Excise Taxes

Table 2-6.1 and Figure 2-6.1 show the current supply of Greebes.

Table 2-6.1
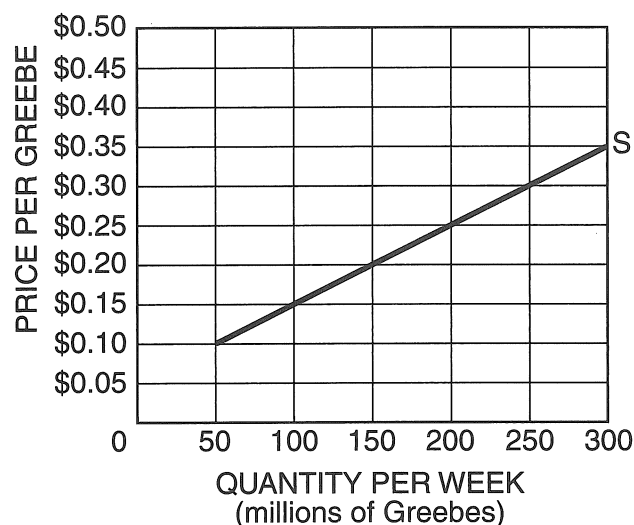**Supply Schedule of Greebes**

Quantity (millions)	Supply price before tax (per Greebe)	Supply price after tax (per Greebe)
50	$0.10	
100	$0.15	
150	$0.20	
200	$0.25	
250	$0.30	
300	$0.35	

Figure 2-6.1
Current Supply Schedule of Greebes

Now, suppose that in order to raise revenue for higher education, the government enacts an excise (sales) tax on sellers of $0.15 per Greebe. *This tax will result in a new supply curve for Greebes.* Since sellers will view this tax as an additional cost to them, there will be a decrease in supply. To determine where this new supply curve lies, reason as follows. Firms will try to pass the tax on to consumers through a higher price. If before the tax, firms were willing to supply 50 million Greebes at a price of $0.10, they would now be willing to

supply 50 million Greebes only if the price were $0.25. (Remember: $0.15 of the price of each Greebe sold is now going to go to the government. So, if the price is $0.25 and the government is getting $0.15 of this price, then the seller is receiving the remaining $0.10.)

1. Fill in the blank spaces in Table 2-6.1. In Figure 2-6.1 draw the new supply curve that results from the tax. Label the new supply curve S_T.

What will be the result of this excise tax on the equilibrium quantity of Greebes? On the equilibrium price paid by buyers? On the equilibrium price received by sellers? On the tax revenue received by the government? On the revenue kept by sellers after they give the government its tax revenue?

The answers to these important questions will depend on the price elasticity of demand for Greebes. The next section of this activity will help you determine the effects of a $0.15 per unit excise tax on Greebes under four different demand conditions.

Part A: Relatively Elastic and Relatively Inelastic Demand

Compare the demand curves in Figures 2-6.2 and 2-6.3. Demand curve D_1 is relatively more inelastic than demand curve D_2. Put another way, D_2 is relatively more elastic than D_1.

Figure 2-6.2
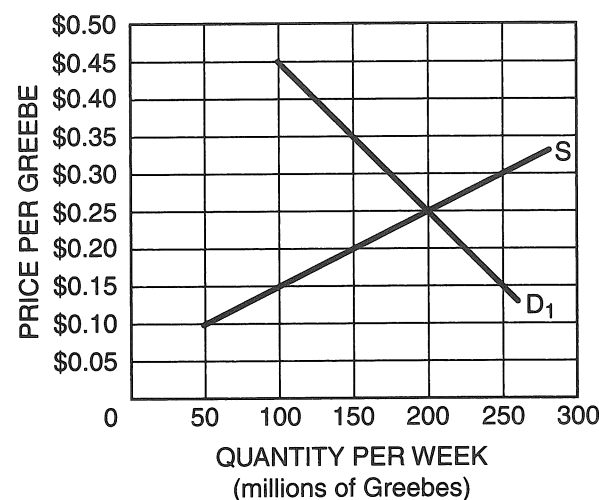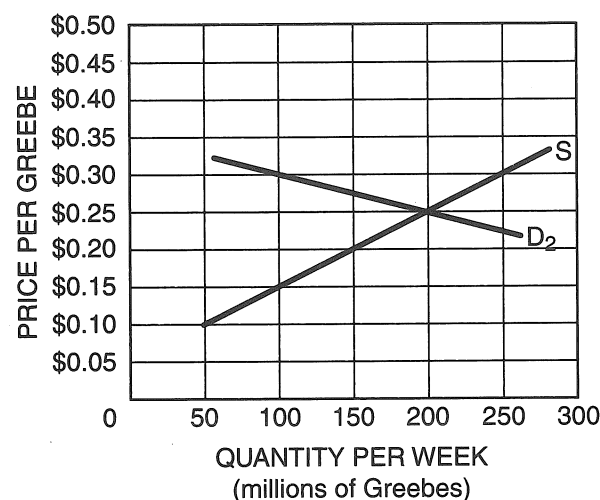**Relatively Inelastic Demand for Greebes**

Figure 2-6.3
Relatively Elastic Demand for Greebes

2. Complete Table 2-6.2, which compares conditions before the tax and after the tax based on demand curves D_1 and D_2. Remember, the government is placing a \$0.15 per unit excise tax on the sellers of the good. You will need to add the new supply curve S_T to Figures 2-6.2 and 2-6.3.

Table 2-6.2

Comparing Effects of Tax Based on Price Elasticity of Demand

	Relatively inelastic demand D_1 Figure 2-6.2		Relatively elastic demand D_2 Figure 2-6.3	
	Before tax	After tax	Before tax	After tax
Equilibrium quantity	200 million			100 million
Equilibrium price	\$0.25			\$0.30
Total expenditure by consumers		\$52.5 million	\$50.0 million	
Total revenue sellers get to keep	\$50.0 million			\$15.0 million
Total tax revenue to government	\$0.0 million		\$0.0 million	

The incidence or burden of the excise tax refers to how the \$0.15 per unit excise tax is shared between the buyers and the sellers. The incidence on the consumer is the increase in the equilibrium price resulting from the tax. The seller's incidence is that part of the tax not paid by consumers.

3. Under demand curve D_1, the incidence of the tax is \$ _____ per unit on consumers and \$ _____ per unit on sellers. Remember, these two values must add up to the per unit excise tax of \$0.15.

4. Under demand curve D_2, the incidence of the tax is \$ _____ per unit on consumers and \$_____ per unit on sellers. Remember, these two values must add up to the per unit excise tax of \$0.15.

5. The incidence of the tax is greater on buyers if demand is relatively (*more / less*) inelastic.

6. The incidence of the tax is greater on sellers if demand is relatively (*more / less*) inelastic.

Part B: Perfectly Elastic and Perfectly Inelastic Demand

Figure 2-6.4
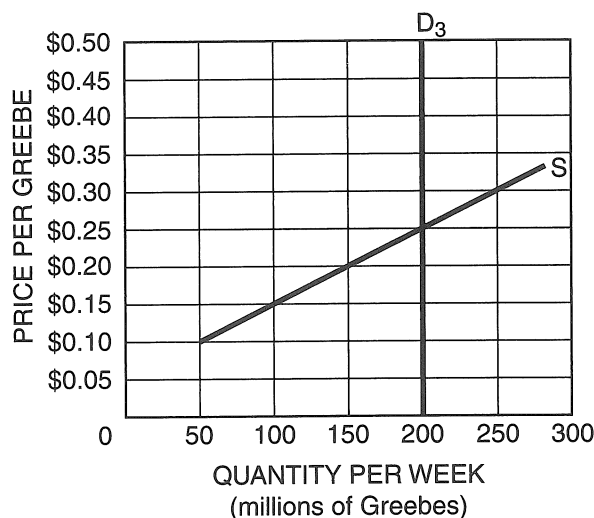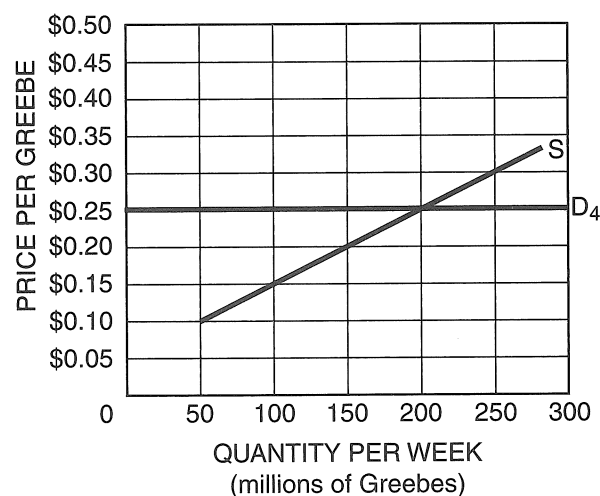**Perfectly Inelastic Demand for Greebes**

Figure 2-6.5
Perfectly Elastic Demand for Greebes

7. In the extreme cases of perfectly inelastic or perfectly elastic demand, the burden of the excise tax is not shared by consumers and sellers—one party will pay the entire tax. Compare Figures 2-6.4 and 2-6.5 and complete Table 2-6.3. Then answer the questions following the table. Remember, the government is placing a $0.15 per unit excise tax on the sellers of the good. You will need to add the new supply curve S_T to Figures 2-6.4 and 2-6.5.

Table 2-6.3
Comparing Effects of Tax Based on Perfectly Inelastic or Perfectly Elastic Demand

	Perfectly inelastic demand D_3 Figure 2-6.4		Perfectly elastic demand D_4 Figure 2-6.5	
	Before tax	After tax	Before tax	After tax
Equilibrium quantity	200 million			50 million
Equilibrium price	$0.25			$0.25
Total expenditure by consumers		$80.0 million	$50.0 million	
Total revenue sellers get to keep	$50.0 million			$5.0 million
Total tax revenue to government	$0.0 million		$0.0 million	

8. Under demand curve D$_3$, the incidence of the tax is $ _____ per unit on consumers and $ _____ per unit on sellers. Remember, these two values must add up to the per unit excise tax of $0.15.

9. Under demand curve D$_4$, the incidence of the tax is $ _____ per unit on consumers and $ _____ per unit on sellers. Remember, these two values must add up to the per unit excise tax of $0.15.

10. The incidence of the tax is totally on buyers if demand is perfectly (*elastic / inelastic*).

11. The incidence of the tax is totally on sellers if demand is perfectly (*elastic / inelastic*).

Part C: Excise Tax Examples

12. A famous Supreme Court justice once said, "The power to tax is the power to destroy." This is more likely to be true regarding sellers if the demand for the product taxed is relatively (*elastic / inelastic*).

13. If you were a government revenue agent interested in getting the most tax revenue possible, you would suggest putting excise taxes on goods whose demand is (*elastic / unit elastic / inelastic*).

14. Think of some real-world goods on which the government places excise taxes: liquor, cigarettes, gasoline. Do you think that the demand for these goods is relatively elastic or relatively inelastic? How does this affect the amount of tax revenue the government receives from taxes on these goods?

Maximum and Minimum Price Controls

Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives. High prices induce extra production while they discourage consumption.

In this exercise, we discover how the imposition of price controls (maximum or minimum prices) interrupts the process that matches production with consumption. *Price ceilings* (maximum prices) sometimes appear in the form of rent control, utility prices, and other caps on upward price pressure. *Price floors* (minimum prices) occur in the form of agricultural price supports and minimum wages.

When the government imposes price controls, citizens should understand that some people gain and some people lose from every policy change. By understanding the consequences of legal price regulations, citizens are able to weigh the costs and benefits of the change.

As a general rule, price floors create a *surplus* of goods or services, or *excess supply*, since the quantity demanded of goods is less than the quantity supplied. Conversely, price ceilings generate *excess quantity demanded,* causing *shortages.*

Figure 2-7.1
Price Floors and Ceilings
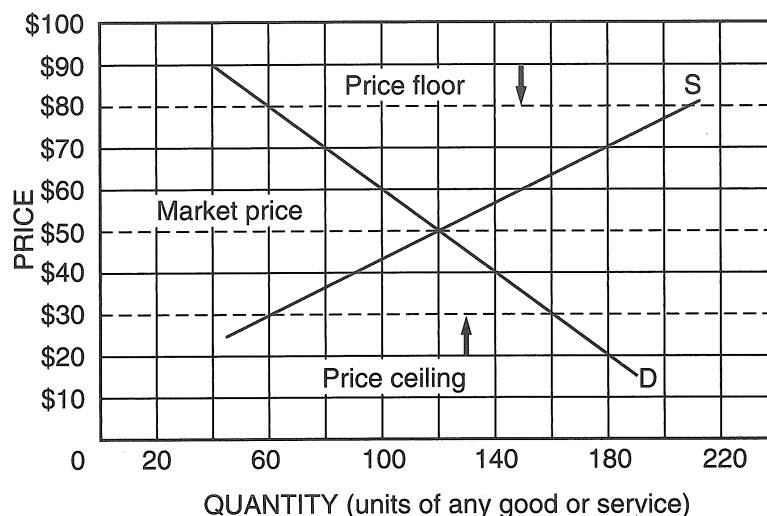
Price floors and ceilings can be plotted with supply and demand curves. Use Figure 2-7.1 to answer the questions.

1. What is the market price? _____

2. What quantity is demanded and what quantity is supplied at the market price?

   (A) Quantity demanded _____

   (B) Quantity supplied _____

3. What quantity is demanded and what quantity is supplied if the government passes a law requiring the price to be no higher than $30 (a price ceiling)?

   (A) Quantity demanded _____

   (B) Quantity supplied _____

   (C) There is a (*shortage / surplus*) of _____.

4. What quantity is demanded and what quantity is supplied if the government passes a law requiring the price to be no lower than $80 (a price floor)?

   (A) Quantity demanded _____

   (B) Quantity supplied _____

   (C) There is a (*shortage / surplus*) of _____

   (D) What happens to total consumer surplus? _____

   (E) Is society better or worse off after the price floor is imposed? _____

   (F) Who gains from the price floor? _____

Property Rights and Market Failure

A key requirement of a well-functioning market economy is the establishment and enforcement of well-defined property rights. When individuals, rather than central governments, own the land and physical capital, many important economic incentives are created. When a person owns property, he or she has the right to use, sell, or trade with another person for mutual gain. For example, a homeowner has an incentive to keep that home in nice condition whether he wants to continue to live in the home or if he thinks that the home might eventually be sold. If the person living in that home doesn't own the home, he may not have a very strong incentive to keep the home in tip-top condition.

If the owner of a restaurant owns the capital used by the firm, she has a profit incentive to produce a high-quality product that is demanded by consumers. After all, if the firm is not profitable, the firm will go bankrupt and the owner's physical capital may be lost.

In the case of the homeowner and the restaurateur, property rights allow for the housing and restaurant markets to exist and to function reasonably well. This of course begs the question: what would happen to a market if property rights were not very well established or were absent altogether?

Many cities and towns are located along a river for two reasons: the river proved to be an excellent source of water for residential and industrial usage, and it was an excellent way of disposing of residential and industrial wastes. A river is an example of a nation's natural resources, but it is owned by nobody. As a result of the absence of property rights to the water (either for consumption or for disposal purposes), it tends to be overused and polluted. We can see this with another example of a negative externality.

Suppose that many chemical companies are located on the banks of the lovely Bohio River. The Bohio is a source of drinking water for many cities, it is a source of recreation for swimmers and boaters, a fishing industry exists on the Bohio, and the river serves a pivotal role in the ecosystem throughout the watershed.

Like all firms, these companies incur marginal production costs for each ton of chemicals that is produced. These marginal costs that accrue to the chemical companies are referred to as *marginal private costs (MPC)* of production and are assumed to increase as more tons of chemicals are produced. In fact, it is the marginal private cost curve that represents the market supply of chemicals. Suppose that the chemical companies can discharge toxic waste into the Bohio River, a common resource that is critical to everyone but owned by no one. This toxic waste requires cities to install additional water purification equipment, causes swimmers to develop skin rashes, hurts the profitability of the firms in the fishing industry, and threatens the viability of the ecosystem. These negative by-products of producing another ton of chemicals are additional *external costs* to society. When we add the marginal private cost to the external cost of producing chemicals, we get a higher dollar amount, the *marginal social cost (MSC)*. Figure 2-8.1 shows both the MSC and MPC curves in the market for chemicals. The vertical distance between the two represents the external costs, or negative externality, imposed upon society because nobody owns the Bohio River.

The graph also shows the downward sloping *marginal social benefit (MSB)* curve that represents the demand for chemicals in this market. Assuming that all the benefits of the chemicals are received by the buyers of the chemicals, the demand curve also represents the *marginal private benefit (MPB)* curve.

1. The market for chemicals will ignore the external costs to society. Businesses seeking to maximize their total profit will produce the output level where their marginal private benefit equals their marginal private cost (MPB = MPC). In Figure 2-8.1, label the market equilibrium quantity of chemicals and the equilibrium price of chemicals as Q_M and P_M.

Figure 2-8.1
The Market for Chemicals

QUANTITY OF CHEMICALS (tons)
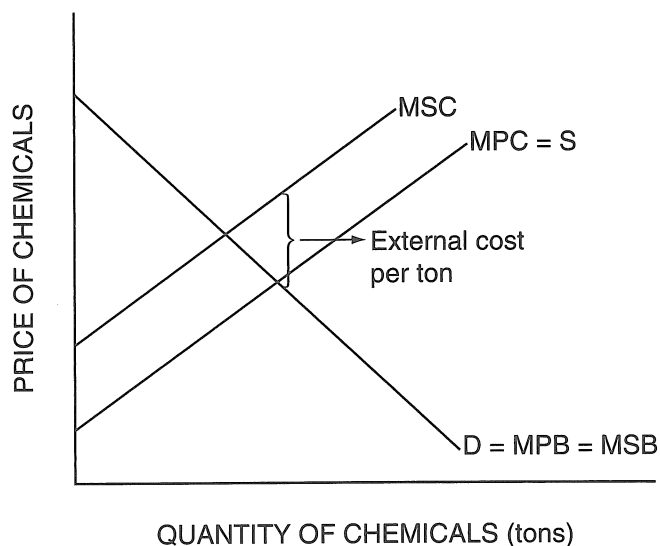
2. From society's perspective, the optimal or socially efficient output level of chemicals is the one where marginal social benefit equals marginal social cost (MSB = MSC). In the graph, label the socially efficient quantity of chemicals and socially efficient price of chemicals as Q_E and P_E.

3. Which output level is greater: the one produced by firms in the market or the one desired by society? Does this indicate that the negative externality caused by pollution results in an over-allocation or an under-allocation of society's scarce resources to the chemical market? Explain.

4. What impact did the absence of property rights for the Bohio River have on the outcome of the chemical market?

Deadweight Loss

When a market transaction is made between a buyer and a seller, both parties expect to benefit from that transaction: Buyers will receive consumer surplus, and sellers will receive producer surplus. If the market is competitive and free of externalities, the equilibrium price and quantity are such that the sum of consumer surplus and producer surplus (total surplus or total welfare) is maximized. There is no other outcome that can generate more total welfare than the competitive outcome. However, when something prevents the market from reaching that equilibrium outcome, total welfare falls, and the decline in total welfare is called *deadweight loss*. Deadweight loss really just represents the value of transactions that *could have* been made, but are not made. In the activities below you will see deadweight loss can emerge in a couple of different ways but common sources of deadweight loss include: price and quantity controls, excise taxes, monopoly power, and externalities.

Part A: The Market for Hamburgers

Table 2-9.1 shows the demand and supply schedules for hamburgers, a good that is currently exchanged in a competitive market. We can see that consumers have diminishing marginal benefit from hamburgers as more are consumed. We can also see that suppliers have increasing marginal cost of producing hamburgers as more are produced. Use the table to answer the questions that follow.

Table 2-9.1
The Market for Hamburgers

Demand			Supply		
Quantity of hamburgers demanded	Marginal benefit from a hamburger	Consumer surplus (CS)	Quantity of hamburgers supplied	Marginal cost of a hamburger	Producer surplus (PS)
1	$10	$4	1	$2	
2	$9		2	$3	$3
3	$8		3	$4	
4	$7		4	$5	
5	$6		5	$6	
6	$5		6	$7	
7	$4		7	$8	
8	$3		8	$9	
9	$2	-$4	9	$10	
10	$1		10	$11	-$5

1. What is the equilibrium quantity of hamburgers exchanged in the market, and what is the equilibrium price in the market?

2. At the equilibrium quantity, complete the columns of consumer and producer surplus. Remember that each hamburger is sold at the equilibrium price.

3. What is the total welfare generated by the competitive equilibrium in the hamburger market?

4. Now suppose the government decides that too many hamburgers are being exchanged in the competitive market and requires that only three hamburgers be bought and sold at the equilibrium price found in Question 1. How does this regulation affect total welfare?

Part B: The Market for Textbooks

This activity will use a little bit of algebra and graphical analysis to see how deadweight loss is created with a price ceiling.

Suppose that the market for textbooks can be described with the following demand and supply equations.
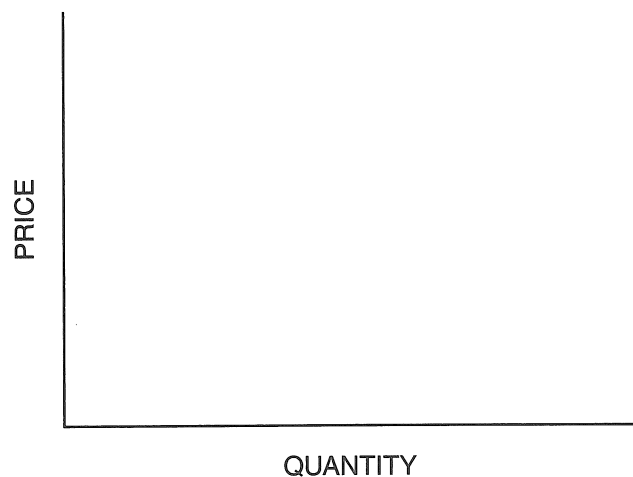
$$\text{Market Demand: } P = 300 - Q_d$$

$$\text{Market Supply: } P = 100 + Q_s$$

5. Sketch a graph of this market and solve for the equilibrium price and quantity.

Figure 2-9.1
The Market for Textbooks

6. Show the area of CS and PS in the graph.

7. Compute the dollar value of CS and PS.

8. Now suppose a benevolent college president has decided that the price of textbooks is "too high" and successfully imposes a price ceiling of $150. Show the impact of a price ceiling in the graph.

9. Recalculate the CS and PS and determine the amount of deadweight loss (DWL) that is created by this policy.