

# Commodities

**SUBMITTED BY:** Nina Hoe, University of Pennsylvania

**SUBJECT(S):** Computation

**GRADE LEVEL(S):** 9, 10, 11, 12

## ≡ OVERVIEW:

This lesson begins with a discussion of commodities and the concepts of hedging and future contracts. Students think about the reasons that companies might hedge for commodity prices or why they might not. Students read relevant excerpts from Knowledge@Wharton and Wharton Global Youth Program articles and compute the potential savings and losses as a result of hedging for commodity prices. Finally, students discuss the implications of commodity trading and hedging.

## ≡ NBEA STANDARD(S):

- Computation, I. Mathematical Foundations
- Computation, II. Number Relationships and Operations
- Computation, III. Patterns, Functions, and Algebra
- Computation, VI. Problem-Solving Applications

## ≡ RELATED ARTICLES:

- [“The WGYE Essay Contest: Entrepreneurial Winners Conjure Gloves, Alternative Energy, Shoes and Locks”](#)
- [“Raising Llamas: Gustavo Maluéndez’s Path from Pretend Cattleman to Real-life Rancher”](#)
- [“John Brock of Coca-Cola: Staying Strong in the Competitive Beverage Industry”](#)
- [“How the Trade War with China Is Hurting U.S. Farmers”](#)

- “Educator Toolkit: Wall Street”
- “Career Insight: Jerrold Fine on What It Takes to Succeed on Wall Street”

**Common Core Standard(s):**

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context
- A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

**Objectives/Purposes:**

- Students understand the concept of commodities.
- Students understand the meaning and purpose of hedging and future contracts.
- Students compute theoretical savings and losses as a result of entering in future contracts.

**Knowledge@Wharton Articles:**

- “Are Commodities Futures Too Risky for Your Portfolio? Hogwash!”
- “Back to the Future: Will Rising Commodities Prices Create a New ‘Inflation Generation’?”
- “Post-crash Scenarios for Commodities and Turbo Coupled Emerging”

**Other Resources/Materials:** Calculators**Activity:**Whole Class Discussion: (20 mins)

## 1. What is a commodity?

Play the Wharton Global Youth Program (WGYP) Glossary: [Commodity](#) “A commodity is a very common, typically inexpensive product that is largely and easily-available to the mass market. Toilet paper is a commodity, because it is very common and cheap, and usually consumers make the decision to buy it based on price and/or habit.”

2. What are some other examples of commodities?

***(basic resources and agricultural products such as iron ore, crude oil, coal, salt, sugar, coffee beans, soybeans, aluminum, copper, rice, wheat, gold, silver, palladium, and platinum. Soft commodities are goods that are grown, while hard commodities are the ones that are extracted through mining; energy commodities include electricity, gas, coal and oil)***

3. Do you think all commodities are really the same? Is all toilet paper the same? All sugar?

***(No, there can be differentiation, but in general they are similar.)***

4. What makes commodities different from stocks?

***(Stocks are companies/products that are individually valued and traded – for example, Microsoft trades much differently from Apple, although they are both similar companies. Commodities are generally treated as equivalent in the market no matter who produces them – for example the price of gold is set by the market, and so gold, no matter where it is in the world, is considered to have the same value.)***

***Optional:*** Have the class read the Knowledge@Wharton article: [“Back to the Future: Will Rising Commodities Prices Create a New ‘Inflation Generation’?”](#)

5. What are things or events that affect commodity prices?

***(Floods or weather can affect agriculture, etc.)***

Play the Wharton Global Youth Program (WGYP) Glossary: [Supply and Demand](#) “*Supply and demand is the fundamental concept of a market economy. It allows the level of supply of a given product, or how much is manufactured and offered for sale, and the demand for it, to determine the price of a product. If the supply for a given product exceeds the demand for it, then in order to sell the product, the manufacturers are most likely going to reduce the price, or put the product on sale to stimulate demand. In contrast, if the demand exceeds the supply, manufacturers can raise their prices.*”

6. How might changing commodity prices negatively affect businesses? Give some examples.

***(Airlines might sell \$300 tickets to Florida 6 months away based on the current price of jet fuel. If the price of jet fuel all of a sudden doubles, the airline could go bankrupt. Similarly, if next growing season if all of the orange trees in Florida were hit by a cold winter and froze, the supply of oranges would be significantly lower the normal demand, and thus the price of oranges and orange juice might increase dramatically.)***

7. Do you think commodities are riskier or safer investments than regular stocks?

## 8. How can businesses protect themselves against changing commodity prices?

To **hedge** means to protect (one's investment or an investor) against loss by making balancing or compensating contracts or transactions. In the commodity market, companies can purchase commodities at a fixed rate (for a given period of time) to avoid market volatility, which would make financial statements more volatile, and thus investments in companies riskier. In these cases, companies can use **forward contracts** or **futures** to normalize expenses.

A **forward contract** is a contract or an agreement between two parties to buy/sell a particular asset at a specified time in the future for a specific, agreed upon price.

Below is an excerpt from the WGYA Article: "[John Brock of Coca-Cola: Staying Strong in the Competitive Beverage Industry](#)"

**WGYA:** *The price of corn, one of the raw materials that is used to make high fructose corn syrup, a key ingredient in Coke, has gone up in recent years. How is Coke responding to this and other economic challenges?*

**Brock:** *Yes, we've had some real issues with the price of high fructose corn syrup. Similarly, with the price of aluminum for cans, which make up 60% of our products in North America, as well as petroleum, which, of course, has been volatile. Not only does that affect our fuel prices, but it goes into our plastic bottles.*

*We've had major challenges from a **commodity** price standpoint for the last three years. Very different than the previous 25 years, where the typical increase was 2 to 2.5% a year. The past three years it's been anywhere from 7 to 10%. You ask about corn specifically. The key driving force behind the accelerated price of corn has been the ill-conceived U.S. government program on ethanol [an alternative fuel made from corn and other crops], which is, unfortunately, not good from an environmental standpoint, and it's not good from an economic standpoint.*

*It seemed like a great idea several years ago. Everybody jumped on the bandwagon.*

*Unfortunately now, nobody has what it takes to go undo it. It has absolutely driven the price of corn through the roof. Even though there's been a bit of a retreat in the price over the last several months, along with other commodities, it's still at levels way beyond where it should be. That has driven the price of high fructose corn syrup up, which has driven the price of our products and lots of other food products for American consumers, up. The simple answer to the question is we need to get the U.S. government to change the ethanol program. With that, you'll see some better situations in terms of commodity prices, particularly on corn, in American consumer products across the board.*

In this instance, Coke might hedge the price of corn by entering into a futures contract. If Coke believed that the price of corn was going to continue to increase, they might sign a contract to

purchase a large quantity of corn in 1 year for the same price as it is trading for today.

9. What are the potential benefits of a futures contract?

10. What are the potential risks of a futures contract?

11. Generally, why would a company want to enter into a futures contract?

12. What are they thinking or hoping will happen to the price of the given commodity?

***(in the example given, the company is betting that the price of the commodity is going to increase)***

13. Why would a commodity provider or trader want to enter into a futures contract?

***(Secure a future sale, speculation that price might actually drop)***

***(Problems 1 and 2 can be skipped if students are independent and interested in thinking about real scenarios. Have students break up into small teams and select a company that might want to hedge the price of something.)***

Small Group/Pair Activity: (15 mins)

1. Currently, crude oil is trading for \$93 per barrel. You are an airline company and believe that the price of oil is going to increase substantially within the next year. You enter into a futures contract to buy 10,000 barrels of oil for \$95 per barrel one year from today's date. This is a hedge.

- If the price of oil drops, how does this affect your purchasing of oil?
- If the price of oil stays the same, how does this affect you?
- If the price of oil increases, how does this affect you?
- If the price of oil increases to \$98 per barrel, how much money do you theoretically save as compared with your competitors that did not hedge?
- If the price of oil increases to \$103 per barrel, how much money do you theoretically save as compared with your competitors that did not hedge?
- If the price of oil drops to \$87 per barrel, how much will you theoretically be overpaying as compared with your competitors that did not hedge?
- If the price of oil drops to \$82 per barrel, how much will you theoretically be overpaying as compared with your competitors that did not hedge?

2. Wheat is currently trading for \$7.00 per bushel.

- If there was talk that the price of wheat was on the rise, what types of companies might want to hedge the price of wheat?
  - If there was widespread belief that the price was going to increase, for what price might a traders or wheat provider agree to a future contract?
  - If a company wanted to secure a futures contract for 45,000 bushels of wheat at \$7.15 for a date 6 months from now,
    - i. How much would they be bound to overpay if the price dropped to \$6.85?
    - ii. How much would they be bound to overpay if the price dropped to \$6.25?
    - iii. How much would they theoretically save as compared with their competitors that did not hedge if the price went to \$7.15?
    - iv. How much would they theoretically save as compared with their competitors that did not hedge if the price went to \$7.35?
3. Visit the website <http://money.cnn.com/data/commodities/>. Chose a commodity and a company that might want to hedge its price.

- Decide how much of the commodity will need to be purchase?
- Look at the 1-year graph
- What might happen to the price of this commodity in the future? Why? Discuss possible scenarios.
- Determine a desired price for a futures contract.
- Calculate potential scenarios. What is the best-case scenario? Worst-case scenario? How likely do you think either of these is?
- Compare your futures contracts to the future prices listed on:  
<http://www.bloomberg.com/markets/commodities/futures/>

### **Tying It All Together:**

#### Whole Class Discussion: (10 mins)

1. Have students report on their answers to questions #1 and 2.
2. Have students report on their answers to #3.
3. How are commodity prices related to consumer costs?
4. How are commodity prices related to a business's overall stability?
5. What is the purpose of hedging for commodity prices?
6. What are the risks and benefits?

**Practice Outside of the Classroom:** Listening to the news, what do you hear about commodity prices and futures?

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