Small Group Collaboration

Modeling SKILL: 292 **NAME:** _____

Practice Standard: Reason abstractly and quantitatively.

INTRODUCTION

INDEPENDENTLY, READ THIS PAGE WHILE YOU'RE WAITING FOR YOUR GROUP.

Pick a Job for Yourself.

When you see this icon, you'll know you have something especially important to do for that page.

Journalist: _____

Make sure information is being written down and take notes if needed.

Questioner: _____

Ask questions to make things more clear or to challenge others to think differently.

Time-Tracker: _____

Notice the time, help remind others to keep focused, and move the group forward.

Materials Manager: _____

Make sure everyone has their materials, uses them properly, and puts them away.

Materials needed: pen/pencil, calculator (optional)

What is this skill?

This skill is about solving real world problems involving percentages.

What is the learning goal?

Your goal is to fill customer orders by using percentages to determine the total number of jellybeans, or the number of jellybeans of a certain color.

Why is this learning goal important?

This learning goal is important because understanding how percentages relate to parts and wholes is essential in working with money, rating performance, and making comparisons.

What mathematical vocabulary is important for this activity?

Whole	Total number of things in a sample set
Proportion	Two fractions that are equal, for example $\frac{1}{2} = \frac{3}{6}$
Part	The number of things in a sample set you are interested in
Percent	A number that shows a relationship to 100, represented by %

As soon as everyone is ready to go – turn the page and get started!

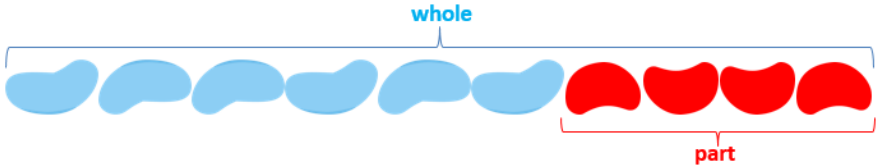
INFORMATION

Jelly Bean Jumble

INDEPENDENTLY, READ THE INFORMATION BELOW OR ONE PERSON CAN READ ALOUD.

Joe is in charge of adding red jellybeans to customers' orders at a jellybean factory. Sometimes the orders are incomplete but as long he keeps the following information in mind he can figure out what he needs to fill his orders.

The **whole** is the total number of jellybeans ordered.



The **part** is the number of jellybeans that are a specific color.

By filling in what he knows about his orders into the following proportion, and **balancing the equation** he can find any information that is missing!

$$\frac{\textbf{part}}{\textbf{whole}} = \frac{\text{percentage}}{100}$$

Sometimes they give Joe the **whole** and the percent, and he needs to find the **part**.

Customer A ordered 10 jellybeans and wants 40% to be red.

$\frac{\textbf{part}}{10} = \frac{40}{100}$

Set up your proportion

$\textbf{part} \times 100 = 10 \times 40$

Cross multiply

$\frac{100\,\textbf{part}}{100} = \frac{400}{100}$

Isolate your variable using division

part = 4

If there are 10 jellybeans and 40% of them are red, 4 jellybeans are red.

Sometimes they give Joe the **part** and the percent, and he needs to find the **whole**.

Customer B ordered 4 red jellybeans and wants 40% to be red.

$\frac{4}{\textbf{whole}} = \frac{40}{100}$

Set up your proportion

$4 \times 100 = \textbf{whole} \times 40$

Cross multiply

$\frac{400}{40} = \frac{40\,\textbf{whole}}{40}$

Isolate your variable using division

10 = **whole**

If 40% of an order of jellybeans is red and there are 4 red jelly beans there are 10 jelly beans in the order.

TALK ABOUT IT: What information did Joe need to set up his proportion? What was different about the 2 incomplete orders that Joe filled?

WHOLE GROUP

< 5 minutes

TIP!
The whole includes **ALL** jellybeans, not just the ones not included in the part.

TIP!
Balancing the equation means getting the unknown on one side of an equal sign and everything else on the other by using inverse operations

$x - 3 = 15$
$+3 \quad +3$
$x = 18$

Addition and subtraction are **inverse operations** because addition and subtraction undo each other.

Quick Check:

☐ I have read the information on this page with my group.

Go on to the next page.

CHALLENGE GOAL

Modeling Mayhem

INDEPENDENTLY, READ THE INFORMATION BELOW OR ONE PERSON CAN READ ALOUD.

< 5 minutes

GROUP CHALLENGE GOAL

You are going split into thinking teams of 2 or 3 and order some jellybeans. On the next page you will see totals, parts, and percentages. Your team will need to choose **four** values from each column on the left, pick a percentage from the column in the middle, and solve the problems in the right column.

Quick Check
☐ I understand what I need to do for the challenge!

In your own words: Based on your current math knowledge and what you've read so far, make a **prediction** about what you expect to see when you use a part and a percentage to find a whole and when you use a whole and a percent to find a part.

_____

_____

_____

*SMALL TEAM BREAK-OUT: Break into **smaller thinking teams** so that you're working with 1 or 2 other people. The whole group will reconvene for page six.*

TIP!
For the work on pages 4 & 5, you'll be in small teams.

Reconvene: Get back together

Who will be in your **small team** for the work on pages four and five? Write their names below.

_____

Quick Check
☐ We've divided up into small thinking teams.

Go on to the next page.

PART A: SMALL TEAM

SOLVE THIS PART WITH YOUR SMALL TEAM OR INDEPENDENTLY.

Choose the total number of jelly beans in the order from this space	Choose a percentage of red jellybeans from this space	Use this space to find the red jellybeans in the order
63 40 12 8 35 26 15	75% 50% 20% 15% 5%	

Choose a number of red jelly beans from this space	Choose a percentage of red jellybeans from this space	Use this space to find the total number of jelly beans in the order
4 24 22 17 19 30 44	60% 25% 30% 80% 55%	

10 minutes

TIP!
In order to set up your proportion it is important that you correctly identify the part and the whole.

TIP!
The part can never be as large as the whole.

Quick Check
☐ I've checked my work by making sure I've set my proportions up correctly.

Go on to the next page and continue working in your small team.

PART B: SMALL TEAM

SOLVE THIS PART WITH YOUR SMALL TEAM OR INDEPENDENTLY.

If you are given a part and a percent and told to find the whole, how could you use Joe's proportion to check if your answer is correct? Pick a problem from above and explain how you would check it in the space below

_____

_____

_____

_____

_____

TALK ABOUT IT: *Each person should be prepared to share something with the whole group. You can share something you noticed while solving these problems or something you know to be careful of to make sure your answer is correct*

One thing I plan to say is: _____

_____

_____

One question I might want to ask another team about their work is: _____

_____

_____

10 minutes

TIP!
When checking equations it helps to replace something known with an unknown.

Quick Check

☐ Our small team is ready to share with the whole group.

Once the other teams are ready, go to the next page.

PART C: WHOLE GROUP

Discuss and Decide

AS A WHOLE GROUP, DISCUSS AND ANSWER THE CHALLENGE GOAL QUESTION.

SHARE-OUT PROCEDURE:

- **30 seconds**: One person talks – everyone else respectfully listens.
  - ✓ *Does anyone have questions about what they just heard?*
  - ✓ **30 more seconds** to answer questions if needed.
- **Repeat** until everyone has shared.
- **5 minutes**: Anyone can ask questions or speak about the topic.
  - ✓ Discuss & answer the Group Challenge question below.

CHALLENGE GOAL: Prediction & Conclusion

Think back to the prediction you made back on page 3. Based on the activity you completed what conclusions can you draw about parts, wholes and percents?

_____

_____

_____

In a jar there are red, blue and green jellybeans. 25% of the jellybeans are red and there are 12 red jellybeans. If there are 10 blue jellybeans how many green jellybeans are there?

What is the **whole** number of jellybeans?	Show your work:
What is the **part** you are looking for?	Show your work:
How did you use **percents** to determine your answer?	Answer:

10 minutes

TIP!
Use a stopwatch or clock to help track time.

Quick Check
☐ *Everyone* in the group had a chance to speak.

Quick Check
☐ *Everyone* in the group helped complete the Group Challenge.

Go on to the next page.

REFLECTION

INDEPENDENTLY, COMPLETE THE REFLECTION.

Reflection

5 minutes

Instead of cross-multiplying a classmate says you can divide the fraction by 100 and use that number to solve the equation. They gave you this example:

A customer ordered 4 red jellybeans and wants 40% of his order to be red.

$$\frac{40}{100} = 0.4$$

$$\frac{4}{\cancel{whole}} \cancel{whole} = 0.4 \times whole$$

$$\frac{4}{0.4} = \frac{0.4\ whole}{\cancel{0.4}}$$

$$10 = whole$$

Try it with a couple of the examples you have already done

How often does this work: *Always* *Sometimes* *Never*

Explain your choice: _____

_____

Math Practice Standard: Reason abstractly and quantitatively.

On page 4 there was a tip that told you that the part cannot be bigger than the whole. Can you think of a situation where the part is the same size as the whole? Explain your thinking using the words part, whole and percent.

_____

_____

_____

Skill Check

One a scale of 1-5, how well do you NOW understand solving real world problems involving percentages?

_____

1 = low
5 = high

Quick Check

☐ I've answered these questions thoughtfully.

Go on to the next page.

ENDING PROBLEM

INDEPENDENTLY, SOLVE THE PROBLEM.

Ending Problem

< 5 minutes

Of the 150 videos available for rent at a certain video store, 40% of them are comedies. How many videos at the store are not comedies?

a) 60

b) 190

c) 600

d) 90

Read over the problem. What word is really important to pay attention to? If you did not pay attention to that word show what you might have done and the answer you may have gotten below.

TIP!
This question is similar to the types of questions you'll see on your skill assessment.

Clean-Up Check
☐ I've cleaned up my working space and put all materials away.