

Supply, Demand, and Market Equilibrium

Overview

In this lesson, students will gain an understanding of how the forces of supply and demand influence prices in a market economy. Students will be presented with concepts related to supply and demand through a teacher-led power point and will then practice with these concepts individually. Three short simulations will help to enrich the students' understanding of supply and demand throughout the lesson.

Grade

10

NC Essential Standards for Founding Principles: Civics and Economics

- FP.E.1.3 - Explain how supply and demand determine equilibrium price and quantity produced
- FP.E.1.4 - Analyze the ways in which incentives and profits influence what is produced and distributed in a market system

Essential Questions

- What is demand?
- How do changes in price affect the quantity demanded?
- What factors in the economy other than price change demand?
- What is supply?
- How do changes in price affect the quantity supplied?
- What factors in the economy other than price change supply?
- What is a surplus? What is a shortage?
- How do consumers and markets react to both shortages and surpluses?
- What is equilibrium price? How do changes in supply and demand affect equilibrium price?

Materials

- "Supply and Demand" PowerPoint, available in Carolina K-12's Database of K-12 Resources:
 - <http://k12database.unc.edu/?s=supply+demand>
 - Some school districts block the ability to download PPT files via the database. If you are unable to open the accompanying PPT, or cannot locate it, you can send an email request for the file to CarolinaK12@unc.edu
- LCD projector
- Handout 1: Demand Practice, attached (answers located in accompanying Power Point)
- Handout 2: Supply Practice, attached (answers located in accompanying Power Point)
- Handout 3: Supply and Demand Practice, attached (answers located in accompanying Power Point)
- Sample EOC Questions and Answer Key, attached

Duration

2 block periods

Procedure

Introduction to Supply and Demand

1. As a warm-up, lead students in a brainstorm of the word "**price**", either verbally or as a journal entry. Encourage students to explore all aspects of the word that come to mind. Discuss the following:
 - What is a price? Are prices negotiable? Explain.
 - Who sets prices? If no one person sets prices, how are they determined?

- Do prices influence the decisions you make as a consumer? In what ways?
- What characteristics of a product make you willing to pay a higher price for it compared to other products?
- Describe a time when you felt that the price of a good you wanted was too high. How did this change your decision-making?
- Describe a time when you felt that the price of a good you wanted was too low. How did this change your decision-making?
- Why don't businesses charge low enough prices so that everyone can afford to buy their goods/services? On the other hand, why don't businesses charge as much money as they possible can for their goods?
- What current events or events in recent history can you think of that relate to prices being too high or too low? How long did this event last? What caused the event?

2. Inform the students that in order to understand how prices are set, they must first understand **supply and demand**. Tell students they will begin by learning about the force of demand and explain that market exchanges include two different parties: consumers and producers. Demand is focused on the decision-making of **consumers**, or individuals that buy goods/ services. Review Slides 1-8 on the *Supply and Demand PowerPoint*. Add explanations and examples to the power point's text and illustrations when necessary.

- On **slide 1**, ask the students the following questions referring to the picture on the slide:
 - Based on the definition for demand, which of the following do you have a demand for? Explain why or why not.
- On **slide 3**, encourage the students to relate demand schedule to discussion of coordinates in a math class. The quantity demanded will be the x-coordinate and the price will be the y-coordinate.
- On **slide 3**, the students will no doubt ask what a "widget" is. A **widget** is a nondescript, made-up good used by economist to simplify discussion and reduce the "what if" questions that can confuse the essential topics of supply and demand.
- On **slide 4**, assist students in understanding which axis price goes on (**P** is a vertical letter, so put the **Price** on the vertical axis. Quantity is thus left for the horizontal axis.)
- On **slide 5**, ask the students to discuss the graph of the demand curve.
 - Consider some terms you have learned in a math class. What is slope?
 - What is the slope of the demand curve?
 - Do you think that price and quantity demanded tend to have this relationship?
 - Does it seem logical that consumers will want less of a good at a higher price? Explain.
- On **slide 5**, provide students with memory aide for remembering the slope of the demand curve (the **Demand curve goes Down.**)
- On **slide 7**, ask the students the following questions referring to the picture on the slide:
 - Based on the definition for utility, what is your utility for the following good measure in the maximum amount of money you would pay? Explain how you decided.
 - Does everyone in class have the same utility for the goods or different? Why do you think that is?

Note: One point of confusion for students on the topic of demand is the difference between "quantity demanded" and "demand". Explain that quantity demanded is the corresponding number of a good that will be demanded based on one given price. Demand is a collection of points reflecting different quantities demanded at all possible price.

3. **Demand Simulation** One way to emphasize the law of demand (Slide 6) is by holding a mock auction in which students bid to buy desired goods.

- Create 21 envelopes with the following amounts of play money. Either use monopoly money or print money from <http://www.moneyinstructor.com/play.asp>. Choose 21 students to participate in the auction and give each student an envelope. (Create more or less envelopes depending on your class size. Make sure that there are more envelopes with smaller values of money and less envelopes with

larger values of money to best highlight the law of demand. Tailor the chart appropriately based on your numbers.) Put the following amounts of money in the envelopes:

- 1 envelope with \$20
 - 2 envelopes with \$10
 - 4 envelopes with \$5
 - 6 envelopes with \$1
 - 8 envelopes with 50¢
- Instruct participating students to signal if they are willing to pay for the good at the bidding price. They are only allowed to bid as much as they have in their envelope. Remind the rest of the class that they should listen respectfully during the simulation.
 - Auction a candy bar or other desired good such as extra credit to the class. Start at 50¢ and continue up to \$20.
 - Create the following chart on the board like the one below and record the number of students that bid at each price. If available, project a grid and plot the points from the chart to create a market demand curve or pass out grids to each student and have them collect data during the simulation.
 - After the auction, students should reflect on the following topics (these questions can be discussed as a class or completed as a written response):
 - What happened to the numbers of students bidding on the good as the auctioneer increased the price?
 - Why do you think students that wanted the candy bar stopped bidding as price increased?
 - What is the definition for demand? What is the law of demand?
 - What similarities/differences did this simulation have with realistic economic exchanges? Why did the final auction price end up higher than one would find in stores?
 - Did all of the participants spend as much money as they had in their envelope? If not, explain why not?
 - Did preference have any influence on the participants?

Price for Candy Bar (\$)	Quantity of Candy Bars Demanded
.50	
1	
5	
10	
20	

Diminishing Marginal Utility Simulation

4. One way to highlight the principle of diminishing marginal utility (Slide 8) is by allowing students to rate the utility they receive after eating successive treats.
 - First, ask students to rate their present well-being on a scale of 0 (lousy) to 100 (bliss) on a chart like the one below.
 - Give each student 10 M&Ms or a snack size package. (Make sure to review Emergency medical records before giving students candy in class and defer to any school or county policies). The more M&Ms available to the students, the more valid the outcome of the simulation will be.
 - Have the students eat the M&Ms, one at a time. After each one, ask students to again rate their well-being on the handout in the Well-being column. Then, the students will subtract the previous well-being from the new well-being and enter the value into the Change in Well-being column.
 - Collect the rating-sheets, tabulate, and display total utilities, marginal utilities, and (hopefully) diminishing marginal utility. Have students assist in the tabulation to speed the calculation process. Project class totals on the board and point out that although total well-being increases with consumption (people tend to rate happiness higher as they consume more of a good), marginal well-being will begin to plateau or decrease (the more of a good consumed, the less additional benefit the good has).

Number of M & Ms	Well-being 0-100 (Total Utility)	Change in Well-being (Marginal Utility)
0		-----
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

5. Continue Supply and Demand power point slides 9-14.
 - On **slide 9**, point out to the students that price is the biggest influence on the quantity demanded of a good/service. A change in price leads to a change in the **quantity demanded** (not a change in demand). This represents a movement along a demand curve.
 - On **slide 10**, elaborate on each factor that will change demand. Give examples for each factor and whether demand would increase or decrease. Up and down can be confusing, especially with the supply curve.
 - On **slides 12-13**, avoid using the phrase “demand goes up” or “demand goes down” in relation to the graph.
 - When describing an increase in demand, use the phrases “shift outward” and “shift to the right” away from the y-axis.
 - When describing a decrease in demand, use the phrases “shift inward” and “shift to the left” toward the y-axis.

6. Print out copies of *Handout 1: Demand Practice* and have the students complete it individually or in pairs. All information was covered in the Power Point. Once students have completed the reading and questions, discuss answers as a class. Slides 16-22 have the correct answer for Part III of the activity. Ask students to explain each directional shift and why as you move through the power point. Have multiple students share their story about the Tar Heelians and ask the rest of class to predict what will happen to the demand curve.

Force of Supply

7. Inform the students that they will now learn about the opposite force of supply. As a warm up to introduce the supply, project the table below on the board.
 - Inform students that you are opening a business and need some workers for the afternoon hours. Have the students fill in the chart based on how many hours they would be willing to work for you a week at the various wages. The students can work no more than 40 hours a week and will also have to continue attending school and doing all their homework.

Hourly Wage	Hours per Week
\$2	

\$6	
\$10	
\$14	
\$18	
\$22	

Discuss student responses using the following questions:

- What are you supplying your boss with in return for a wage?
- How many hours were you willing to work at each given price?
- Do you see a trend in the data on the chart? What is it?
- Why are most people willing to work more hours for higher pay?
- Is there a point at which the increasing wage did not lead you to increase the number of hours you would work? If so, why?

8. Inform students that instead of talking about consumers, they will now be considering the decisions made by suppliers, or producers. Review Slides 23-29 of the Power Point. Add explanations and examples to the power point's text and illustrations when necessary.

- On **slide 25**, remind students of the memory aide for remembering which axis price goes on (**P** is a vertical letter, so put the **Price** on the vertical axis.)
- On **slide 26**, ask the students to discuss the graph of the supply curve.
 - What is the slope of the supply curve?
 - Do you think that price and quantity supplied tend to have this relationship?
 - Does it seem logical that producers will want more of a good at a higher price? Explain.
- On **slide 26**, provide students with memory aide for remembering the slope of the supply curve (the **Supply** curve goes **up**.)

9. Continue Supply and Demand power point slides 30-34.

- On **slide 30**, point out to the students that price is the biggest influence on the quantity demanded of a good/service. A change in price leads to a change in the **quantity supplied** (not a change in supply). This represents a movement along a supply curve.
- On **slide 31**, elaborate on each factor that will change supply. Give examples for each factor and whether supply would increase or decrease.
- On **slides 32-33**, avoid using the phrase "supply goes up" in relation to the graph. When describing an increase in supply, use the phrases "shift outward" and "shift to the right". When describing a decrease in supply, use the phrases "shift inward" and "shift to the left" toward the y-axis. Up and down can be confusing, especially with the supply curve.

10. Pass out copies of *Handout 3: Supply Practice* and have the students complete it individually or in pairs. All information was covered in the Power Point. Once students have completed the reading and questions, discuss answers as a class. Slides 37-43 have the correct answer for Part III and IV of the activity. Ask students to explain each directional shift and why as you move through the power point. Have multiple students share their story about the Tar Heelians and ask rest of class to predict what will happen to the supply curve.

Supply and Demand Auction Simulation

11. Each student is assigned a position as a 'buyer' or a 'seller' in a fictitious market. The two groups will stand in lines across from each other in the middle of the room. All the sellers are on one side, and the buyers on the other. If the room is not long enough, consider using the hall.

- The instructor first hands out cards indicating each student's reservation price as a buyer or a seller, with a unique price on each card.
 - Use the tables below to create cards. Use an Index card, with either a B or an S on the front and the corresponding reservation price on the bottom,

- Explain to the students the reservation price for buyers is the highest price they are willing to pay for a good. They are willing to make a purchase as long as the price the auctioneer calls is **equal to or less than** their reservation price.
- Explain to the students the reservation price for sellers is the lowest price they are willing to receive for a good. They are willing to make a sale as long as the price the auctioneer calls is **equal to or greater than** their reservation price.
- The teacher serves as auctioneer. Ask buyers and sellers to assemble across from each other.
- The auctioneer will provide an opening price. Buyers and sellers will step forward if that meets their reservation price. If they can find a member of the opposite group then a trade is completed and that pair of students will shake hands. Each individual can make only one trade per round. A trading round ends when no more offers to buy or sell are forthcoming. Then, all students rejoin their respective group and a second round may be started.
- The simulation will not end until you reach a price in which there is the same number of buyers as sellers or the market equilibrium price is reached where supply and demand are equal.
- Price Sequence for Auctioneer- 20, .50, 15, 1, 11. 1.50, 10, 2, 9, 2.50, 7, 3, 6, 4, and lastly 5. At a price of five, there should be five buyers and five sellers wanting to make a trade. Thus \$5 will be the market equilibrium price.

Buyer (B) or Seller (S)	Reservation Price
B	.50
B	1
B	1.50
B	2
B	2.50
B	3
B	3.50
B	4
B	4.50
B	5
B	5
B	5.50
B	6
B	7
B	8

S	2
S	3.50
S	4
S	4
S	4.50
S	5
S	6
S	6.50
S	7
S	7.50
S	9
S	10
S	12
S	15
S	20

➤ **Note:** For classes smaller than thirty, take away roles farthest away from equilibrium prices of \$5 (ie B \$.50 and S \$20...). For classes larger than thirty, add roles farthest away from equilibrium price of \$5 (ie B \$.25 and S \$25....)

12. Debrief the simulation with the students using the following questions:

- When the auctioneer called for prices above \$5, were there more buyers or sellers? Why do to think that was considering the definitions of supply and demand?
- When the auctioneer called for prices below \$5, were there more buyers or sellers? Why do to think that was considering the definitions of supply and demand?
- What was the equilibrium price, or the price at which the number of buyers and sellers was equal?
- At \$5, did all of the buyers make a trade? In reality, does everyone that wants a good have enough money to buy a good?
- At \$5, did all of the sellers make a trade? In reality, do all businesses that want to sell a good offer a low enough price for all their goods to be sold?

13. Continue Supply and Demand power point slides 44-52.

- On **slide 45**, make sure the students are aware that the chart is the same data from the separate demand and supply schedules combined into one schedule.
- On **slide 48**, remind students of times in the simulation during which there were more sellers than buyers, causing a surplus.
- On **slide 50**, remind students of time in the simulation during which there were more buyers than sellers, causing a shortage.

14. Pass out copies of *Handout 4: Supply and Demand Practice* and have the students complete it individually or in pairs. All information was covered in the Power Point. Once students have completed the reading and questions, discuss answers as a class. Slides 53-69 have the correct answer for Part I and II of the activity.

Differentiation

Students with special needs

- Students with special needs may have more difficulty with math concepts. Plan a brief review of graphing skills for the whole class. Review how to plot x and y values on graphing paper. To review slope, draw a line with a positive slope and a line with a negative slope on the board before introducing supply and demand. Show students how an increase in the y value increases the x value on the first graph but decreases the x value on the second graph.
- Work with math teachers in the school to correlate lessons about graphing and supply and demand and exchange best practices on strengthening graphing skills.
- Allow students who have difficulty with graphing to work with a more proficient partner on the supply and demand practice activities.

AIG

- Have the students research newspaper articles that relate to supply and demand. For each article, they should create a supply and demand graph and show any changes in the curves that are discussed in the article.
- Have students predict future price changes in a basket of goods based on changes in availability and popularity. For example, what will happen to the price of gas in the future as availability decreases?

Demand Practice

Part I: Answer the questions below based on the information presented in class and using your textbook.

1. What 3 things must exist in order to have demand for a good or service?

2. What is the difference between a demand schedule and a demand curve?

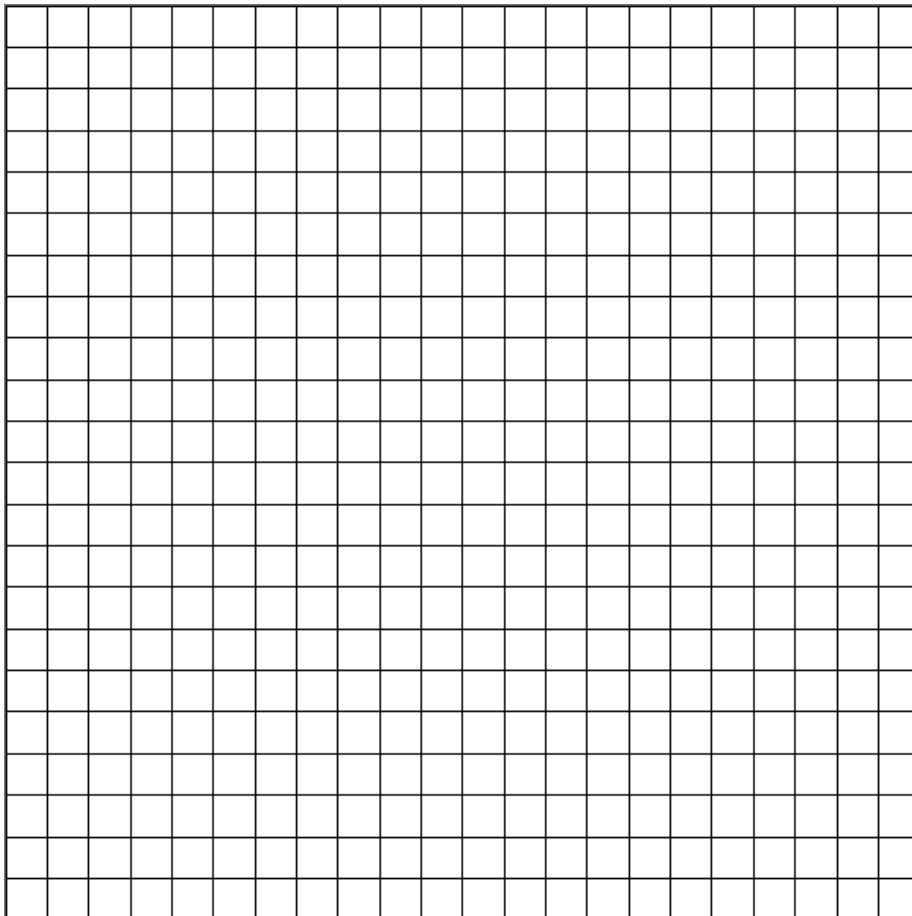
3. What is the law of demand?

4. What is utility?

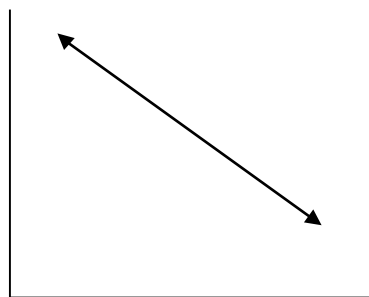
5. Describe the principle of diminishing marginal utility?

Part II: Graph the data from the demand schedule on the area provided.

Price of Basketballs	Quantity of Basketballs Demanded
\$2	10
\$4	8
\$6	6
\$8	4
\$10	2



Part III: On a separate sheet of paper, redraw the graph below and label each axis for each question. Then sketch the new demand curve for basketballs based on the statement provided using a different color. Draw arrows to highlight the direction of the shift of the demand curve. Give a short explanation to the right of the graph for why demand changed.



1. The income of Tar Heelians declines after a hurricane hits Tar Heelia.
2. Tar Heelia's beaches are named some of the most beautiful beaches in the world and tourism to Tar Heelia doubles.
3. The price of kick balls decrease. (Kick balls are a **substitute good** for basketballs)
4. The price of basketball t-shirts decreases, which I assume all of you know are a **complementary good**.
5. The basketball manufacturers decide to add a money back guarantee on their product, which increase the popularity for them.
6. Many Tar Heelians begin to believe that they may lose their jobs in the near future. (Think expectations!)
7. Come up with your own story about basketballs and the Tar Heelians. Write down the story, draw the change in demand based on the story, and explain why demand changed.

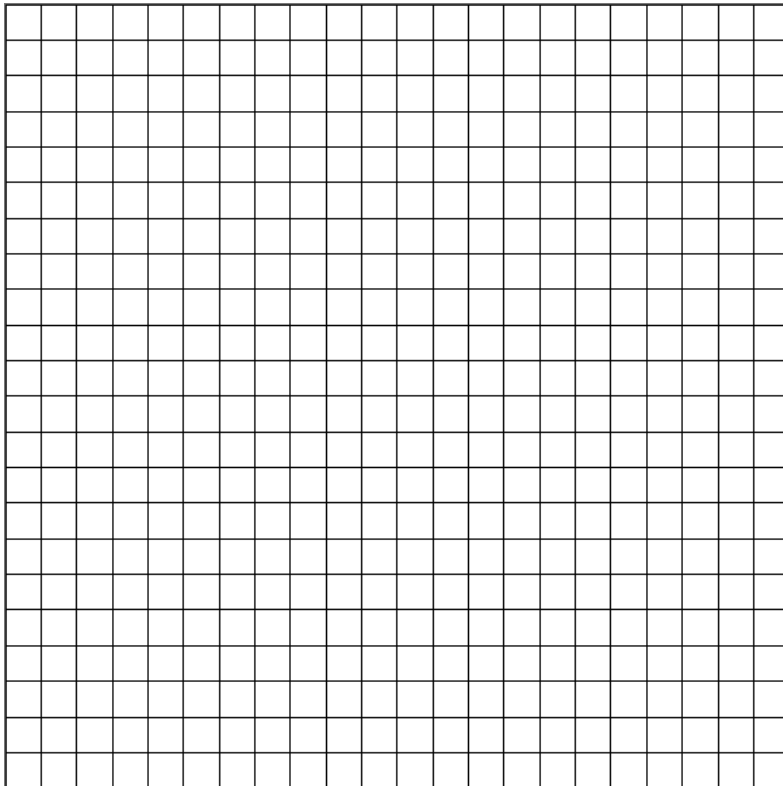
Supply Practice

Part I: Answer the questions below based on the information presented in class and using your textbook.

1. What is supply?
2. What is the difference between the supply schedule and the supply curve?
3. What is the law of supply?
4. What gives producers the incentive to produce more? What is the goal of business owners in our economy?
5. How does productivity affect supply?
6. What are subsidies?

Part II: Graph the data from the demand schedule on the area provided.

Price of Basketballs	Quantity of Basketballs Supplied
\$2	2
\$4	4
\$6	6
\$8	8
\$10	10

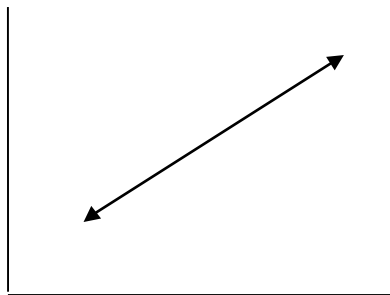


Part III: Complete the chart below using the following options

	Cost to Produce	Amount of Supply	Supply Curve Shift
Option #1	Increase OR	Decrease OR	Left (Inward) OR
Option #2	Decrease	Increase	Right (Outward)

	Cost to Produce	Amount of Supply	Supply Curve Shifts
Cost of Resources Falls	Decrease	Increase	Right (Outward)
Cost of Resources Rises			
Productivity Decreases			
Productivity Increases			
New Technology			
Higher Taxes			
Lower Taxes			
Government Pays Subsidy			

Part IV: On a separate sheet of paper (or the back of this sheet), redraw the graph below and label each axis for each question. Then sketch the new supply curve for basketballs based on the statement provided using a different color. Draw arrows to highlight the direction of the shift of the supply curve. Give a short explanation to the right of the graph for why supply changed.

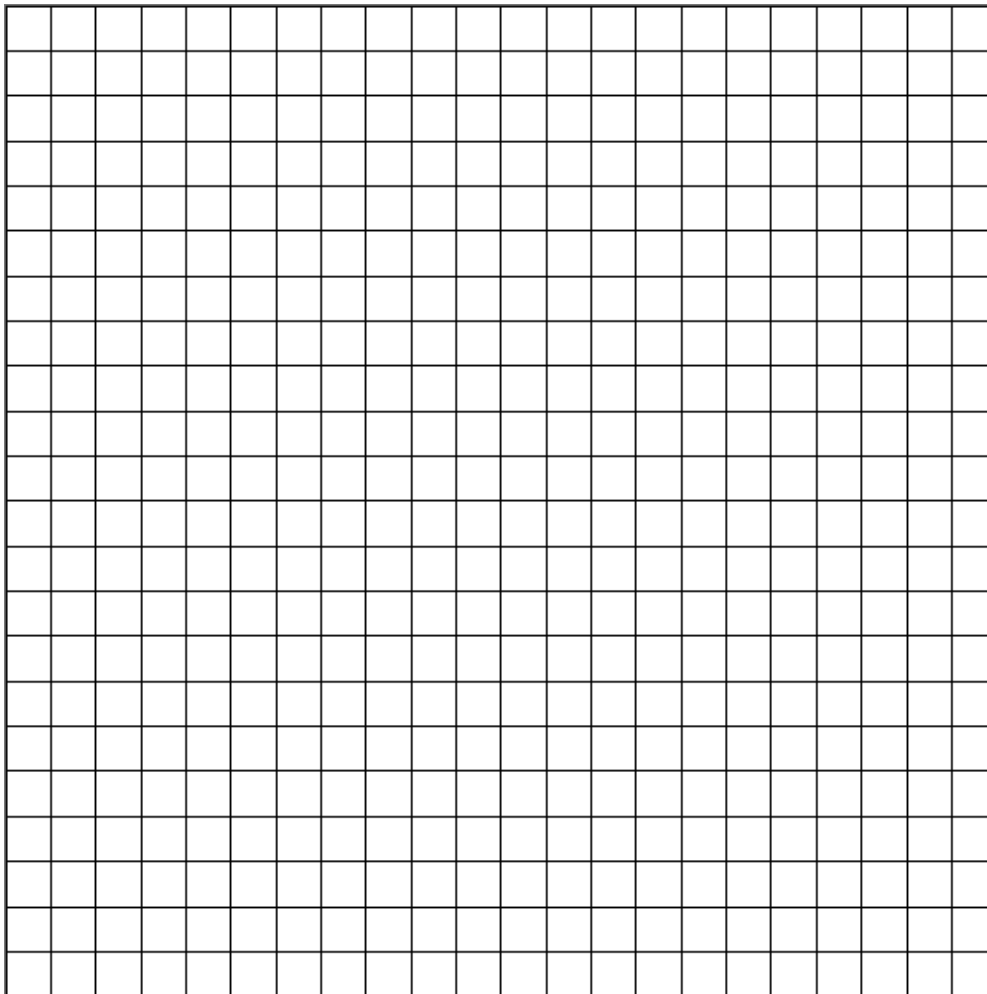


1. The government of Tar Heelia adds a subsidy to baseball production.
2. Basketballs producers also produce kick balls. The price of kick balls goes up.
3. The government of Tar Heelia adds a new tax to basketball production.
4. Basketball producers expect an increase in the popularity of basketballs worldwide.
5. The price of rubber, a major input in basketball production, increases.
6. Tar Heelian workers are introduced to coffee as Tar Heelia become integrated into the world market and their productivity increases drastically.

Supply and Demand Practice

Part I: Graph the data from the demand/ supply schedule on the area provided.

Price of Basketballs	Quantity of Basketballs Demanded	Quantity of Basketballs Supplied
\$2	10	2
\$4	8	4
\$6	6	6
\$8	4	8
\$10	2	10

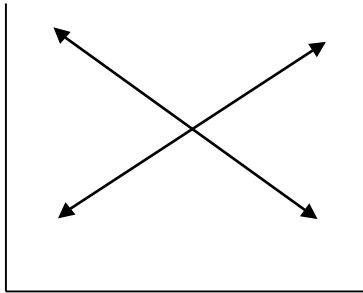


1. Draw a dashed line at \$4 all the way across the chart. If our product hits the market for sale at \$4, what market situation will be present: shortage or surplus? What is the size of the shortage/ surplus?
2. Draw a dashed line at \$8 all the way across the chart. If our product hits the market for sale at \$4, what market situation will be present: shortage or surplus? What is the size of the shortage/ surplus?

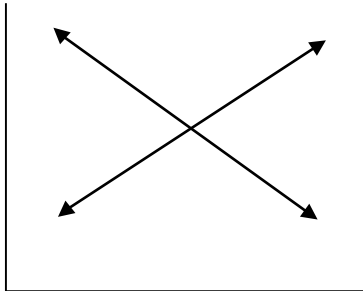
3. What is the equilibrium price in the basketball market? How many (Q) will be sold at this price?
4. If basketballs become more popular and the public demands 4 more basketballs at all possible prices, what will be the new equilibrium price. Draw the change in demand on the graph above.

Part II: I have provided the original demand curve and supply curve for purple ties for the town of Chapel Hill. First, label each axis correctly and denote each curve with D for Demand and S for Supply. Then, for each of the following, sketch the change in the demand curve and/or supply curve for purple ties based on the statement provided.

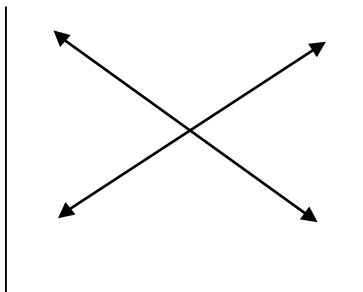
1. The income of the Chapel Hill townies declines after an early loss during March Madness.



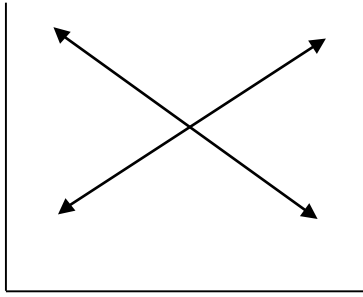
2. Chapel Hill is named one of the most beautiful towns in North Carolina and tourism doubles (it is a Southern piece of Heaven).



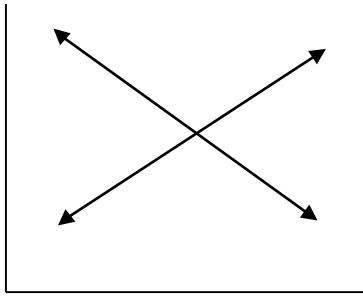
3. The price of blue ties decreases. (Blue ties are a substitute good for purple ties)



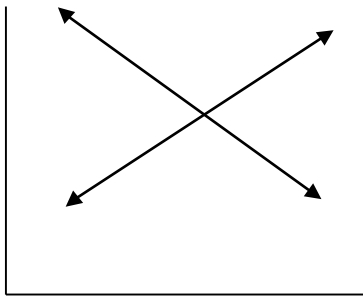
4. The Federal government has been warning the public about the possibility of a recession and job loss in the RDU area. (Think expectations!)



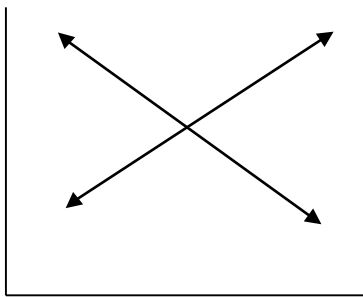
5. The price of purple striped shirts decreases (Purple striped shirts are a complement to purple ties, even if they do make the wearer look somewhat like an optical illusion).



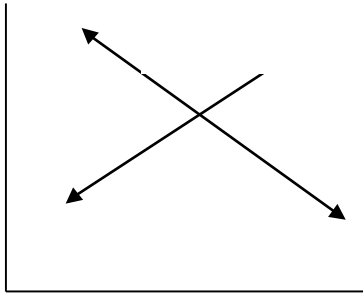
6. The price of silk increases (ties are made with silk).



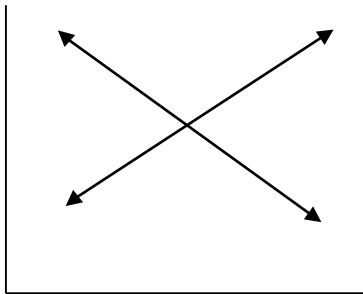
7. The government adds a subsidy to tie production, hoping this will finally be the key to surpassing South Carolina economically.



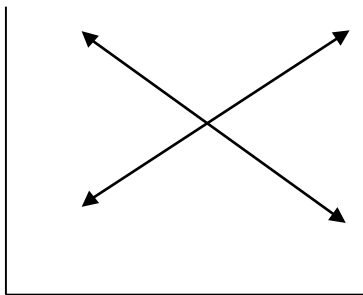
8. After the release of Alan Greenspan's first jazz flute album (he is an avid fan of the purple tie), purple tie producers are expecting a huge increase in demand and thus an increase in the price.



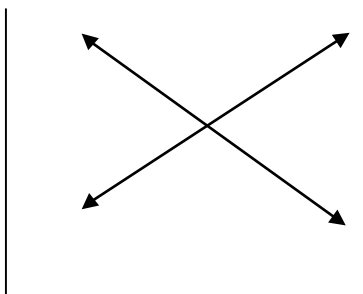
9. Because politicians are snobby old men that can't appreciate interesting ties, Congress enacts new tax on the production of purple ties.



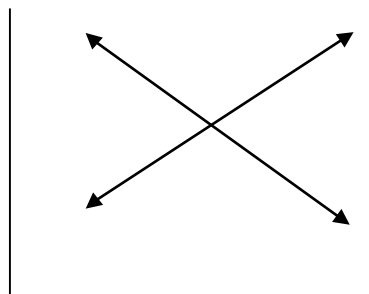
10. As the popularity of purple ties sweeps the greater Orange County area, new producers enter the purple tie market.



11. Purple ties are named by GQ magazine as a "must have" for all young professionals. At the same time, a new textile machine decreases the cost of producing purple ties.



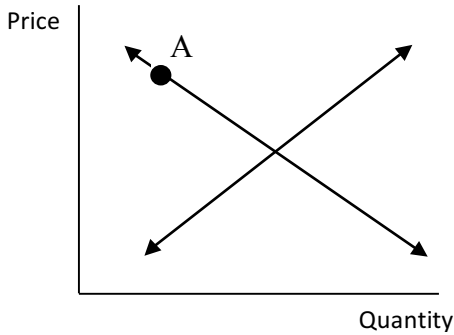
12. The price of pink ties (a related good that most purple ties also produce) rises as spring approaches. Tie consumers in Chapel Hill begin to expect purple ties to be put on sale since spring is coming, so they put off purchasing.



Supply and Demand Test Questions

- Which would be a likely cause of an increase in the price of pizza?
 - a decreased interest in take-out and fast-food dining
 - a decrease in the price of hamburgers, a substitute food
 - an increase in the price of cheese, a complement
 - a health report showing eating pizza reduces stress

- What does Point A on the diagram below represent?



- a situation where the buying and selling decisions of consumers and producers are consistent.
 - a combination of two consumer goods which buyers will choose at given prices.
 - a particular price and the corresponding quantity demanded by consumers.
 - the ratio of the selling price to the buying price.
- Which of the following **best describes** the relationship between price and quantity demanded shown by the demand curve?
 - as the product's price falls, consumers buy less of the good.
 - there is a direct relationship between price and quantity demanded.
 - as a product's price rises, consumers buy less of other goods.
 - there is an inverse relationship between price and quantity demanded.
 - An improvement in the technology used in the production of automobiles will **most likely** cause the price and quantity of automobiles to change in which of the following ways?

	Price	Quantity
A)	Increase	Increase
B)	Increase	Decrease
C)	Decrease	Decrease
D)	Decrease	Increase
 - An increase in the popularity of Good X will most likely cause the equilibrium price and quantity of Good X to change in which of the following ways?

	Price	Quantity
A)	Increase	Increase
B)	Increase	Decrease
C)	Decrease	Increase
D)	Decrease	Decrease
 - A drought will most likely cause the equilibrium price and quantity of oranges to change in which of the following ways?

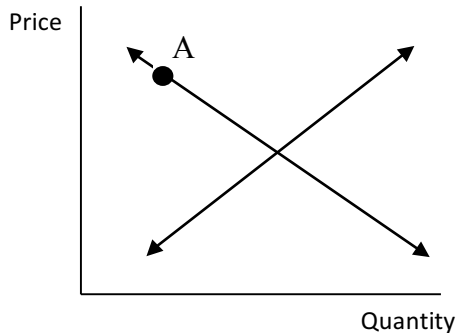
	Price	Quantity
A)	Increase	Increase
B)	Increase	Decrease
C)	Uncertain	Increase
D)	Decrease	Decrease

Supply and Demand Practice EOC Questions- ANSWER KEY

1. Which would be a likely cause of an increase in the price of pizza?

- A) a decreased interest in take-out and fast-food dining
- B) a decrease in the price of hamburgers, a substitute food
- C) an increase in the price of cheese, a complement
- D) a health report showing eating pizza reduces stress

2. What does Point A on the diagram below represent?



- A) a situation where the buying and selling decisions of consumers and producers are consistent.
- B) a combination of two consumer goods which buyers will choose at given prices.
- C) a particular price and the corresponding quantity demanded by consumers.
- D) the ratio of the selling price to the buying price.

3. Which of the following **best describes** the relationship between price and quantity demanded shown by the demand curve?

- A) as the product's price falls, consumers buy less of the good.
- B) there is a direct relationship between price and quantity demanded.
- C) as a product's price rises, consumers buy less of other goods.
- D) there is an inverse relationship between price and quantity demanded.

4. An improvement in the technology used in the production of automobiles will **most likely** cause the price and quantity of automobiles to change in which of the following ways?

	Price	Quantity
A)	Increase	Increase
B)	Increase	Decrease
C)	Decrease	Decrease
D)	Decrease	Increase

5. An increase in the popularity of Good X will most likely cause the equilibrium price and quantity of Good X to change in which of the following ways?

	Price	Quantity
A)	Increase	Increase
B)	Increase	Decrease
C)	Decrease	Increase
D)	Decrease	Decrease

6. A drought will most likely cause the equilibrium price and quantity of oranges to change in which of the following ways?

	Price	Quantity
A)	Increase	Increase

B)	Increase	Decrease
C)	Uncertain	Increase