Core Standards for Mathematics . . .

[http://www.corestandards.org/assets/CCSSI\\_Math%20Standards.pdf](http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf)

Dividing Fractions by Fractions Skill Building Websites . . .

<http://www.ixl.com/math/grade-6/>

[http://webquest.internet4classrooms.com/skill\\_builders](http://webquest.internet4classrooms.com/skill_builders)

[https://www.khanacademy.org/math/arithmetic/fractions/multiplying\\_and\\_dividing\\_frac](https://www.khanacademy.org/math/arithmetic/fractions/multiplying_and_dividing_frac)

Graphics . . .

Chocolate Bars: <http://www.medicalnewstoday.com/articles/243387.php>

Order Specialist: <http://www.clipartof.com/gallery/clipart/computer.html>

Recipe Analyst: [http://foodsafetyauthorityindia.blogspot.com/2011\\_08\\_01\\_archive.html](http://foodsafetyauthorityindia.blogspot.com/2011_08_01_archive.html)

Packaging Supervisor: <http://www.clipartof.com/portfolio/toonaday/packaging>

Success: <http://www.illustrationsof.com/99966-royalty-free-success-clipart-illustration>

Iste.nets-t . . .

<http://www.iste.org/docs/pdfs/nets-t-standards.pdf?sfvrsn=2>

Vocabulary . . .

<http://www.mathsisfun.com/definitions/index.html>