OPEN A Smoothie Shop

promoting learning through PERFORMING in Education high-interest activities

Add Fractions with Unlike Denominators

PROJECT-BASED MATH

Name _____

Open a SMOOTHIE Shop

LESSON OUTLINE

You are planning a smoothie shop for your neighborhood. You are preparing to open your shop to a few friends to test out four signature smoothie recipes. You need to create your menu and buy supplies for your opening.

Driving Question: How can I create a smoothie shop that has enjoyable drinks in a range of flavors?

Follow the process below to complete your project:

#1 Plan a smoothie shop - pick a name, logo, and location.

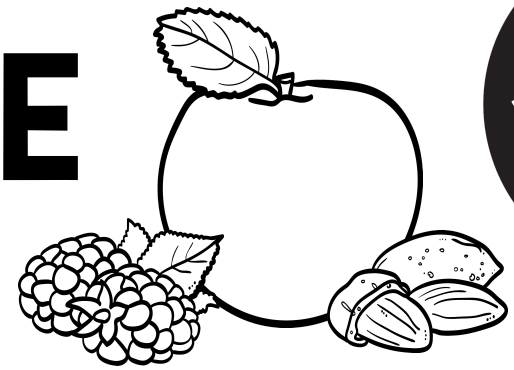
#2 Plan a menu.

#3 Calculate the amounts needed.

#4 Compare to available materials and create a shopping list.

#5 Re-evaluate and finalize the menu.

SMOOTHIE SHOPS



STEP 1

Under "K", write what you already know about smoothies and smoothie shops. Under "W", write what you want to know about running a smoothie shop. After completing your project, write what you learned about operating a smoothie shop under the "L".

Topic: _____

K	W	L

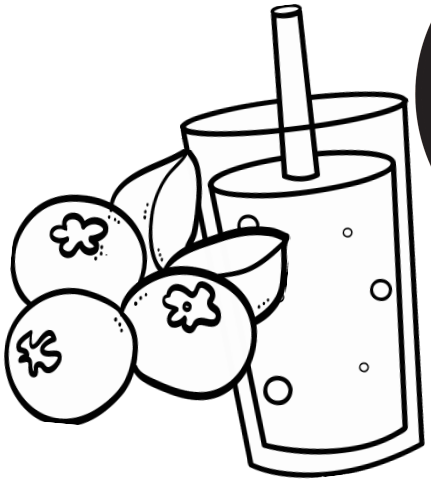
SMOOTHIE SHOP DESIGN

STEP 1

Create a name, logo, and location for your smoothie shop.

Use the grid below to draw a map of your neighborhood and label where you will put your smoothie shop.

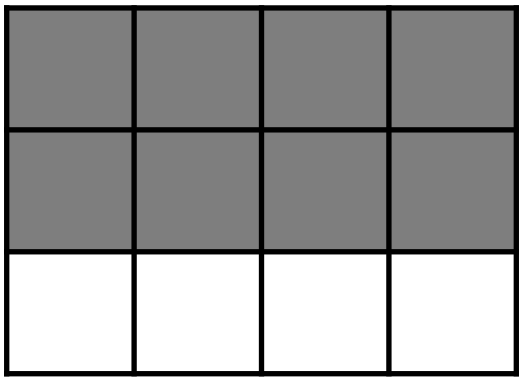
FRACTION CONCEPTS



STEP 1

Review fractions.

1 **What fraction of the shape is shaded?**



_____

2 **Find equivalent fractions.**

$\frac{1}{3} = \frac{\quad}{\quad}$

$\frac{1}{2} = \frac{\quad}{\quad}$

$\frac{2}{5} = \frac{\quad}{\quad}$

3 **Compare the fractions with <, >, and =.**

$\frac{1}{5} \bigcirc \frac{3}{5}$

$\frac{3}{4} \bigcirc \frac{2}{4}$

$\frac{3}{6} \bigcirc \frac{4}{8}$

4 **When do you use fractions in cooking?**

_____

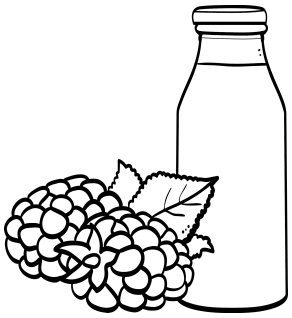
_____

_____

_____

_____

_____



ADDING FRACTIONS

STEP 1

When adding fractions, use the lowest common denominator. Check to see if you can simplify to lowest terms after adding.

Adding Fractions:

1. Find the lowest common denominator for both fractions.
2. Make equivalent fractions with the common denominator.
3. Add the numerators.
4. Simplify if possible.

Multiply numerator and denominator by 2 to make an equivalent fraction with a denominator of 10.

$$\frac{1}{5}\ \begin{matrix}\times 2\\ \times 2\end{matrix} + \frac{3}{10} = \frac{2}{10} + \frac{3}{10} = \frac{5}{10} = \frac{1}{2}$$

5/10 can be simplified to 1/2

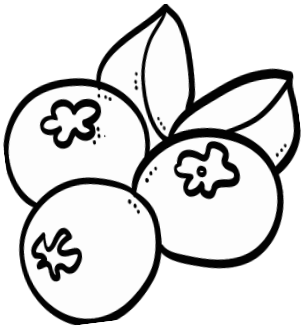
2/10 is equivalent to 1/5

Circle the addition problems with common denominators.

$$\frac{2}{8} + \frac{3}{5} \qquad \frac{2}{6} + \frac{5}{6} \qquad \frac{8}{10} + \frac{7}{12}$$

$$\frac{1}{7} + \frac{6}{7} \qquad \frac{4}{9} + \frac{3}{4}$$

FRACTION PRACTICE



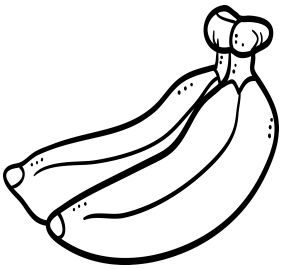
STEP 1

Practice adding fractions by adding the amounts of each item together.

1

Bananas: 2/3 cup

Raspberries: 2/3 cup



Total: _____

2

Almonds: 1/4 cup

Chocolate: 1/6 cup

Total: _____

3

Spinach: 1/2 cup

Kale: 1/2 cup

Total: _____

4

Strawberries: 2/3 cup

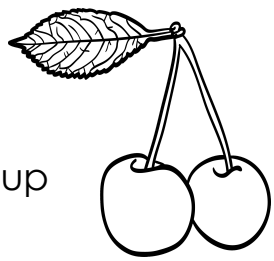
Honey: 1/4 cup

Total: _____

5

Cherries: 2/3 cup

Almond Milk: 3/4 cup



Total: _____

6

Cookies: 1/3 cup

Vanilla: 1/6 cup

Total: _____

RECIPE OPTIONS

STEP 2

DIRECTIONS

You need to choose items for your smoothie recipes. From the list of choices, pick at least 2 fruits or greens, one liquid, and one add-on item. Write your choices on the lines on the next page to create 4 different signature smoothie blends to sell at your shop.

SMOOTHIE ITEMS

Fruit	Amount	Liquid	Amount
Banana	2/3 cup	Almond Milk	3/4 cup
Blackberry	2/3 cup	Apple Juice	3/4 cup
Blueberry	2/3 cup	Coconut Milk	3/4 cup
Mango	2/3 cup	Oat Milk	3/4 cup
Pineapple	2/3 cup	Orange Juice	3/4 cup
Raspberry	2/3 cup	Soy Milk	3/4 cup
Strawberry	2/3 cup	Water	3/4 cup
Greens	**Amount**	**Add-Ons**	**Amount**
Kale	1/2 cup	Cinnamon	1/6 cup
Romaine Lettuce	1/2 cup	Cocoa Powder	1/6 cup
Spinach	1/2 cup	Cookie Pieces	1/3 cup
Swiss Chard	1/2 cup	Protein Powder	1/4 cup
Wheat Grass	1/4 cup	Vitamin Boost	1/3 cup

RECIPE OPTIONS

STEP 2

DIRECTIONS
You need to choose items for your smoothie recipes. From the list of choices, pick at least 2 fruits or greens, one liquid, and one add-on item. Write those choices on the lines to create 4 different smoothie blends.

Smoothie #1

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Smoothie #2

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Smoothie #3

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Smoothie #4

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

CALCULATE TOTALS

STEP 2

Look at your smoothie recipes. For each ingredient that is used more than once in your recipes, add the amount needed for each recipe to find out the total amount of each ingredient you will need to purchase.

EX

	Smoothie 1	2/3 cup
+	Smoothie 3	2/3 cup
=	Total needed	4/3 = 1 1/3 cup

Item: **Bananas**

1

Item: _____

2

Item: _____

3

Item: _____

4

Item: _____

5

Item: _____

CALCULATE TOTALS

STEP 2

Use this page if you need more space to determine totals for your smoothie recipes.

EX

	Smoothie 2	1/2 cup
+	Smoothie 3	1/2 cup
=	Total needed	1 cup

Item: Spinach

6

Item: _____

7

Item: _____

8

Item: _____

9

Item: _____

10

Item: _____

ADDING MIXED NUMBERS

STEP 3

Fractions that have a whole number and a fraction are called mixed numbers. When adding mixed numbers, add the fraction amounts first, then add the whole numbers. When adding mixed numbers it can be helpful to arrange them vertically.

Adding Mixed Numbers:

1. Find the lowest common denominator for all the fractions.
2. Make equivalent fractions.
3. Add the fractions.
4. Add the whole numbers.
5. Simplify if possible.

$$\begin{array}{r} 2\ \frac{2}{6} \\ +\ 1\ \frac{2}{3} \\ \hline \end{array} = \begin{array}{r} 2\ \frac{2}{6} \\ +\ 1\ \frac{4}{6} \\ \hline 3\ \frac{6}{6} \end{array} = 4$$

Rewrite the fractions with common denominators.

6/6 can be rewritten as 1 whole. 3 +1 = 4

Circle the fractions that have been simplified to their lowest terms.

$2\ \frac{2}{6}$ $\quad \frac{7}{8}$ $\quad 3\ \frac{2}{3}$ $\quad 4\ \frac{1}{4}$

$1\ \frac{5}{4}$ $\quad \frac{9}{5}$ $\quad 1\ \frac{6}{9}$ $\quad \frac{8}{12}$

MIXED NUMBER PRACTICE

STEP 3

DIRECTIONS
Add the mixed numbers. Simplify if possible.

1. $3\frac{2}{4} + 2\frac{1}{8}$ = _____

2. $1\frac{2}{6} + \frac{2}{3}$ = _____

3. $4\frac{1}{4} + 1\frac{1}{3}$ = _____

4. $5\frac{3}{10} + 2\frac{1}{5}$ = _____

5. $2\frac{4}{6} + \frac{3}{4}$ = _____

6. $6\frac{3}{5} + 4\frac{1}{3}$ = _____

PLAN AN OPENING

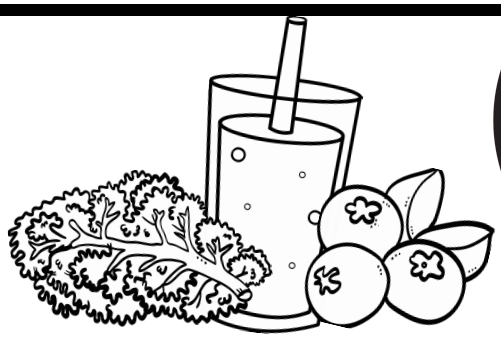
STEP 3

You are inviting 10 people to your opening. Make a list of the people who are coming and the smoothie each person orders. Determine the total quantity needed for each type of smoothie.

Person Invited	Smoothie Choice

Smoothie	Total Needed
#1	
#2	
#3	
#4	

PLAN AN OPENING



STEP 3

Looking back at your recipes, add the amounts you need for each item to make all 10 smoothies.

EX

4 smoothies need almond milk.

3/4 c + 3/4 c + 3/4 c + 3/4 c = 12/4 cup

12/4 cup = 3 cups

Almond Milk = 3 cups

1

Item: _____

2

Item: _____

3

Item: _____

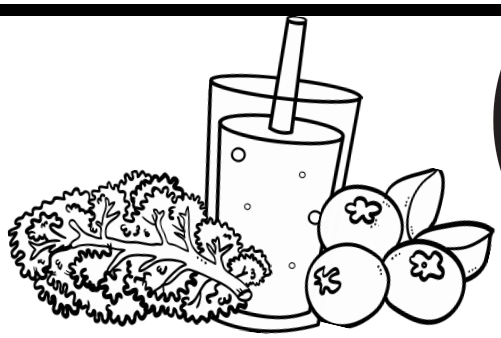
4

Item: _____

5

Item: _____

PLAN AN OPENING



STEP 3

Use this page if you need more space to determine totals for your smoothie recipes.

6

Item: _____

7

Item: _____

8

Item: _____

9

Item: _____

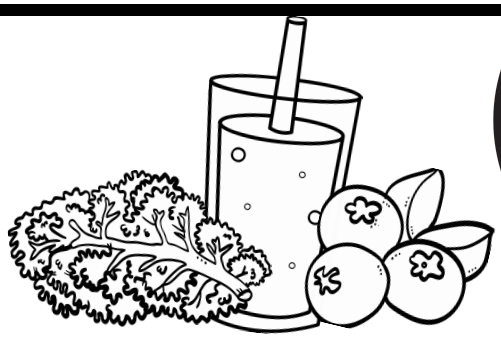
10

Item: _____

11

Item: _____

PLAN AN OPENING



STEP 3

Use this page if you need more space to determine totals for your smoothie recipes.

12

Item: _____

13

Item: _____

14

Item: _____

15

Item: _____

16

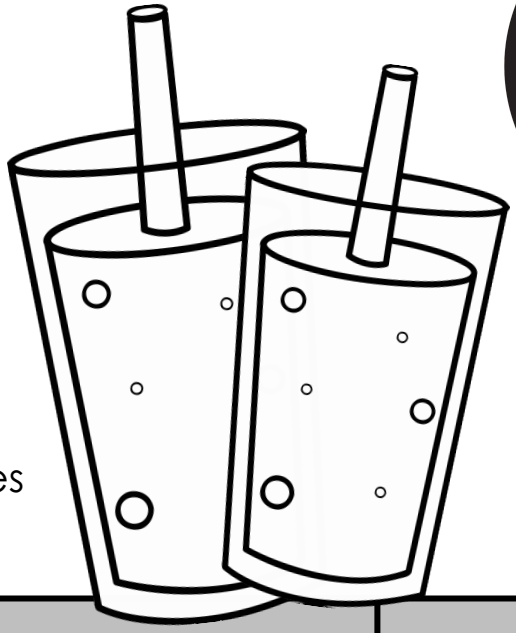
Item: _____

17

Item: _____

FIND TOTALS

STEP 3

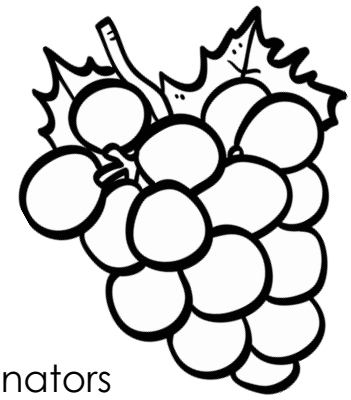


DIRECTIONS
Next to each available item, record the amount you will need to make smoothies for all 10 people.

SMOOTHIE ITEMS

Fruit	Amount	Liquid	Amount
Banana		Almond Milk	
Blackberry		Apple Juice	
Blueberry		Coconut Milk	
Mango		Oat Milk	
Pineapple		Orange Juice	
Raspberry		Soy Milk	
Strawberry		Water	
Greens	**Amount**	**Add-Ons**	**Amount**
Kale		Cinnamon	
Romaine Lettuce		Cocoa Powder	
Spinach		Cookie Pieces	
Swiss Chard		Protein Powder	
Wheat Grass		Vitamin Boost	

COMPARING FRACTIONS



STEP 4

When you compare fractions, first make the denominators equal. Then, compare the amounts.

Comparing Fractions:

1. Find the lowest common denominator for the fractions you are comparing.
2. Make equivalent fractions with the common denominator.
3. Compare.

$$\frac{4}{9} \bigcirc \frac{3}{4}$$

$\frac{4}{9}$: x 4 → $\frac{16}{36}$

$\frac{3}{4}$: x 9 → $\frac{27}{36}$

Multiply numerator and denominator by the same number to make an equivalent fraction.

$$\frac{16}{36} < \frac{27}{36}$$

Rewrite both fractions with the lowest common denominator.

Practice comparing the fractions using <, >, =.

1

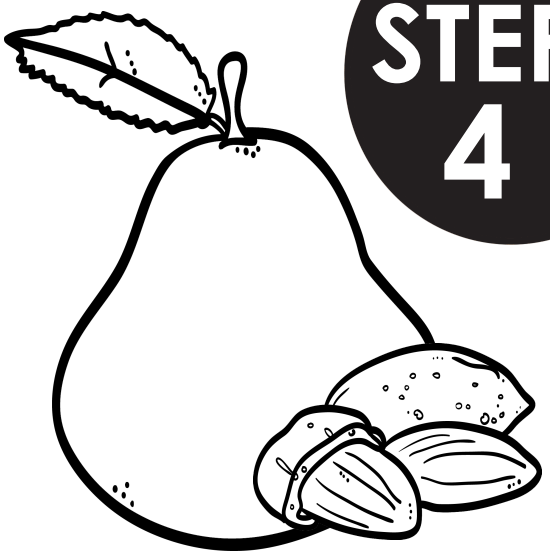
$$\frac{2}{5} \bigcirc \frac{3}{6}$$

2

$$\frac{4}{8} \bigcirc \frac{5}{10}$$

COMPARING PRACTICE

STEP 4



DIRECTIONS

Compare the two fractions using <, >, =. Show the equivalent fractions you used to compare the two fractions.

$\frac{7}{9} \bigcirc \frac{2}{3}$

$\frac{3}{5} \bigcirc \frac{3}{4}$

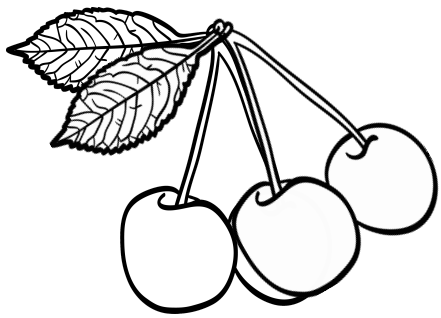
$\frac{4}{5} \bigcirc \frac{8}{10}$

$\frac{1}{2} \bigcirc \frac{4}{7}$

$\frac{6}{15} \bigcirc \frac{2}{3}$

$\frac{4}{6} \bigcirc \frac{7}{8}$

COMPARE AMOUNTS



STEP 4

Look at the list of available items. The amounts listed are the amounts the items are sold in. Record the amount you need of each item to make all 10 smoothies for your guests. On the next page, make a shopping list of supplies.

Fruit	Amount Per Package	Amount Needed	Liquid	Amount Per Package	Amount Needed
Banana	4 1/4 cups		Almond Milk	4 cups	
Blackberry	4 3/4 cups		Apple Juice	4 1/2 cups	
Blueberry	4 3/4 cups		Coconut Milk	3 1/2 cups	
Mango	3 2/3 cups		Oat Milk	3 1/2 cups	
Pineapple	3 2/3 cups		Orange Juice	4 1/2 cups	
Raspberry	4 3/4 cups		Soy Milk	3 1/2 cups	
Strawberry	4 1/2 cups		Water	5 cups	
Greens	**Amount Per Package**	**Amount Needed**	**Add-Ons**	**Amount Per Package**	**Amount Needed**
Kale	3 3/6 cups		Cinnamon	1/2 cup	
Romaine Lettuce	4 4/6 cups		Cocoa Powder	1 cup	
Spinach	3 3/6 cups		Cookie Pieces	2 1/2 cups	
Swiss chard	4 cups		Protein Powder	3 cups	
Wheat Grass	2 1/3 cups		Vitamin Boost	3 cups	

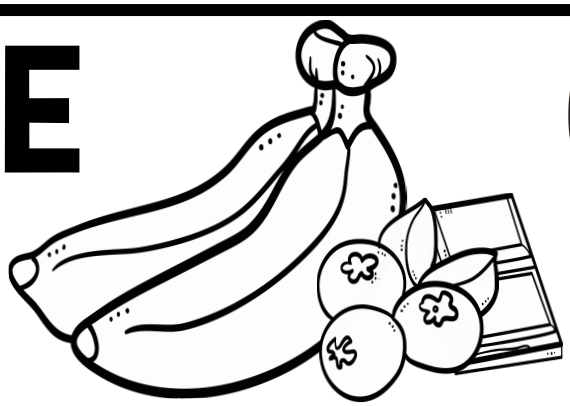
MAKE A SHOPPING LIST

STEP 4

Make a shopping list of materials you need. Compare the amount you need with the amount in one package. Remember to use common denominators when comparing. Decide if it is enough or if you will need to buy a second package.

ITEM	AMOUNT PER PACKAGE	<, >, =	Amount Needed	Is one package enough?	Number of packages needed

FINALIZE MENU



STEP 5

After your soft opening, you're ready to launch your smoothie shop to the public! Decide if you are making changes to your smoothies. Design your final menu. Include your logo, catchy names for your smoothie choices, and their ingredients.

#1_____

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

#2_____

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

#3_____

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

#4_____

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

SMOOTHIE SHOP WRAP UP

STEP 5

It's time to share your smoothie shop menu. Describe each of the things below and then explain how you made your decisions.

Smoothie Shop

1. Menu Items

How did you choose which items to include in your smoothies?

2. Signature Smoothies

How did you decide on names for your signature smoothies?

3. Extra Items

What other types of items would you like to include in your smoothies that weren't included on the list?

Explain how you made your decisions.

1. _____

_____

_____

_____

_____

_____

_____

2. _____

_____

_____

_____

_____

_____

_____

3. _____

_____

_____

_____

_____

_____

_____

RUBRIC

	4	3	2	1
Background & Information Gathering	Student took notes on the topic and asked relevant questions. Student researched beyond the class time provided.	Student took time in class to learn and take sufficient notes on the topic.	Very little effort was put into taking notes on the topic.	No effort was put into taking notes on the topic.
Collaboration	Student showed leadership in interactions with other students. They shared ideas and feedback and listened to ideas and feedback.	Student collaborated well with other students during the project. They shared ideas and feedback and listened to ideas and feedback.	Student had trouble sharing ideas and feedback and/or listening to ideas and feedback.	Student did not actively participate in collaboration opportunities.
Calculations	Student completed 100% of the math calculations correctly.	Student completed about 80% of the math calculations correctly.	Student completed about 60% of the math calculations correctly.	Student completed less than 60% of the math calculations correctly.
Project Wrap-up & Writing	Student created a writing piece that approached the topic from all angles and addressed all possible concerns.	Student created a writing piece that gave solid reasons and evidence to support their ideas.	Student created a writing piece that was missing key reasons and evidence. Their decisions were left unsupported.	Student did not attempt or finish the writing piece.
Visual Presentation	The students visual plan is drawn and labeled in an easy to understand manner. The went above and beyond to present their work and ideas in a unique way.	The students visual plan is drawn and labeled according to the directions.	Student's visual plan was difficult to understand or unprepared.	Student did not complete a full visual plan of their smoothie shop.