Lesson 17: The Stock Market

Goals

- Apply operations with rational numbers to calculate a stock's new value, change in value, or change expressed as a signed percentage of the previous value.

- Compare (orally and in writing) changes in the value of different stocks, including the dollar amount and the percentage of the previous value.

- Interpret (orally) tables that represent the values of different stocks in the stock market.

Learning Targets

- I can solve problems about the stock market using rational numbers and percentages.

Lesson Narrative

In the previous unit, students worked with percent increase and decrease. In this lesson, students see how signed numbers can be applied to representing changes in the stock market (MP4). This includes representing a decrease (in the price of an individual stock or the value of a stock portfolio) as a negative percentage of the original value.

The names given in the activities are generic, and the data is based on real stock market data from 2016. You may wish to replace them with up to date real companies and data.

Alignments

Addressing

- 7.EE.B.3: Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. $

- 7.NS.A.3: Solve real-world and mathematical problems involving the four operations with rational numbers.Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

Instructional Routines

- MLR1: Stronger and Clearer Each Time

- MLR5: Co-Craft Questions

- MLR8: Discussion Supports

Required Materials

Copies of blackline master

Required Preparation

Print the Your Own Stock Portfolio blackline master. Each student will need 1 set of copies.

> **Student Learning Goals**
>
> Let's learn about the Stock Market.

17.1 Revisiting Interest and Depreciation

Warm Up: 5 minutes
The warm-up reminds students of their understanding of percentage increase and decrease in preparation for the shares questions later in the lesson. Some students will use different strategies; identify those for the discussion after the activity.

Addressing

- 7.EE.B.3

Launch

Remind students that they can use any strategies from sixth grade for answering the percentages questions.

Anticipated Misconceptions

If students forget about using an equation to calculate percent increase or decrease, remind them that they can use the equation $y = kx$ to figure out the answers to the questions.

> **Student Task Statement**
>
> 1. Lin deposited $300 in a savings account that has a 2% interest rate per year. How much is in her account after 1 year? After 2 years?
>
> 2. Diego wants to sell his bicycle. It cost $150 when he bought it but has depreciated by 15%. How much should he sell it for?

Student Response

1. After one year: $300 \cdot 1.02 = 306$, After two years: $306 \cdot 1.02 = 312.12$; so she has $312.12 in her account.

2. $150 \cdot 0.85 = 127.5$ so $127.50.

Activity Synthesis

The most important thing is to recall efficient methods of calculating percent increase and decrease, such as setting up an equation in the form A% of B is C. Select students to share their methods in preparation for the next activity.

17.2 Gains and Losses

10 minutes
Students are introduced to the idea of the stock market and how the value changes. They apply their understanding of negative numbers to percentage change as well as money (MP4).

Addressing

- 7.EE.B.3

- 7.NS.A.3

Instructional Routines

- MLR5: Co-Craft Questions

Launch

Introduce the concept of shares in a company. They have a specific value at a specific time that can change up or down. They represent a measure of the worth of the company. We sometimes express the change as a value in dollars, so investors can see how much money they will make or lose. We can also present these as a percentage to compare companies in terms of growth.

Before students begin working on the task consider asking how they would represent an increase or decrease in value so that it was easily apparent.

To familiarize students with the information in the table, consider asking which companies' stocks increased in value and which companies' stocks decreased in value from day 1 to day 2. Have students explain their reasoning and come to an agreement before anyone begins doing calculations.

Access for Students with Disabilities

Representation: Internalize Comprehension. Activate or supply background knowledge. Allow students to use calculators to ensure inclusive participation in the activity.
Supports accessibility for: Memory; Conceptual processing

Student Task Statement

1. Here is some information from the stock market in September 2016. Complete the table.

company	value on day 1 (dollars)	value on day 2 (dollars)	change in value (dollars)	change in value as a percentage of day 1 value
Mobile Tech Company	107.95	111.77	3.82	3.54%
Electrical Appliance Company		114.03	2.43	2.18%
Oil Corporation	26.14	25.14		-3.83%
Department Store Company	7.38	7.17		
Jewelry Company		70.30		2.27%

2. Which company's change in dollars had the largest magnitude?

3. Which company's change in percentage had the largest magnitude?

Student Response

	company	value on day 1 (dollars)	value on day 2 (dollars)	change in value (dollars)	change in value as a percentage of day 1 value
1.	Mobile Tech Company	107.95	111.77	3.82	3.54
	Electrical Appliance Company	111.6	114.03	2.43	2.18
	Oil Corporation	26.14	25.14	-1.00	-3.83
	Department Store Company	7.38	7.17	-0.21	-2.85
	Jewelry Company	68.74	70.30	1.56	2.27

2. Mobile Tech Company's change has the largest magnitude.

3. Oil Corp's change as a percentage of its original value had the largest magnitude.

Activity Synthesis

The important part of this activity is that students use a directed quantity for percentage change to model decrease in value as negative and increase as positive. Ask students how they would prefer the information to be presented, and ask them to support their conclusions.

17.3 What is a Stock Portfolio?

15 minutes
This task introduces the concept of a stock portfolio being a selection of stocks an investor might own to try to make money—students examine the change in portfolio and evaluate the value. They must use both positive and negative change, and percentage change.

Addressing

- 7.EE.B.3

- 7.NS.A.3

Instructional Routines

- MLR8: Discussion Supports

Launch

Introduce the concept of a portfolio of shares in a company.

Student Task Statement

A person who wants to make money by investing in the stock market usually buys a portfolio, or a collection of different stocks. That way, if one of the stocks decreases in value, they won't lose all of their money at once.

1. Here is an example of someone's stock portfolio. Complete the table to show the total value of each investment.

name	price (dollars)	number of shares	total value (dollars)
Technology Company	107.75	98	
Airline Company	133.54	27	
Film Company	95.95	135	
Sports Clothing Company	58.96	100	

2. Here is the same portfolio the next year. Complete the table to show the new total value of each investment.

company	old price (dollars)	price change	new price (dollars)	number of shares	total value (dollars)
Technology Company	107.75	+2.43%		98	
Airline Company	133.54	-7.67%		27	
Film Company	95.95		87.58	135	
Sports Clothing Company	58.96	-5.56%		100	

3. Did the entire portfolio increase or decrease in value over the year?

Student Response

1.

name	price (dollars)	number of shares	total value (dollars)
Technology Company	107.75	98	10,559.50
Airline Company	133.54	27	3605.58
Film Company	95.95	135	12,953.25
Sports Clothing Company	58.96	100	5,896

2.

company	old price (dollars)	price change	new price (dollars)	number of shares	total value (dollars)
Technology Company	107.75	+2.43%	110.37	98	10,816.26
Airline Company	133.54	-7.67%	123.30	27	3,329.10
Film Company	95.95	-8.72%	87.58	135	11,823.3
Sports Clothing Company	58.96	-5.56%	55.68	100	5,568

3. The portfolio has decreased in total value from $33,014.33 to $31,5365.66.

Activity Synthesis

The important part of this activity is that it extends on the context previously examined, ahead of students building their own portfolio in a later activity.

17.4 Your Own Stock Portfolio

15 minutes
Distribute copies of the "Stocks Prices"

Students calculate their own portfolio

Distribute copies of the "Changes in Stock Prices after 3 Months" so they can calculate the change.

Addressing
- 7.EE.B.3
- 7.NS.A.3

Instructional Routines
- MLR1: Stronger and Clearer Each Time

Launch

Distribute copies of the Stock Prices Blackline Master. Have prepared the Changes in Stock Prices after 3 Months Blackline Master.

Student Task Statement

Your teacher will give you a list of stocks.

1. Select a combination of stocks with a total value close to, but no more than, $100.

2. Using the new list, how did the total value of your selected stocks change?

Student Response

1. Answers vary.

2. Answers vary.

Activity Synthesis

Have students trade with a partner and check each other's work. (Answers vary because each student worked with a different selection of stocks.)

Have students examine the "Changes in Stock Prices after 3 Months" page and discuss:

- How can you tell if the price of a stock increased or decreased from looking at this list?

- Which company's stock price increased or decreased by the most?

- Without doing any calculations, predict which company's stock price had the largest increase as a percentage of its starting value.

- Without doing any calculations, predict which company's stock price had the largest decrease as a percentage of its starting value.

Lesson Synthesis

Key learning points:

- There are a number of contexts in which using negative numbers to represent directed change is important; the stock market is one of them.

- Percentage change down can be represented with a negative percentage

Discussion questions:

- Which way of showing the change do you prefer, percentage or monetary value?

- Can you think of other situations in life where using a negative to represent a change would be useful?