

In-Class Workbook

Ratios and Proportional Relationships:

Unit 6 – Part 2: Percent Change

How does solving problems with equivalent ratios relate to algebra?

Standard	Description
7.RP.A.3	→ Use proportional relationships to solve multistep ratio and percent problems.
7.EE.B.4	→ Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Packet Completion Rubric				
4	3	2	1	0
Workbook demonstrates significant effort. Student utilizes notes to help extend their thinking, writing questions, comments or reactions to the content.	Workbook demonstrates some effort. Student takes notes but could further understanding by questioning and interacting with the material.	Workbook shows little effort. Student takes notes sporadically, and could benefit from greater consistency with the material.	Workbook shows little to no effort. Student does not take notes and must demonstrate future interaction with the material to aid understanding.	Workbook is entirely incomplete or not turned in.

Grading Breakdown: 3.5 - 4 = A 3 - 3.4 = B 2.5 - 2.9 = C 2 - 2.4 = D 0 - 1.9 = F

“Happiness depends on ourselves ”

-Aristotle

Unit 6 Part 2 Guiding Question:

How does multiplying a number by 1, less than 1, or greater than 1 affect the product?

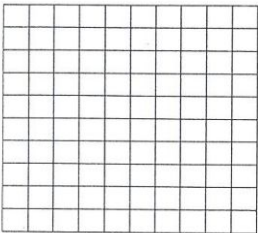
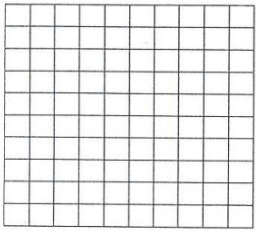
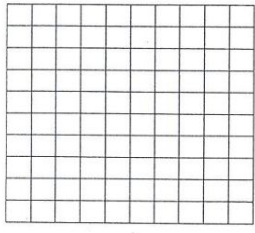
<u>Lesson Objectives</u>	
<u>Lesson:</u>	<u>I can:</u>
❑ 6.3	<ul style="list-style-type: none">○ Write equivalent fractions, decimals, and percents.
❑ 6.4	<ul style="list-style-type: none">○ Solve percentage problems through equivalent ratios and algebraically○ Describe the effect of a product when a number is multiplied by 1, more than 1, or less than 1.
❑ 6.5	<ul style="list-style-type: none">○ Solve markup problems in which the percent is greater than 100%
❑ 6.6	<ul style="list-style-type: none">○ Solve markdown problems in which the percent is less than 100%
❑ 6.7	<ul style="list-style-type: none">○ Distinguish between markup and markdown problems and solve
❑ 6.8	<ul style="list-style-type: none">○ Solve percentage word problems○ Solve for percent error○ Solve simple interest problems

Lesson 6.3 Do Now

The ratios for three colors of marbles in a bag are shown.

Red	Blue	Yellow
$\frac{3}{10}$	$\frac{27}{50}$	$\frac{4}{25}$

1. Rewrite each ratio as a number compared to 100. In other words, write a proportion where the equivalent fraction is out of 100. Then shade the grid to represent the marble ratio.

Red	Blue	Yellow
$\frac{3}{10} = \frac{\quad}{100}$	$\frac{27}{50} = \frac{\quad}{100}$	$\frac{4}{25} = \frac{\quad}{100}$
		
Represent ratio as decimal & percent	Represent ratio as decimal & percent	Represent ratio as decimal & percent

Homework Reminder

This is where you will shade in the box if you turned in your homework.
Homework 6.2 is due today!

Check-In

What is something you do for fun?

Do you have questions about unit conversions? If so, ask your teacher if they could meet at lunch this week to help you.

Direct Instruction- Percent, Decimal, Fraction Foldable

Direct Instruction

Percents greater than 100-

- Suzie's teacher just passed back the most recent math test. Suzie scored 108% on her exam!! How could this be possible? Write your thoughts in the space below

Can you think of any other times that it may be necessary to write a percent that is greater than 100?

-
-
-

A percent greater than 100 can still be written as a fraction, a decimal, and with a percentage sign.

Let's Try!

DIRECTIONS: WRITE EACH PERCENTAGE LISTED BELOW AS A FRACTION AND A DECIMAL

- | | | |
|-----------------------|-----------------------------|----------------|
| • <u>108%:</u> | Fraction: $\frac{108}{100}$ | Decimal: 1.08 |
| • <u>120%:</u> | Fraction: _____ | Decimal: _____ |
| • <u>157%:</u> | Fraction: _____ | Decimal: _____ |
| • <u>210%:</u> | Fraction: _____ | Decimal: _____ |
| • <u>233%:</u> | Fraction: _____ | Decimal: _____ |

You Try!

- | | | |
|---------------------------------|-----------------|----------------|
| • <u>116%:</u> | Fraction: _____ | Decimal: _____ |
| • <u>135%:</u> | Fraction: _____ | Decimal: _____ |
| • <u>Challenge: 504%</u> | Fraction: _____ | Decimal: _____ |

Using percents with proportions-

Percents can be written as fractions and compared to an equivalent _____ to _____ relationship in order to solve for an unknown. Let's take a look.

$$\frac{\textit{Part}}{\textit{Whole}} = \frac{\textit{Percent}}{100}$$

Example #1:

Luke scored a 3.2 out of 4 on his most recent science exam. What percentage of the questions did Luke answer correctly?

1. Define the variable:
-

2. Set up a proportion to solve:

3. Final Answer: _____

Example #2:

Andrew spent 10% of his monthly allowance over the weekend. What is Andrew's total monthly allowance if he spent \$7.00 over the weekend?

1. Define the variable:
-

2. Set up a proportion to solve:

3. Final Answer: _____

Example #3:

Mary ran a marathon last month! Mary finished before 78% of the people that ran. There were a total of 600 people in the race. Answer the following questions:

A. How many people did Mary finish in front of?

1. Define the variable:
-

2. Set up a proportion to solve:

3. Final Answer: _____

B. How many people finished in front of Mary?

1. Define the variable:

2. Set up a proportion to solve:

3. Final Answer: _____

Guided Practice

1) 98% of 40 orders	2) 15% of 60 people
3) 12% of 10 donations	4) 45% of 80 votes
5) Erika just played her new video game. She passed 30% out of 10 checkpoints. How many checkpoints did Erika achieve?	6) The girls basketball team had a scrimmage against the boys. The girls team scored 56 points and the boys team scored 42 points. What percentage of total points scored were scored by the girls team?

7) Write 42% as a fraction and a decimal!	8) Write 98% as a fraction and a decimal!
9) Write 103% as a fraction and a decimal!	10) Write 265% as a fraction and a decimal!

Unit 6: Percent Change	<u>Lesson 6.4</u>
------------------------	-------------------

<u>Lesson 6.4 Do Now</u>	<p>Piper is cleaning out her closet. She is going to donate 20% of her shoes, 10% of her shirts, and 40% of her books. Find out the number of shoes, clothes, and books Piper donates, given the following (Round to the nearest whole number).</p> <p>1. Piper has 20 shoes: _____</p> <p>2. Piper has 15 shirts: _____</p> <p>3. Piper has 30 books: _____</p>
<u>Homework Reminder</u>	<p>This is where you will shade in the box if you turned in your homework. Homework 6.3 is due today!</p>
<u>Check-In</u>	<p>Make a list of all of the things you would like to accomplish today:</p> <p>How are you doing today?</p>

Direct Instruction

Think back...

Andre is a baker and sells cupcakes at the local farmers' market. One Saturday, Andre calculates that he sold 85% of his cupcakes. If Andre had brought 55 cupcakes to the farmers' market, then how many did he sell?

1. Define the variable:

2. Set up a proportion and solve:

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

3. Write in words how you would solve this proportion:

4. What if we were to solve this proportion by using what we know about algebra?

Step one- Simplify both sides of the equation	$\frac{x}{55} = \frac{85}{100}$
Step two- box the variable:	$\frac{x}{55} = .85$
Step three- multiply by 55	$\frac{x}{55} \times \underline{\hspace{1cm}} = .85 \times \underline{\hspace{1cm}}$
Step four- Solve for x	$x = \underline{\hspace{2cm}}$
Step five- Restate the final answer	Andre sold <u> </u> cupcakes at the farmers market.

Now that we know how to use to for an unknown variable. The equation $y = (r)x$ can be used to solve percent change problems.

y	New Value
r	The percent change
X	Initial Value

You Try!

DIRECTIONS: WRITE EACH OF THE FOLLOWING SCENARIOS AS A PROPORTION AND THEN AS AN EQUATION.

Example #1

Jillian has completed 80% of her homework. If her homework is 20 questions long, then how many questions does Jillian still have left to do?

a. Define each variable:

Y	
r	
X	

b. Define the unknown variable: _____

c. Set up a proportion: _____

d. Isolate the unknown variable:

e. Equation: _____

f. Solve for the unknown variable: _____

Example #2

Marco has visited 13 out of the 50 states in the US. What percentage of the US States has Marco visited?

a. Define each variable:

Y	
r	
X	

b. Define the unknown variable: _____

- c. Set up a proportion: _____
- d. Isolate the unknown variable:
- e. Equation: _____
- f. Solve for the unknown variable: _____

More Practice

DIRECTIONS: WRITE EACH OF THE FOLLOWING AS AN EQUATION

1. 80% of 112	2. 75% of 90
---------------	--------------

Percents greater than 100

Annie plays basketball for Wheeler Middle School. In game 1, Annie scores 22 points for her team. In game 2, Annie scores 120% of the points she scored in game 1. How many points did Annie score in game 2?

Answer the following:	
Which game did Annie score more points in?	<u>Circle One:</u> Game 1 <u>or</u> Game 2
How do you know? _____	
Set up a proportion to solve for the unknown:	
Use the proportion to write an equation to solve for the unknown:	
What do you notice is different about this equation?	

When solving percent change problems, the initial value is _____ by the percent. The _____ is the new value.

$$\text{New Value (y)} = \text{Percent (r)} \times \text{Initial Value (x)}$$

$$y = rx$$

Explore: How does the percent(r) effect the new value?

% < 100	Example: 20%	Written as a decimal: _____	20% of 60 is... _____
% = 100	Example: 100%	Written as decimal: _____	100% of 60 is... _____
% > 100	Example: 180%	Written as a decimal: _____	180% of 60 is... _____

How does multiplying a number by a percent less than 100, equal to 100 and greater than 100 change the number?

TERMS TO KNOW:

Percent Increase-

Percent Decrease-

Guided Practice

In your own words describe each of the following vocab terms and give an example of each.

1. Percent Increase-

- **Example**

2. Percent Decrease-

-
- **Example:**
-

Write each of the following as a proportion, an equation, and then solve.

1. 108% of 93

Proportion:

Equation:

Answer: _____

1. 80% of 400

Proportion:

Equation:

Answer: _____

1. 120% of 40

Proportion:

Equation:

Answer: _____

6. 100% of 9



Proportion:

Equation:

Answer: _____

Lesson 6.5 Do Now

The grizzly bear population in Yellowstone National Park in 1970 was about 240 individuals. Over the next 35 years, it increased by about 115%. What was the population in 2005?

1. Define the unknown:	
2. Set up a proportion:	
3. Write an equation to solve for the unknown:	
4. Solve for the unknown:	
5. Check to see if your answer makes sense Hint: the grizzly bear population increased...	 <u>OR</u> 

Homework Reminder

This is where you will shade in the box if you turned in your homework.
Homework 6.4 is due today!

Check-In

Look back at your list from the 6.4 Check-In. What percent of the list of things that you wanted to accomplish did you achieve?

How are you doing today?

Direct Instruction

Lesson 6.4 introduced the idea of percent increase and percent decrease. This lesson will introduce a specific type of percent increases known as a _____.

A markup is when the _____ value is multiplied by a percent to increase the _____ value.

A store owner will markup the price at which they buy items, so that the store can make a profit.

An equation used to find mark up: $Y = x + (r)x$

Define each of the variables in the equation: $y = x + (r)x$

Explore:

Autumn is selling cookie dough for a school fundraiser. The school buys a box of cookie dough for \$8.00. In order to make a profit, the school will mark up each cookie dough box by 50%.

What would you expect the price of each cookie dough box to be? Give a rough estimate.

What information did you use to help inform your estimate?

Write an expression to show the markup:

- Expression in words: _____
- Expression with numbers: _____

Write an expression to show the initial price of a cookie dough box plus the markup:

- Expression in words: _____
- Expression with numbers: _____

Use the expression to write an equation that shows the price that autumn will sell each cookie dough box for:

- Equation in words: _____
- Equation with numbers: _____

What is the price that Autumn will sell each box of cookie dough for?

- Final Answer: _____

When solving the last problem, another equation that could be written is:

The price of each box of cookie dough that Autumn sells = $8(1.50)$

Why does this equation work?

Let's Try:

Jessa just opened a new boutique. She bought a bunch of bracelets that were made by her friend Brittany. Each bracelet she bought from her friend was \$20. To make a profit, Jessa must markup the price of the bracelets. If Jessa marked up the price of the bracelets by 90%, then how much will she sell each one for? Write an equation and then solve!

You Try!

1. Henry bought a truck for \$6,000 He plans to fix the truck up and then sell it. Henry will markup the price of the truck by 260% . What price will Henry sell the truck for? Write an equation and then solve!

Define each of the following:		
Y (New Value)	r(Percent)	X(Initial Value)

- a. Equation-

- b. The price Henry will sell the truck for-

2. Jane buys a pair of socks for \$14.00. If the store had bought the socks for \$8, then how much were the socks marked up by?

Define each of the following:		
Y (New Value)	r(Percent)	X(Initial Value)

- c. Equation-

- d. The amount the socks were marked up by-

One more for good luck!

Alex and Perry just opened a shaved ice stand! They figured out how much it cost them to make a small, medium, and large shave ice. Now the girls wants to markup the price of each size by 120%. Help them solve in the space below.

Size:	Initial Value:	Markup:	New Value:
Small	\$0.75		
Medium	\$0.90		
Large	\$1.00		

Guided Practice

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

_____	_____
_____	_____
_____	_____

Unit 6: Percent Change	<u>Lesson 6.6</u>
-------------------------------	--------------------------

<u>Lesson 6.6 Do Now</u>	<p>Bella has a candle company. Her newest scent, “Fresh Pine”, just hit the market. It costs Bella \$11.00 to make each candle. She plans to mark up each candle by 90% of the original price.</p> <p>What equation can be used to solve this problem?</p> <p>What price will Bella sell each candle for?</p> <p>Does your answer make sense? Why or why not?</p>
<u>Homework Reminder</u>	<p>This is where you will shade in the box if you turned in your homework.</p> <p>Homework 6.5 is due today!</p>
<u>Check-In</u>	<p>How are you doing today?</p> <p>What is something that you enjoyed about yesterday?</p>

<u>Direct Instruction</u>
<p>Lesson 6.5 introduced the idea of a mark up.</p>

In your own words, describe what a mark up is:

Review:

An equation used to find mark up: $y = x + (r)x$

This lesson will introduce a special kind of percent decrease known as a _____.

A markdown is when the initial value is multiplied by a _____ to decrease the _____.

A store owner might use markdown to sell items quickly in their store.

An equation used to find mark down: $y = x - (r)x$

Define each of the variables in the equation: $y = x - (r)x$

Explore:

Jenny buys a new jacket that is priced at \$55. When she gets to register the employee tells her that the jacket has been marked down 20%. Draw a model that shows the original price of the jacket, the markdown, and the final price of the jacket in the space below.

Example:

1. Leah goes to the mall to get a start on Christmas shopping. She is super excited that her favorite store has some black friday items on sale! Leah bought a new speaker that initially cost \$150, but was marked down 60%. What price does Leah pay for the speaker?

2. Teri goes to the supermarket to buy her groceries on super save Saturday! Below is a list of the items with their original cost and the percent markdown. What will Teri pay for each item?

Grocery Item	Original Price	Percent Markdown	New Price
Bananas	\$5.99	20%	
Papaya	\$9.50	30%	
Chicken	\$11.00	10%	
Rice	\$2.99	15%	

Bonus: What is the total price of Teri's grocery bill?

You Try!- For each problem define y, x, and r. Use the equation $y = x - (r)x$ to solve.

- | | |
|--|--|
| 1. Marco goes to the pool store to buy a few pool toys for his upcoming party. The winter sale is on and a lot of items have been marked down! Marco buys a blow up swan that was originally priced at \$74.99 but has been marked down by 35%. How much will marco pay? | 2. Dog Food at Pet Palace has been marked down by 30% in order to sell it quickly. A certain brand of dog food typically cost \$15.00 for a bag. How much will this bag of dog food cost with the current mark down? |
| 3. A discount store marks down all of its holiday merchandise by 20% off the regular selling price. Find the discounted price of decorations that regularly sell for \$16 and \$23. | 4. Aaron buys a laptop for \$1,300. The laptop originally cost \$2,000 before the markdown. What percent was the laptop marked down by? |

One more for good luck!

Bailey is redecorating her room. She picks out a new desk! Lucky for her, the desk has just been marked down. Bailey purchases the desk \$430 after it has been marked down 20%. What was the original price of the desk?

Guided Practice

Holiday Shopping Spree!

The holiday season is nearly upon us! It is time to buy gifts for your family and friends. You have \$300 to purchase gifts for 5 people (you must purchase 5 gifts). Follow the steps to find out how much your shopping spree will cost (it's okay to approximate prices for your items).

Step 1. Choose your recipients and gifts! Make sure you are taking your budget into consideration!

Gift Recipient	Gift	Price
1.		
2.		
3.		
4.		
5.		

Step 2: Find the new price of some of the sale items!

→ There was a coupon in the mail for Gift 1. What is the cost of the item after taking 15% off?

→ The store has marked down Gift 4 by 25%, what is the price now?

→ Gift 3 was marked down by $\frac{1}{2}$ because of their customer loyalty program. What is the new sale price?

Step 3: Total the amount you owe after finding the new prices from Step 2.

Gift 1:	\$
Gift 2:	\$
Gift 3:	\$
Gift 4:	\$
Gift 5:	\$

Total Cost →	\$
--------------	----

Step 4: Find the Commission

The employee that sold you Gift 5 gives you a coupon for 20%. How much will you now pay for gift 5?

Step 6: Last minute snack after working up an appetite! Find the tip!

While shopping, you suddenly became famished! You stopped by a cafe at the mall to grab lunch. The bakery items are marked down by 40%, because the cafe is about to close. You buy a muffin that originally cost \$5.00 and cookie that cost \$2.50.

How much do you spend on the muffin?

How much do you spend on the cookie?

How much do you spend in total at the cafe?

Step 7: Did you have enough money?

Taking into consideration the gifts, coupons, and lunch, did you have enough money and stay under your \$300 budget? Or are you going to have to return any items?

<u>Lesson 6.7 Do Now</u>	<p>Madison is a store owner. She buys jewelry from a jewelry maker in town. The shell necklace she wants to typically costs \$20. However it is currently 10% off. Madison orders 10 for her shop and plans to mark up the price by 40%. How much profit will Madison's store make after selling all 10 necklaces?</p> <p>How much does each necklace from the local Jeweler cost? _____</p> <p>How much does Madison sell each necklace for at her store? _____</p> <p>How much will Madison make in profit after selling each necklace? _____</p>
<u>Homework Reminder</u>	<p>This is where you will shade in the box if you turned in your homework. Homework 6.6 is due today!</p>
<u>Check-In</u>	<p>How are you doing today?</p> <p>Is there anything that you need to take time to do today?</p>

<u>Direct Instruction</u>	
<p><u>In the table below, compare and contrast Markup and Markdowns. Be sure to use vocabulary that you might expect to see for each, the equations used, and an example!</u></p>	
<u>Markup</u>	<u>Markdown</u>

<u>REVIEW</u>	
<u>Markup:</u>	<u>Markdown</u>
<u>Equation:</u>	<u>Equation:</u>
<ul style="list-style-type: none"> • • • • • 	<ul style="list-style-type: none"> • • • • •

<u>Guided Practice</u>	
CARD # _____	CARD # _____
CARD # _____	CARD # _____
CARD # _____	CARD # _____
CARD # _____	CARD # _____

CARD # _____	CARD # _____
CARD # _____	CARD # _____

Unit 6: Percent Change	<u>Lesson 6.8</u>
-------------------------------	--------------------------

<u>Lesson 6.8 Do Now</u>	<p>Directions: Decide whether each problem is a markup or markdown and write an equation to solve for the unknown in each problem.</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; padding: 10px;"> <p>Tiffany bought a ring for \$20,000. The ring was marked up by 55%. What was the initial price of the ring?</p> </td> <td style="width: 50%; padding: 10px;"> <p>Clara buys a sweatshirt that is $\frac{1}{3}$ off. She then uses a coupon that saves her 10% off her purchase. How much will Clara pay if the sweatshirt was originally \$80?</p> </td> </tr> </table>		<p>Tiffany bought a ring for \$20,000. The ring was marked up by 55%. What was the initial price of the ring?</p>	<p>Clara buys a sweatshirt that is $\frac{1}{3}$ off. She then uses a coupon that saves her 10% off her purchase. How much will Clara pay if the sweatshirt was originally \$80?</p>
<p>Tiffany bought a ring for \$20,000. The ring was marked up by 55%. What was the initial price of the ring?</p>	<p>Clara buys a sweatshirt that is $\frac{1}{3}$ off. She then uses a coupon that saves her 10% off her purchase. How much will Clara pay if the sweatshirt was originally \$80?</p>			
<u>Homework Reminder</u>	<p>This is where you will shade in the box if you turned in your homework. Homework 6.7 is due today!</p>			
<u>Check-In</u>	<p>How are you doing today?</p> <p>What is one thing that would make this day better? Can you do that today?</p>			

Direct Instruction

SIMPLE INTEREST:

- When you _____ money into a savings account, your money usually earns **interest**.
- When you _____ money (car loan, student loan, etc.), you are usually required to pay back the loan PLUS **interest** on the loan.

TERMS TO KNOW:

Principle:

Simple Interest:

Practice:

1. Larry invests \$100 into a savings plan. The plan pays 4.5% in simple interest each year on his \$100 account balance. The following chart shows the balance in his account after each year for the next 5 years. He did not make any deposits or withdrawals during this time. How much money was in Larry's account after 5 years?

2. Suppose Larry made no deposits or withdrawals for a total of 23 years. How much money will Larry make in interest alone? How much money will he have in total in his account after 23 years?

You Try!

Erica's parents gave her \$500 for her high school graduation. She put the money into a savings account that earns 7.5% annual interest. She left the money in the account for nine months before she withdrew it. How much interest did the account earn if interest is paid monthly?

SALES TAX, COMMISSION, & GRATUITY

TERMS TO KNOW:

Sales Tax: _____

Commision: _____

Gratuity: _____

Practice:

1. Silvio earns 10% for each car sale he makes while working at a used car dealership. If he sells a used car for \$2000, what is his commission?

2. Tu's family stayed at a hotel for 10 nights on their vacation. The hotel charged a 10% room tax, per night. How much did they pay in room taxes if the room cost \$200 per night?

3. Selena's family and friends celebrated her birthday by dining out at a fancy restaurant. The total cost of their food and beverages was a whopping \$2000. Service at the restaurant was incredibly slow so Selena's party decided to leave a gratuity (tip) of only 10% .

You Try!

1. In New York, state sales tax rates vary by county. In Allegany County, the sales tax rate is 8 ½ percent.
 - a. A book costs \$12.99, and a video game costs \$39.99. Rounded to the nearest cent, how much more is the tax on the video game than the tax on the book?

 - b. Suppose a pair of shoes in Allegany county is originally priced at \$45. The shoe store is a having a storewide sale of 30% off. What is the price of the pair of shoes after the markdown and sales tax?

Guided Practice

POSTER # _____ **ANSWER** _____

POSTER # _____ **ANSWER** _____



POSTER # _____ **ANSWER** _____

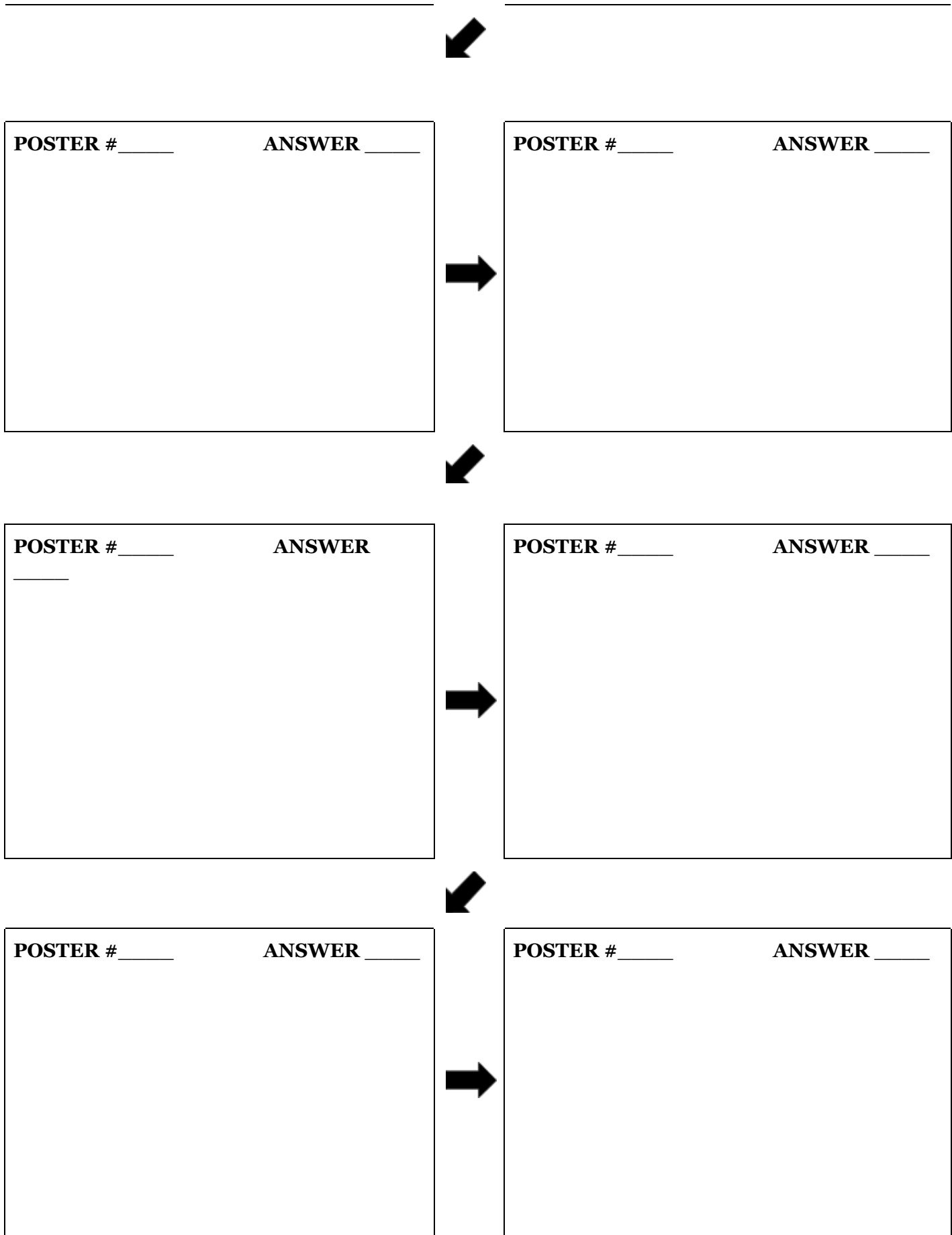
POSTER # _____ **ANSWER** _____



POSTER # _____ **ANSWER** _____

POSTER # _____ **ANSWER** _____





Workbook Reflection

Answer the question as completely as possible, using evidence from what we have learned this unit. Justify your response with examples and evidence from throughout the packet.

How can we use algebra to help solve percent change problems? Give an example!

Choose one of the following concepts and describe it. Include visuals to support your answer.

- *Difference between a percent that is written with a percentage sign, as a fraction, or a decimal.*
- *Difference between a markup and markdown*
- *How knowing how to solve percentage problems can help you in the real-world*

What lesson most challenged your thinking?

What would you have done differently?

Flip through your packet, and look to see if you shaded the box every day for turning in your homework. How many days did you shade it in?

Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8
----------	----------	----------	----------	----------	----------	----------	----------

If you didn't finish it each night, consider why →

Would you like to come in during lunch or recess for support?