



## Who is controlling the oil price?

**Subject:** Mathematics/Algebra

**Grade Level:** 9<sup>th</sup>-10<sup>th</sup>

**Rational or Purpose:** This lesson is designed to introduce economic concepts into a mathematics lesson. In the introductory stage of an economy course, students learn about the concepts of supply and demand. Such concepts are represented by two linear graphs. The activity will help students to see the application of linear graph in their daily life and increase their social awareness of the world around them.

**Materials:** Student worksheet

**Lesson Duration:** 40 minutes

**TEKS Objectives:**

111.32. Algebra I

(b) (A.6)

**Background Information:**

In recent years, drivers in the U.S. have been hit hard by the soaring price of gas. A comparison between the winter of 2006 and the winter of 2007 shows the price of gas has jumped by about 50%. Oil price touched USD\$100/barrel on January 2<sup>nd</sup> 2008 and rose over USD\$100/barrel on January 3<sup>rd</sup>. Two weeks later, the gas price dropped to about USD\$92/barrel due to gloomy economic outlook and possible increase in output by Organization of Petroleum Exporting Countries (OPEC). Here we see the price of oil is affected by the demand of consumer and industries, and the supply of the oil producer. In addition, the rise in oil prices has caused a widespread increase in the cost of other consumer products, especially at grocery store.

**Activity**

1. Before the activity begins, ask students to survey gas prices at a random gas station 2 to 3 days before the lesson. Students may go online to search for current gas price.
2. Given a hypothetical scenario that the country is now experiencing a harsh, bitterly-cold winter, students will be asked to discuss and list what they need to ensure they will be warm throughout the winter. (Part B on the worksheet)
3. Follow the questions on the worksheet and guide their thinking if necessary. Students may need additional daily examples to understand the meaning of a demand curve. Based on the consumer's behavior, students should be able to explain why demand curve has a negative slope.

4. The teacher must be aware of a common misconception: A change in demand is not the same as a change in quantity demanded. A change in demand means that the demand curve will shift to the left (decrease demand) or right (increase demand). A change in quantity demand means that on a specific demand curve, the quantity demanded is changing in response to price (no curve shift).
5. Price elasticity: *Inelastic Demand vs. Elastic Demand*  
Price elasticity determines the magnitude of the negative slope of a demand curve. In food and energy, the demand appears to be inelastic because the goods are necessary for everyday life. Even a drastic price change will not alter consumers' behavior to the same degree. In this case, the curve will have a more negative slope and look steeper. Products such as clothes and shoes, are more elastic because there are many competitor and substitutes in the market. A slight change in price may shift consumers from one product to another. Therefore, the demand will look more flat and have a slope near to zero (horizontal line).
6. To introduce the concept of supply, students will read a news article and use a graph to help them see how increase in supply under a specified demand will help drive prices lower.
7. To conclude this activity, students will read and discuss the significance of rising oil price. The teacher is encouraged to help students elaborate on the possible consequences by high oil prices.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class Section: \_\_\_\_\_

## Who is controlling the price of oil?

### Part A. Current gas price

On (date) \_\_\_\_\_ at (gas station) \_\_\_\_\_, the gas prices

are listed as following:

Regular Unlead (Octane Rating: 87):     \$ \_\_\_\_\_

Plus Unlead (Octane Rating: 91):     \$ \_\_\_\_\_

Premium Unlead (Octane Rating: 93):     \$ \_\_\_\_\_

(Optional) Crude Oil per barrel:     \$ \_\_\_\_\_ (look up at [www.bloomberg.com/energy](http://www.bloomberg.com/energy))

### Part B. Look at the demand side

Scenario: We are experiencing an unexpectedly, cold winter right now. In the following space, make a list or a diagram to illustrate *what* you need in order to make yourself warm this harsh winter season and *why* you need it. If you see a relationship between one item and another, connect them with arrows and words to express their relationship.

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Class Section: \_\_\_\_\_

Part B (continued)

How is our demand on gas this harsh winter different from a normal winter? Why?

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If we need gas and fuel so badly to warm our homes and ourselves, do you think price of gas will go up or down? (*Hint*: View this from the consumer and businessman perspectives, how can the company make more profit?)

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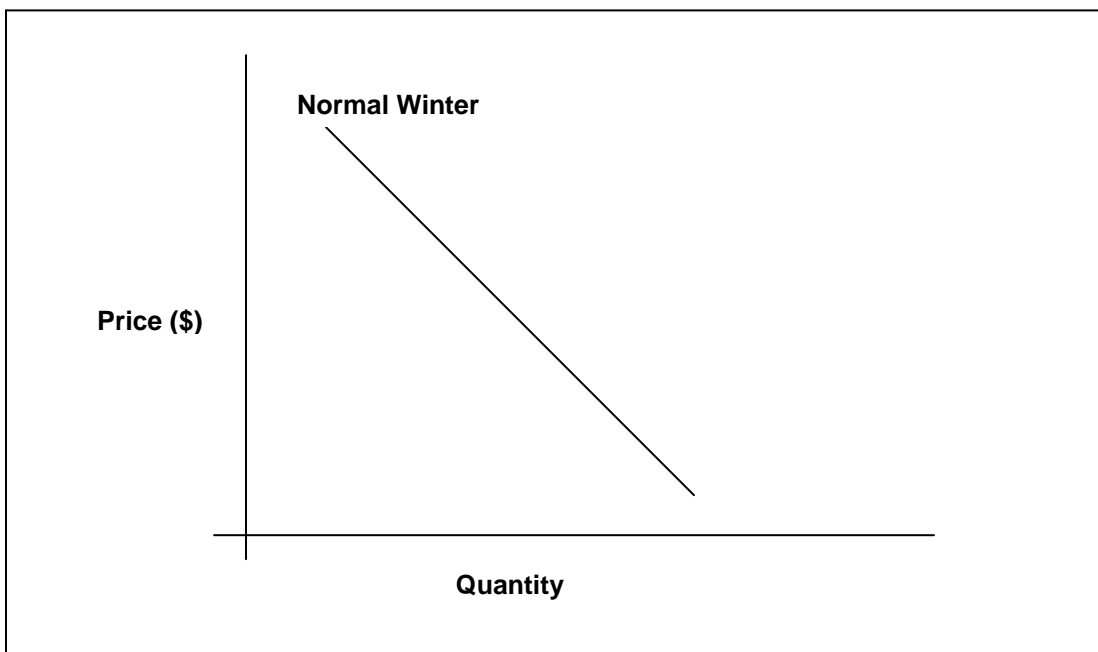
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If we have a warmer winter, do you think the gas will be cheaper or more expensive?

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In the following graph with axes already labeled, draw a linear regression to represent the situation in a harsh winter.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

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What behavior can explain the demand curve's negative slope?

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On the same graph on the previous page, draw a linear regression to represent the demand for gas during a warmer winter?

We see the curve being shifted to the left or the right, depending on the situation (while other things remain unchanged). In this example, people who have been consuming energy need *more of that energy* in a harsh winter. The *amount of people* who need energy remains the same. Therefore, we see a shift in demand curve. (The demand curve changes when the situation is changed.)

If a company wants to attract more customers (increase the *quantity demand*), then that company will probably cut the price to achieve its goal.

At this point, you should understand why demand curve has a negative slope. Now we have to think about how steep the demand curve should be. What causes the degree of steepness of a demand curve?

If the government raises the cost of water by 20%, would you still take a bath everyday?

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If the price of milk jumped 50%, would you still drink milk everyday?

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From the above examples, will the price change affect the amount we consume? If so, by how much?

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This kind of demand is called a(n)

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Name: \_\_\_\_\_

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Supposed you are walking on a street and you are hungry. There are two fast food chain stores in front of you. You realize that Store A no longer has the dollar burger while Store B has some dollar burger available. (The dollar burger that was offered in Store A is now \$1.19.) What would you choose in this situation?

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Your sneakers can no longer be worn because you have worn them for 5 years. You go to a sporting goods store and look for a good deal. There are two pairs of shoes you like a lot. When you compare the prices, Brand C's shoes are priced at \$39.99 while Brand D's shoes are selling for \$47.99. Which brand will you choose?

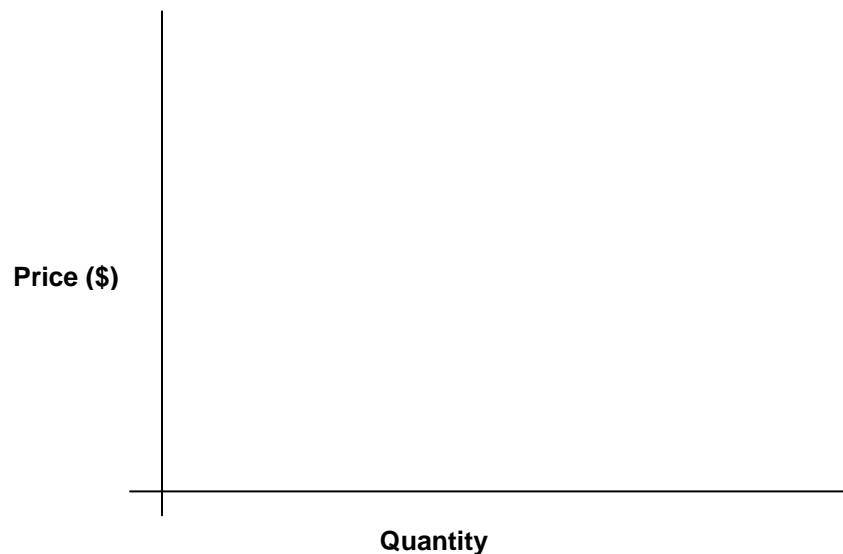
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This kind of demand is called a(n) \_\_\_\_\_

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On the graph below, draw two linear graphs to represent these two demands list above. You must be able to explain how each kind of demand is represented.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class Section: \_\_\_\_\_

Part C. Looking at the supply side

Which region exports the most oil for the rest of the world?

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There is an organization in the region that decides the amount of oil being produced everyday. What is it?

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Here is an article published on January 17<sup>th</sup>, 2008 on Reuters.com:

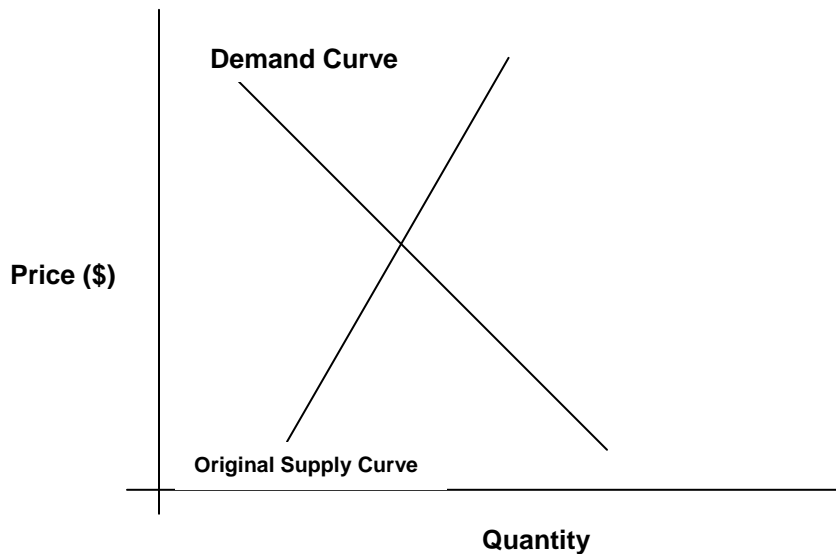
**Oil falls near \$90 on recession fears** - Richard Valdmanis

NEW YORK (Reuters) - Oil slipped toward \$90 a barrel on Thursday amid growing fears the U.S. economy will slip into a recession and hurt demand from the world's top energy consumer.

The loss stretches oil's slide to about 10 percent since the record over \$100 a barrel hit January 3, taking pressure off of producer-group OPEC to boost output at its next meeting in February... In fresh signs of economic weakness, factory activity in the U.S. Mid-Atlantic region contracted sharply in January and home building in December fell to the slowest pace since the early 1990s, according to reports on Thursday...

...OPEC reacted coolly this week to a call from President George W. Bush for **more oil output to bring down prices** and ease strain on the economy. OPEC President Chakib Khelil said there was no reason why the group should raise output at its next meeting on February 1 if oil inventories recovered in the second quarter, a time of year global consumption tends to slow.

President Bush asked OPEC to increase oil output to bring down prices. If OPEC agrees to increase output, where will the new supply curve be? Is the price lower/higher?



Name: \_\_\_\_\_

Date: \_\_\_\_\_

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You may ask, "Why do we care about oil price?" There are a lot of implications from oil price and they can drive other issues and problems in our society and economy. Here is an article published in 1982 from the New York Times:

**AWAITING THE NEXT OIL CRISIS** - Daniel Yergin

For the energy problem is not merely an issue of whether motorists pay \$1.20 or \$2.20 a gallon for gasoline. The energy issue really involves the possibilities for economic growth, and it is on such growth that our political and economic system depends. It spells the difference between jobs and unemployment lines; it helps to resolve national political tensions, and it eases potential international conflict.

...The first impact was on inflation: The oil-price jumps were reflected directly in higher prices for gasoline, home heating oil and fuel oil. Up went the price index. With the rise in the price of oil came increases in the cost of anything connected with or substituted for it - from plastics and airline travel to coal, housing insulation and Hondas. Up went the price index. Meanwhile, people noticed that prices were going up, and so they sought to compensate through wage hikes. In this way, the oil-price rises became embedded in the underlying inflation - and in people's psychology. Up, up went the price index.

...The second factor is the deep recession. The link between energy consumption and economic activity has been loosened, but not broken. An economic downturn still leads to less energy consumption. Thus, the drop in oil use cannot be entirely attributed to the adjustment. Ulf Lantzke, the executive director of the International Energy Agency, has expressed the matter succinctly: "There still is an oil gap; only now it is expressed in the number of unemployed." Looking at the pattern of the last decade, a somewhat pessimistic scenario for our energy future in the rest of the century begins to emerge. It is based on the strong possibility that there will be upheavals in the Middle East or a change in outlook by the ruling elite in Saudi Arabia and the already obvious difficulties in finding new supplies and raising capital for new energy projects.

This article is quoted in a book published in 2004, named *Origins of the Crash: The Great Bubble and Its Undoing* by Roger Lowenstein. The author says,

*"Consultants predicted that in the 'next' crisis oil would rise to \$100 a barrel, choking off the country's growth and even threatening democracy!"*

*(Optional Activity)*

Ask your parents if they are aware of price of dairy products and other groceries. Write a brief report on what they tell you. You may also express your thought in the report.

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