

# Fractions Cooperatively: More than Just Fair Sharing

Daniel E. Schroll  
Loudoun County Public Schools  
Loudoun County, VA

Who am I, who are you?

- Introduce yourself to at least one person at your table you do not know.
  - Your name
  - What do you do?
  - 2 fractional statements about you.

---

---

---

---

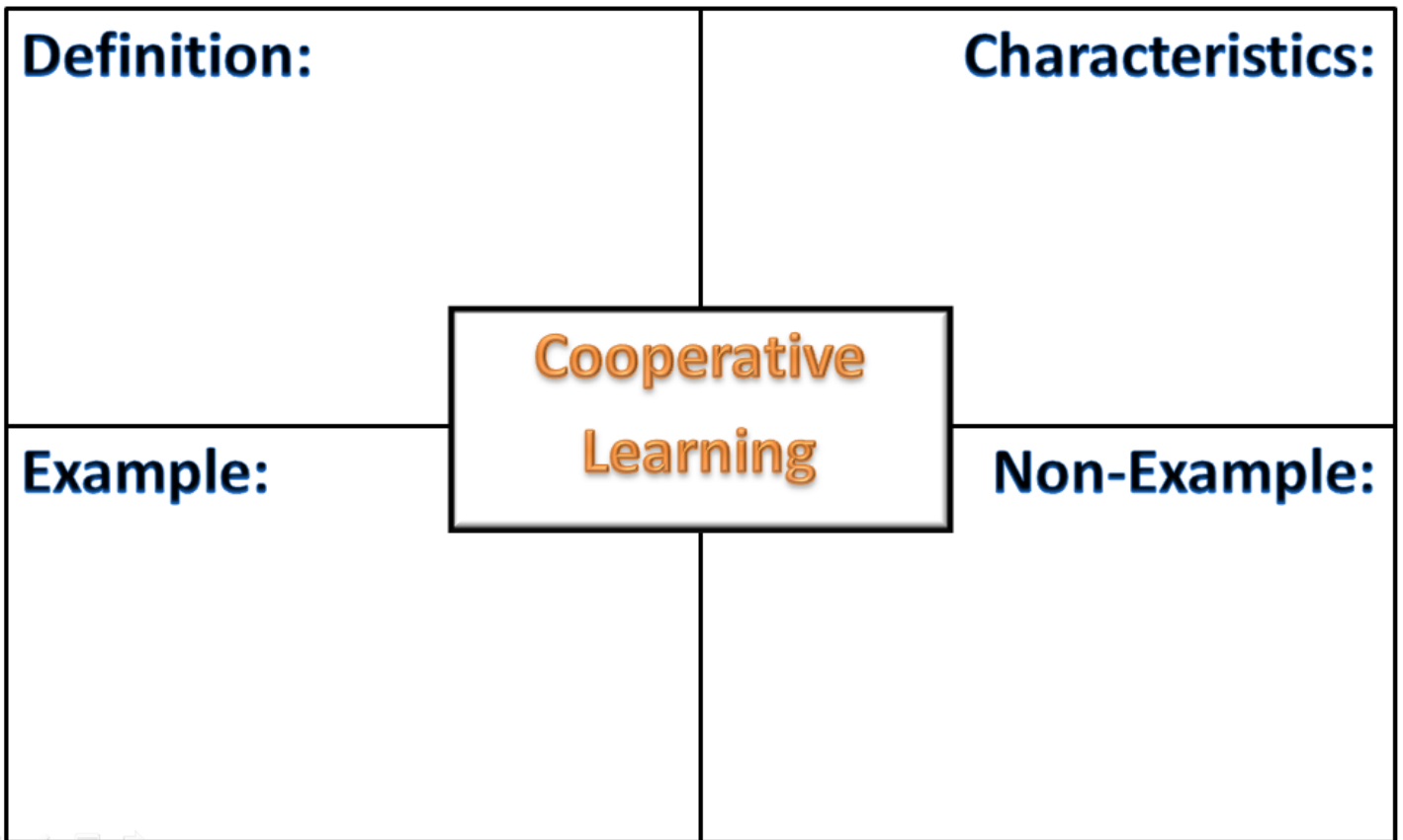
---

---

---

---

# What is Cooperative Learning?:



Why is Cooperative Learning Important?:

- ***Working cooperatively** is an **essential skill** needed in the public schools in order for the United States to continue to be competitive in the future.*

United States Department of Labor

- *Changes in the workplace increasingly demand teamwork, collaboration, and communication . . . **To be prepared** students must be able to **exchange ideas effectively with others**.*

NCTM (National Council of Teachers of Mathematics)

---

---

---

---

---

---

---

---

Benefits of Cooperative Learning:

- Provides a less threatening environment to ask questions, discuss ideas, make mistakes, and learn from each other.
- It allows students to be able to explore a situation from multiple angles.
- Promotes essential skills: Communication, Reasoning, and Problem Solving

---

---

---

---

---

---

---

---

*“Cooperative learning most often fails, because we fail to prepare.”*

~ Elizabeth Cohen  
Stanford University

Cohen, E. (1994). *Designing group work: Strategies for the heterogeneous classroom*. New York, NY: Teachers College Press.

---

---

---

---

---

---

---

---

## Skill Building: Broken Circle

- At each table is a bag of “broken circles.”
- Make sure each person has at least 2 pieces.
- As a table put the broken circle TOGETHER without talking or the use of gesturing to communicate.

---

---

---

---

---

---

---

---

*“There is no decision that teachers make that has a greater impact on students’ opportunities to learn and on their perceptions about what mathematics is than the selection or creation of the tasks with which the teacher engages students in studying mathematics.”*

~Lappan and Briars

Lappan, Glenda and Diane Briars. “How Should Mathematics Be Taught?” In *Its M. Carl (ed.), Seventy-Five Years of Progress: Prospects for School Mathematics* (Reston, VA: The National Council of Teachers of Mathematics, 1996), p. 131–156.

---

---

---

---

---

---

---

---

## TIPS: Choosing the right task

**P**romotes Working Together.

**A**ccessible to all students.

**C**lear goals.

**E**ncourage inquiry.

Adapted from *Effects of Cooperative Learning on Student Discourse*, Daniel Schraif, 2008

---

---

---

---

---

---

---

---

### Why do KIDS struggle with FRACTIONS?

- Fractions are often taught as an isolated unit, instead of being taught and exposed to throughout the year.
- We rush into computation and procedures before kids are ready.
- We make assumptions.
- We fail to make connections.

---

---

---

---

---

---

---

---

### Fraction Connections

**Measuring**      **Map skills (using scale)**  
Cooking              Percentages  
Telling time      Building  
**Weather**              Money  
Decimals      Driving  
Probability      Sewing  
**Lunar cycles**      Area  
Ratios              Sharing resources  
                                 evenly

---

---

---

---

---

---

---

---

ACTIVITY: Sandwich Fraction



- As a table group: Discover as many ways as you can to cut a peanut butter and jelly sandwich into quarters.

---

---

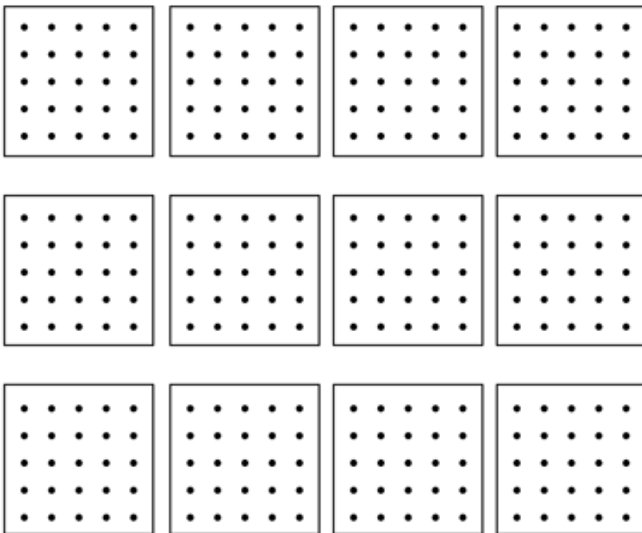
---

---

---

---

---



ACTIVITY: Sandwich Fraction

Discussion about the MATH:



What's the Big Math idea?

---

---

---

---

---

---

---

### Activity: Missing Photo

Mr. Jones lost his favorite picture of his family. He remembers some things about the picture. Using the clues recreate his family picture.

- |                             |                                    |
|-----------------------------|------------------------------------|
| 4/6 wearing hats            | 1/4 hats are blue                  |
| 2 people are children       | 3/4 hats are green                 |
| 1/2 children have blue eyes | 1/3 have red shirts                |
|                             | 1/2 of the red shirts have buttons |

---

---

---

---

---

---

---

---

### WORKSPACE:

### Activity: Missing Photo

#### Adaptations/Differentiation

- Use common denominators
- Number of clues
- Students look at a picture and write fractional clues for another group.

#### Discussion of the MATH:

- Equivalent fractions
- Defining the whole
- Set Model

---

---

---

---

---

---

---

---

Activity: Who has more gas in the tank?  
Who will pay more at the pump?



**Honda Pilot**  
**Capacity: 21 gallons**



**Kia Forte**  
**Capacity: 13 gallons**

---

---

---

---

---

---

---


---

THINKING SPACE:



# FAT fractions!

For a healthy diet, you should not eat too much fat each day. The USDA recommendation is about **60 g\*** of fat each day.

	Serving Grams	Calories	Calories from Fat	Total Fat (g)	Saturated Fat (g)	Trans Fat (g)	Cholesterol (mg)	Sodium (mg)	Carbohydrates (g)	Dietary Fiber (mg)	Sugars (g)	Protein (g)
<b>12" Medium Pan Pizza</b>	<b>1 slice (1 slice = 1/8 pizza)</b>											
Cheese Only	90	240	90	10	4	0	20	530	26	1	2	10
Pepperoni	88	250	110	12	4.5	0	25	630	26	1	2	10
Supreme	109	280	130	14	5	0	30	650	27	2	3	11
Super Supreme	119	300	140	15	6	0	30	770	27	2	3	12
Chicken Supreme	107	230	80	9	3	0	25	520	27	2	2	12
Meat Lovers®	109	320	160	18	7	0	40	820	26	1	2	13
Pepperoni Lovers®	101	300	140	15	6	0	35	790	27	1	2	13
Veggie Lovers®	105	220	80	9	3	0	15	500	27	2	3	9
Ultimate Cheese Lover's	89	260	110	12	4.5	0	25	530	26	1	2	11

Use the chart above to answer the following questions:

What fraction is 2 slices of pizza? \_\_\_\_\_

How much grams of fat are in 2 slices of Cheese Pizza? \_\_\_\_\_

If I ate 2 slices of Chicken Supreme, what fraction of my daily allowance of fat have I consumed? \_\_\_\_\_


**KEY**  
There are 60 squares. Each square represents 1 gram of fat.

\*60 grams is the recommendation for children and early adolescence and is based upon a 1,300 calorie diet.

### Nutrition Tracker:

You are on a trip and have to eat out for each of your three meals (breakfast, lunch, and dinner). While on the trip you are to keep track of the fat you consume and the fraction of the daily limit (60 grams). Try to stay as close to your daily limit without going over.

Food	Restaurant	Grams of fat	Fractions of Daily Limit	Fraction in Simplest Form

You may use the chart below to help you keep track:


**KEY**  
There are 60 squares. Each square represents 1 gram of fat.

## NUTRITIONAL INFORMATION

<p><b>Chick-Fil-A</b></p>  <p><a href="http://www.chick-fil-a.com/Food/Menu">http://www.chick-fil-a.com/Food/Menu</a></p>	<p><b>Chipotle</b></p>  <p><a href="http://www.chipotle.com/en-US/menu/nutrition_calculator/nutrition_calculator.aspx">http://www.chipotle.com/en-US/menu/nutrition_calculator/nutrition_calculator.aspx</a></p>	<p><b>Domino's</b></p>  <p><a href="https://order.dominos.com/en/pages/content/nutritional/cal-o-meter.jsp">https://order.dominos.com/en/pages/content/nutritional/cal-o-meter.jsp</a></p>
<p><b>Dunkin Donuts</b></p>  <p><a href="https://www.dunkindonuts.com/content/dunkindonuts/en/menu/nutrition/nutrition_catalog.html">https://www.dunkindonuts.com/content/dunkindonuts/en/menu/nutrition/nutrition_catalog.html</a></p>	<p><b>McDonald's</b></p>  <p><a href="http://www.mcdonalds.com/us/en/meal_builder.html">http://www.mcdonalds.com/us/en/meal_builder.html</a></p>	<p><b>Papa John's</b></p>  <p><a href="http://www.papajohns.com/menu/nutritional_info.shtm">http://www.papajohns.com/menu/nutritional_info.shtm</a></p>
<p><b>Starbucks</b></p>  <p><a href="http://www.starbucks.com/menu/nutrition">http://www.starbucks.com/menu/nutrition</a></p>	<p><b>Taco Bell</b></p>  <p><a href="http://www.tacobell.com/nutrition/information">http://www.tacobell.com/nutrition/information</a></p>	<p><b>Wendy's</b></p>  <p><a href="http://www.wendys.com/food/Nutrition.jsp">http://www.wendys.com/food/Nutrition.jsp</a></p>

# Activity: Healthy Fractions

- What math was involved?
- How could you adapt this task to your classroom?

Food Component	DV
Total Fat	65 grams (g)
Saturated Fat	20 g
Cholesterol	300 milligrams (mg)
Sodium	2,400 mg
Potassium	3,500 mg
Total Carbohydrate	300 g
Dietary Fiber	25 g
Protein	50 g
Vitamin A	5,000 International Units (IU)
Vitamin C	60 mg
Calcium	1,000 mg
Iron	18 mg

Information taken from the US FDA Daily Value Intake for children and adults 4 and over. Based upon a 2,000 calorie diet.

## Cooperative Learning: A Student's Perspective

- *"There is only one of you (referring to the teacher), and I might have missed something or not understood something. If you are busy; I have three people who are willing to help."*
- *"I like working in a small group because it keeps me focused and on task."*

## Cooperative Learning: A Student's Perspective

- *"Even though I prefer to work alone, we all benefit from sharing ideas, working together, and making those ideas better."*
- *"I did not like fractions; I hated them. My second grade teacher taught them over and over again, and I did not understand them. I would become frustrated. I couldn't see the point in learning fractions. . . . I love fractions, and can see that they are now very useful."*