

The Hidden Price Tag: Externalities and the Real Cost of Things

Bloom's Level: Analyze

Standard:

HS-ESS3-4 — Evaluate human impacts on Earth systems

TEKS.113.5.B.15 — Environmental Economics

NCSS.D2.Geo.5.9-12 — Human-Environment Interaction

STUDENT EDITION



The price on a gas pump only reflects part of the true cost — pollution and climate damages are paid by society, not shown on the sign.

The Hidden Price Tag: Externalities and the Real Cost of Things

When the Price at the Pump Isn't the Whole Story

Imagine pulling into a gas station and paying \$3.50 for a gallon of gasoline. Transaction complete, right? Not quite. That number on the pump only tells part of the story.

Somewhere downstream, that gallon of gas will release carbon dioxide into the atmosphere, contribute to smog in a nearby city, and add a fraction of a degree to a warming planet. Nobody charged you for those effects — but someone, somewhere, will pay for them. This gap between what you pay and what something actually costs is one of the most powerful ideas in economics and environmental science. Economists call it an **externality**, and once you understand it, you'll start seeing hidden price tags everywhere.



The price on a gas pump only reflects part of the true cost — pollution and climate damages are paid by society, not shown on the sign.

What Is an Externality?

An **externality** is a cost or benefit that falls on a third party — someone who wasn't part of the original transaction. Think of it as a side effect that the market price doesn't capture. In other words, the buyer and seller agree on a price that works for them, but that price ignores consequences felt by people who had no say in the deal.

Externalities come in two forms:

- **Negative externalities** occur when a transaction creates costs for others. Pollution is the classic example. When a factory burns coal to generate electricity, the price of that electricity doesn't include the health costs borne by people who breathe the polluted air nearby.
- **Positive externalities** occur when a transaction creates benefits for others. When someone gets vaccinated against the flu, they protect not only themselves

but also the people around them who can no longer catch the disease from them. The vaccine's market price doesn't reflect that broader social benefit.

Breaking Down the Gasoline Example

Let's examine the \$3.50 gallon of gas more carefully. Researchers and economists have estimated that when you factor in:

- **Air pollution and respiratory health costs** (hospital visits, lost workdays)
- **Climate change damages** (rising sea levels, extreme weather events, agricultural disruption)
- **Military and geopolitical costs** of securing oil supply chains

...the true social cost of a gallon of gasoline may be anywhere from \$5 to over \$10. The difference between the pump price and the true cost is a **negative externality** — and it's being paid, invisibly, by society at large, by ecosystems, and by future generations.

Examining Real-World Examples

Energy and the Atmosphere

Coal-fired power plants emit sulfur dioxide, nitrogen oxides, and carbon dioxide. These gases contribute to acid rain, which damages forests and lakes, and to climate change, which alters Earth's hydrosphere and biosphere. The communities living near these plants — often lower-income neighborhoods — bear disproportionate health burdens. Compare this to solar energy: once a panel is installed, it generates electricity with near-zero emissions. The negative externalities are dramatically smaller, which is one reason many economists argue solar's social cost is far lower than its market price suggests. This comparison makes clear that the type of energy we choose carries consequences well beyond our monthly utility bill.

The Surprising Case of Honeybees

Here's a positive externality you might not expect. When a farmer keeps honeybees for honey production, neighboring fruit orchards benefit from the bees' pollination — for free. The orchard owner didn't pay for that service, and the beekeeper wasn't compensated for it. Markets, left alone, would likely produce fewer beekeepers than

society actually needs, because the full value of their bees isn't reflected in honey prices. This is a pattern worth recognizing: when positive externalities exist, markets tend to underproduce the beneficial good.

Vaccines and Herd Immunity

Contrast the honeybee example with vaccines. When enough people in a community are vaccinated, the disease can no longer spread easily — this is called **herd immunity**. Each individual vaccination creates a positive externality for everyone else. Because individuals only consider their own benefit when deciding whether to get vaccinated, markets alone tend to produce fewer vaccinations than the socially optimal level. Both the honeybee and vaccine examples illustrate the same underlying logic: when the full benefits of an action aren't captured by the person taking it, society ends up with less of that action than it truly needs.

How Governments Try to Correct Externalities

Recognizing that markets sometimes fail to account for externalities, governments use several tools to bring prices closer to their true social cost:

- **Taxes (Pigouvian taxes):** A carbon tax adds a fee to fossil fuels proportional to their emissions. This forces producers and consumers to internalize the environmental cost, making cleaner alternatives more competitive. Several countries, including Canada and Sweden, have implemented carbon pricing systems.
- **Subsidies:** Governments can subsidize goods with positive externalities to encourage more production and consumption. Tax credits for electric vehicles or solar panels are examples — they lower the price to reflect the broader social benefit.
- **Regulation:** Emissions standards, clean air acts, and environmental protection laws set legal limits on how much pollution is permissible, directly capping negative externalities.

Each approach has real trade-offs worth examining. Carbon taxes generate public revenue and create market incentives, but critics argue they can place heavier financial burdens on lower-income households who spend a larger share of their

income on energy. Subsidies encourage beneficial behavior but draw on public funds that could be used elsewhere. Regulations can precisely target harmful activities but may be difficult to enforce consistently — especially when pollution crosses national borders. Recognizing these tensions is essential to evaluating which policy tools work best in different contexts.

What Can Individuals Do?

Understanding externalities isn't just an academic exercise — it can shape everyday decisions. Choosing energy-efficient appliances, supporting local transit, or advocating for stronger environmental policies are all ways individuals can help reduce negative externalities. When consumers and voters understand the gap between market prices and true social costs, they are better equipped to support policies that close that gap. Individual choices, multiplied across millions of people, can shift market demand and signal to producers that social costs matter.

Conclusion: Seeing the Invisible Price Tags

Externalities reveal a fundamental truth about markets: prices are powerful signals, but they don't always tell the whole story. When the costs of human activity spill over onto ecosystems, communities, and future generations without being reflected in market prices, markets fail — and the environment often pays the price. By learning to differentiate between private costs and social costs, and by examining the relationships between economic decisions and Earth's systems, you gain a sharper lens for evaluating real-world problems. The next time you see a price tag — on gas, on electricity, on food — ask yourself: What's the hidden cost? Who's really paying? And what can be done about it?

Lesson Objective

In this lesson, you will explore how human economic decisions — like burning fossil fuels or choosing energy sources — create hidden costs and benefits that affect Earth's atmosphere, ecosystems, and communities. You will analyze the concept of externalities to understand the gap between what people pay for goods and what those goods truly cost society and the environment. By the end, you will be able to break down real-world examples and evaluate how economic choices connect to environmental impacts.

Standard: HS-ESS3-4 — Evaluate human impacts on Earth systems; TEKS.113.5.B.15 — Environmental Economics; NCSS.D2.Geo.5.9-12 — Human-Environment Interaction

Bloom's Level: Analyze

Bloom's Goal: Students will analyze the relationship between market prices and true social costs by examining how negative and positive externalities reflect the broader environmental and economic consequences of human activity.

Explanation: Analyzing requires students to break down complex concepts — like the difference between private costs and social costs — and identify how the parts relate to each other and to larger Earth systems. This goes beyond simply recalling definitions; students must examine evidence, compare examples such as fossil fuels versus solar energy, and draw connections between economic decisions and environmental outcomes.



When beekeepers tend their hives, nearby orchards receive free pollination — a classic example of a positive externality that markets often overlook.

Application Questions

Read each question carefully, use evidence from the article to support your thinking, and write a complete response in your own words.

1. A coal-fired power plant sells electricity at a price that does not include the health and environmental costs it creates for nearby communities. Analyze how this situation represents a negative externality, and explain which Earth systems are affected by the plant's emissions.

Think about: Consider what an externality is, who bears the costs that are not included in the electricity price, and which specific Earth systems — atmosphere, hydrosphere, biosphere, or geosphere — are impacted by coal plant emissions like sulfur dioxide, nitrogen oxides, and carbon dioxide.

2. The article describes both a carbon tax and government subsidies for solar panels as tools to correct externalities. Analyze the strengths and trade-offs of each approach, and explain which groups of people might be helped or harmed by each policy.

Think about: Think about how each policy changes the price signals in the market, who benefits from lower-cost clean energy, and who might struggle with higher energy costs under a carbon tax. Consider the article's point about lower-income households spending a larger share of income on energy.

3. Compare the honeybee pollination example with the vaccine herd immunity example. Analyze what these two situations have in common in terms of externalities, and explain why markets alone tend to produce less of each than society actually needs.

Think about: Identify what type of externality both examples share, think about why individuals making decisions for themselves might not account for the benefits they create for others, and consider what the article says about the relationship between positive externalities and market underproduction.

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Primary Source Analysis (DBQ)

Read the primary source excerpt below carefully. Then answer the four analysis questions that follow. Use evidence from the source and your knowledge of externalities, environmental economics, and human-environment interaction to support your responses.

Testimony Before the U.S. Senate Committee on Environment and Public Works [\[Congressional Testimony\]](#)

The price a consumer pays at the gasoline pump bears little resemblance to the true cost that fuel imposes upon our nation. When we burn a gallon of petroleum, we release pollutants that fill our city air with smog, sending children to emergency rooms with asthma attacks and costing our hospitals millions of dollars annually. We accelerate the warming of our atmosphere, threatening coastal communities with rising seas and farmers with unpredictable harvests. We entangle our foreign policy in distant oil-producing regions, spending blood and treasure to secure supply lines. None of these costs appear on the price sign at the filling station. They are borne instead by our citizens, our ecosystems, and our children's futures. Until our energy prices reflect these true social costs, the market will continue to steer us toward choices that are privately cheap but publicly devastating. I urge this Committee to consider a meaningful carbon pricing mechanism that compels industry and consumers alike to reckon honestly with the full consequences of their energy decisions.

— Adapted from testimony of an environmental economist before the U.S. Senate Committee on Environment and Public Works, Washington, D.C., 2009

1. Who is the author of this testimony, and what is their likely purpose in presenting it to the Senate Committee? How might the author's role as an environmental economist influence the perspective expressed in this source? [Sourcing]

2. This testimony was delivered in 2009, a period of growing public debate about climate change and energy policy. How does the historical and political context of this era help explain why the author was calling for carbon pricing, and what broader environmental concerns were shaping this conversation? [Context]

3. The author states that gasoline costs are 'borne instead by our citizens, our ecosystems, and our children's futures.' Using evidence from the source, identify at least two specific negative externalities described and explain how each represents a cost that is not reflected in the market price of gasoline. [Close Reading]

4. The author advocates for carbon pricing as a solution to the problem of externalities. Based on what you have learned about Pigouvian taxes, subsidies, and regulation, do you think carbon pricing alone is sufficient to address the negative externalities of fossil fuel use? Use evidence from the source and your knowledge to support your answer.

[Corroboration]

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Timeline Construction

Below are five key events or developments in the history of how societies have recognized and responded to environmental externalities. Your tasks are: (1) Place the events in correct chronological order by writing the letter IDs from earliest to most recent. (2) For each event, respond to the significance prompt in 1-2 sentences, explaining why that event mattered for understanding the relationship between human economic activity and Earth's systems.

C. The United States passes the Clean Air Act, establishing the first major federal regulations setting legal limits on air pollutants — including sulfur dioxide and nitrogen oxides emitted by coal-fired power plants.

Date / Period:

Significance:

Why was it significant that the government used regulation rather than market prices alone to address the negative externalities of air pollution from fossil fuels?

A. British economist Arthur Pigou formally introduces the concept of externalities in his work 'The Economics of Welfare,' arguing that market prices often fail to capture the full social costs or benefits of economic transactions.

Date / Period:

Significance:

Why was Pigou's identification of externalities a turning point in how economists and policymakers thought about the relationship between markets and environmental harm?

E. Sweden becomes one of the first countries in the world to implement a national carbon tax, placing a direct fee on fossil fuel emissions to force producers and consumers to internalize the climate costs of burning carbon.

Date / Period:

Significance:

Why did Sweden's carbon tax represent a significant shift in how governments attempted to correct the negative externalities associated with fossil fuel use and climate change?

B. Scientists document widespread acid rain damage to forests and lakes across North America and Europe, linking the destruction to sulfur dioxide and nitrogen oxide emissions from coal-burning power plants hundreds of miles away.

Date / Period:

Significance:

Why did the discovery of acid rain strengthen the argument that negative externalities from industrial energy production could cross borders and damage ecosystems far from the original source?

D. Canada implements a national carbon pricing system, requiring provinces to put a price on carbon emissions, with revenues returned to households — illustrating both the promise and the equity trade-offs of Pigouvian tax policy.

Date / Period:

Significance:

Why is Canada's carbon pricing system considered an important real-world test of whether carbon taxes can reduce negative externalities while also addressing concerns about financial burdens on lower-income households?

Civic Action Scenario

Read the civic scenario below carefully. Identify the stakeholders involved and answer all three questions using evidence, reasoning, and your understanding of externalities, environmental economics, and civic responsibility.

Scenario: The city of Millbrook is considering approving a new coal-fired power plant on the edge of town. The plant would create 400 jobs and lower electricity rates for local businesses and residents. However, environmental scientists warn that the plant will release sulfur dioxide and carbon dioxide, increasing respiratory illness rates in nearby neighborhoods and contributing to regional climate change. A coalition of residents — many from lower-income communities closest to the proposed site — has organized to demand that the city council hold a public hearing before any permits are issued. The city council must decide whether to approve the plant, reject it, or require the company to offset its environmental costs before construction begins.

Stakeholders: Millbrook city council members responsible for approving or denying the permit

- | Lower-income residents living near the proposed plant site who face the greatest health risks
- | Local business owners and workers who would benefit from lower energy costs and new jobs
- | Environmental scientists and advocacy groups concerned about long-term damage to air quality and climate systems

1. Analyze the negative externalities associated with approving the coal plant. Who bears the costs that are NOT reflected in the price of the electricity the plant would produce, and how does this represent a market failure?

2. Compare at least two government policy tools — such as a carbon tax, regulation, or subsidy — that the city or state could use to address the externalities created by the plant. What are the trade-offs of each approach for different stakeholder groups?

3. The lower-income residents near the plant site are organizing to participate in the public hearing. Evaluate their civic rights and responsibilities in this situation. What role should public participation play in decisions that involve environmental externalities affecting specific communities?

Economic Decision Tree

Read the scenario below carefully. Review the two policy options, including their costs and benefits. Then answer the three analysis questions using evidence and economic reasoning.

Scenario: The city of Riverside is located near a large coal-fired power plant that supplies electricity to 200,000 residents. Recent air quality data shows that residents living closest to the plant have significantly higher rates of asthma and respiratory illness, and the plant is a major contributor to regional carbon emissions. The city council must decide how to address the negative externalities created by the plant. Two policy options are on the table, and the council must weigh the economic and environmental trade-offs before voting.

Option A: Implement a Carbon Tax on the Power Plant

Costs:

- The carbon tax will likely raise electricity prices for all residents, placing a heavier financial burden on lower-income households who spend a larger share of their income on energy bills.
- The power plant may reduce operations or lay off workers to offset the added tax costs, potentially increasing local unemployment.
- Enforcing the tax and monitoring emissions requires ongoing government administrative resources and funding.

Benefits:

- The tax forces the power plant to internalize the environmental and health costs of its emissions, bringing the market price of electricity closer to its true social cost.
- Revenue collected from the carbon tax can be reinvested into public health programs or subsidies for clean energy alternatives in the community.
- Creating a financial incentive for the plant to reduce emissions encourages long-term investment in cleaner technologies.

Option B: Subsidize Rooftop Solar Panels for Residents

Costs:

- Subsidies require significant public funding, drawing money away from other city services such as schools, roads, or emergency services.
- Not all residents can benefit equally — renters and those in multi-unit buildings may be unable to install rooftop solar panels, creating an uneven distribution of benefits.
- The coal plant continues operating at full capacity in the short term, meaning air pollution and health externalities persist while solar adoption gradually increases.

Benefits:

- Subsidizing solar panels lowers the market price to reflect the broader social benefit of clean energy, encouraging more residents to adopt renewable energy.
- Increased solar adoption reduces overall demand for coal-generated electricity over time, gradually decreasing the plant's negative externalities.
- Residents who install solar panels benefit from long-term reductions in their electricity bills, improving household economic stability.

1. Identify one negative externality created by the coal-fired power plant and explain how it affects a third party who was not part of the original electricity transaction.

2. Compare the two policy options. Which option do you think more directly addresses the concept of internalizing the true social cost of electricity production? Use specific costs and benefits from the decision tree to support your analysis.

3. Both options involve trade-offs that affect different groups of people unequally. Analyze how concerns about economic fairness should factor into the city council's decision, and explain which policy you would recommend and why.

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Close Reading Passage

Read the following passage carefully. Then answer the five questions below, using evidence from the text to support your responses.

Energy Choices and Their Hidden Costs

Coal-fired power plants emit sulfur dioxide, nitrogen oxides, and carbon dioxide. These gases contribute to acid rain, which damages forests and lakes, and to climate change, which alters Earth's hydrosphere and biosphere. The communities living near these plants — often lower-income neighborhoods — bear disproportionate health burdens. Compare this to solar energy: once a panel is installed, it generates electricity with near-zero emissions. The negative externalities are dramatically smaller, which is one reason many economists argue solar's social cost is far lower than its market price suggests. This comparison makes clear that the type of energy we choose carries consequences well beyond our monthly utility bill. Recognizing that markets sometimes fail to account for externalities, governments use several tools to bring prices closer to their true social cost, including carbon taxes, subsidies, and regulation.

1. According to the passage, what are two specific gases emitted by coal-fired power plants, and what environmental problems do they cause? **[Comprehension]**

2. What does the passage identify as three tools governments use to address negative externalities in energy markets? [Comprehension]

3. The passage states that lower-income communities often bear disproportionate health burdens from coal plants. What can you infer about the relationship between economic inequality and environmental harm based on this detail? [Inference]

4. Why might economists argue that solar energy's "social cost" is lower than its market price, even though solar panels can be expensive to purchase and install? [Inference]

5. The author uses the phrase "consequences well beyond our monthly utility bill" to conclude the energy comparison. Analyze how this phrase functions rhetorically — what effect does it have on the reader, and how does it connect individual economic decisions to broader environmental impacts? [Craft]

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Multiple Choice

Read each question carefully and select the best answer from the choices provided. Each question has only one correct answer.

1. A factory releases sulfur dioxide into the air while producing steel. Nearby residents experience increased rates of respiratory illness. Which of the following best describes this situation?
 - A. A positive externality, because the factory creates jobs for the community
 - B. A negative externality, because the health costs fall on people not part of the transaction
 - C. A market correction, because the government has already taxed the factory
 - D. A positive externality, because the factory contributes to the local economy
2. Researchers estimate that the true social cost of a gallon of gasoline is significantly higher than its pump price. Which of the following best explains why the pump price is lower than the true social cost?
 - A. Gas stations intentionally undercharge customers to increase sales volume
 - B. The government subsidizes gasoline to keep prices affordable for consumers
 - C. The pump price does not include environmental and health costs borne by society
 - D. Oil companies absorb the environmental costs internally to avoid regulation

3. When comparing coal-fired power plants to solar energy, which of the following best explains why economists argue that solar energy has a lower true social cost?

- A. Solar panels are always cheaper to install than coal plants
- B. Solar energy produces far fewer negative externalities, such as air pollution and climate change damages
- C. Coal plants are taxed more heavily by the government, raising their market price
- D. Solar energy companies receive more government subsidies than coal companies

4. A beekeeper raises honeybees for honey production, and neighboring orchards benefit from the bees' pollination at no charge. Which of the following conclusions can be drawn from this scenario?

- A. The market will overproduce beekeeping services because the beekeeper earns extra income from orchards
- B. The market will produce the optimal number of beekeepers because honey prices reflect all social benefits
- C. The market will underproduce beekeeping services because the full social value of pollination is not captured in honey prices
- D. The market will underproduce honey because orchards compete with beekeepers for resources

5. A carbon tax is designed to make fossil fuels more expensive by adding a fee proportional to their emissions. Which of the following best describes the intended effect of this policy on Earth's systems?

- A. It forces consumers to stop using fossil fuels immediately, eliminating all carbon emissions
- B. It encourages producers and consumers to shift toward cleaner energy, reducing negative externalities on the atmosphere and climate
- C. It generates government revenue that is used exclusively to repair damaged ecosystems
- D. It lowers the market price of renewable energy by directly subsidizing solar and wind companies

6. Herd immunity occurs when enough people in a community are vaccinated, preventing a disease from spreading easily. How does this concept relate to the idea of externalities?

- A. Herd immunity is a negative externality because vaccines have side effects that affect the broader community
- B. Herd immunity is a positive externality because each vaccination creates benefits for unvaccinated community members
- C. Herd immunity is unrelated to externalities because vaccines are a private medical decision
- D. Herd immunity is a negative externality because it reduces demand for medical services

7. Critics argue that carbon taxes can place heavier financial burdens on lower-income households. Which of the following best explains this concern?

- A. Lower-income households use more fossil fuels than wealthier households on average
- B. Lower-income households spend a larger share of their income on energy, so energy price increases affect them more severely
- C. Carbon taxes are only applied to luxury goods, which lower-income households purchase more frequently
- D. Lower-income households receive fewer government subsidies to offset the cost of carbon taxes

8. Acid rain caused by sulfur dioxide emissions from coal plants damages forests and lakes. Which of the following Earth systems is most directly affected by this negative externality?

- A. The geosphere, because acid rain erodes rock formations underground
- B. The biosphere and hydrosphere, because forests and lakes are living and water-based systems
- C. The atmosphere only, because sulfur dioxide remains in the air and does not reach the ground
- D. The geosphere and atmosphere only, because acid rain affects soil minerals and air quality

9. A government offers tax credits to homeowners who install solar panels. Based on the concept of externalities, which of the following best justifies this policy?

- A. Solar panels are too expensive for any household to afford without government assistance
- B. The subsidy corrects for a positive externality by lowering the price to reflect the broader social and environmental benefits of solar energy
- C. The subsidy is intended to punish fossil fuel companies by reducing demand for their products
- D. Solar panels generate negative externalities that must be offset by government funding

10. When pollution from industrial activity crosses national borders, which of the following challenges does this create for governments trying to regulate negative externalities?

- A. It makes carbon taxes more effective because multiple countries can collect revenue simultaneously
- B. It eliminates the need for regulation because international markets automatically correct for cross-border pollution
- C. It makes enforcement of environmental regulations more difficult because no single government has authority over all affected areas
- D. It reduces the total amount of pollution produced because countries must share the cost of cleanup

True / False

Read each statement carefully. Determine whether the statement is True (T) or False (F) based on your understanding of externalities, environmental economics, and human impacts on Earth's systems. Write T or F for each item.

1. The market price of gasoline fully reflects all of the environmental and social costs associated with burning that fuel, including climate change damages and air pollution health costs.

True False

2. A negative externality occurs when a transaction creates costs that are borne by third parties who were not involved in the original exchange.

True False

3. When positive externalities exist in a market, the market tends to overproduce the beneficial good because sellers are rewarded for all the social benefits they generate.

True False

4. The herd immunity created by widespread vaccination is an example of a positive externality, because individuals who are not vaccinated still benefit from reduced disease transmission.

True False

5. A Pigouvian tax on carbon emissions is designed to make fossil fuel producers and consumers internalize the environmental costs of their activities, bringing market prices closer to true social costs.

True False

6. Government subsidies for solar panels and electric vehicles are intended to correct for negative externalities by making these products more expensive for consumers.

True False

7. Coal-fired power plants contribute to negative externalities by emitting gases that cause acid rain and climate change, which damage forests, lakes, and Earth's biosphere.

True False

8. One significant limitation of carbon taxes as a policy tool is that they can place a disproportionately heavier financial burden on lower-income households who spend a larger share of their income on energy.

True False

9. When a beekeeper's bees pollinate a neighboring orchard at no charge to the orchard owner, this represents a negative externality because the beekeeper is not compensated for the full value of the service.

True False

10. Understanding the difference between private costs and social costs allows individuals and policymakers to better evaluate the true environmental and economic consequences of human activities on Earth's systems.

True False

Vocabulary

Study each term and its definition below. These words are key to understanding how economic decisions affect Earth's systems. As you read and discuss the lesson, look for how each term connects to real-world examples of human-environment interaction.

externality

A cost or benefit from a transaction that falls on a third party who was not part of the original deal and is not reflected in the market price.

Explain in your own words:

negative externality

A harmful side effect of a transaction that creates costs for people or the environment outside of the original buyer-seller agreement, such as pollution from a factory.

Explain in your own words:

positive externality

A beneficial side effect of a transaction that creates advantages for people beyond the original buyer and seller, such as the community protection provided by vaccinations.

Explain in your own words:

true social cost

The full cost of a good or service when all externalities — including environmental and health impacts — are added to the private market price.

Explain in your own words:

herd immunity

A condition in which enough people in a community are vaccinated so that a disease can no longer spread easily, protecting even those who are not vaccinated.

Explain in your own words:

Pigouvian tax

A government-imposed fee on activities that produce negative externalities, such as a carbon tax on fossil fuels, designed to make the market price reflect the true social cost.

Explain in your own words:

carbon tax

A specific type of Pigouvian tax that charges producers or consumers a fee based on the amount of carbon dioxide their activities release into the atmosphere.

Explain in your own words:

subsidy

Financial support provided by the government to lower the cost of goods or services that have positive externalities, such as tax credits for solar panels or electric vehicles.

Explain in your own words:

acid rain

Precipitation that becomes acidic when sulfur dioxide and nitrogen oxides released by burning fossil fuels mix with water in the atmosphere, damaging forests and lakes.

Explain in your own words:

pollination

The process by which pollen is transferred between plants, often by bees, enabling plants to reproduce — an example of a positive externality provided by beekeepers to neighboring farms.

Explain in your own words:

Exit Ticket

Answer both questions in 2-3 sentences each using evidence or examples from the article. Be specific.

1. Analyze how the true social cost of a gallon of gasoline differs from its market price. What specific factors does the article identify as contributing to this gap, and which Earth systems are affected?

2. Compare how a carbon tax and a government subsidy each attempt to correct for externalities. What is one trade-off the article identifies for either approach?



The price on a gas pump only reflects part of the true cost — pollution and climate damages are paid by society, not shown on the sign.



BEES POLLINATE, FARMS THRIVE

Our bees freely pollinate neighboring orchards and crops, helping nature and farms flourish.

Benefits for Our Neighbors

- ✓ Better Fruit Set
- ✓ Higher Yields
- ✓ Healthier Crops
- ✓ Stronger Farms

FREE POLLINATION
BETTER TOGETHER

- APPLES
- CHERRIES
- ALMONDS
- BERRIES

When beekeepers tend their hives, nearby orchards receive free pollination — a classic example of a positive externality that markets often overlook.

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CROSSWORD PUZZLE



The Hidden Price Tag: Externalities and the Real Cost of Things

CROSSWORD PUZZLE

ACROSS

2. A specific type of Pigouvian tax that charges producers or consumers a fee based on the amount of carbon dioxide their activities release into the atmosphere.
4. The full cost of a good or service when all externalities — including environmental and health impacts — are added to the private market price.
5. A cost or benefit from a transaction that falls on a third party who was not part of the original deal and is not reflected in the market price.
8. Precipitation that becomes acidic when sulfur dioxide and nitrogen oxides released by burning fossil fuels mix with water in the atmosphere, damaging forests and lakes.
9. The process by which pollen is transferred between plants, often by bees, enabling plants to reproduce — an example of a positive externality provided by beekeepers to neighboring farms.
10. Financial support provided by the government to lower the cost of goods or services that have positive externalities, such as tax credits for solar panels or electric vehicles.

DOWN

1. A beneficial side effect of a transaction that creates advantages for people beyond the original buyer and seller, such as the community protection provided by vaccinations.
3. A harmful side effect of a transaction that creates costs for people or the environment outside of the original buyer-seller agreement, such as pollution from a factory.
6. A government-imposed fee on activities that produce negative externalities, such as a carbon tax on fossil fuels, designed to make the market price reflect the true social cost.
7. A condition in which enough people in a community are vaccinated so that a disease can no longer spread easily, protecting even those who are not vaccinated.

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WORD SEARCH

M T C Q Z J V D X R D O L M G O M L K K N Y C S P E E N
O W C D D Q F C U E J C Y Z N V U O J A M O R T Q V L Y
H E R D I M M U N I T Y V A U U U S Y E V N G N W K D T
P Q Q U U L W N A S Q V U Z V I Q U R C I T A E Y C R T
D D S P N Q E M D F C I Z L C A J B J Q M H V G L K T Y
Q N M Q Z S G O Q K P X M U A Q J S Z X V D S A U M W X
D K D H W D R A B K E T J Q V Q D I Q A R C B T S W C T
B R L G K L S S P O F R O B X R U D N R Y E Q I U Q J T
I P W Y A J P P H Y Q I S F B X V Y O T F G F V X U F E
H L U W N G I O L P I C K C M Y D P C N R K A E D I O J
Q P N K T S G L T I R E X T E R N A L I T Y C E O W Q F
F R G Y M I O L T O Z F J V U Z L U V V L V I X J H L S
E Y R E X Q U I R J D M C A R B O N T A X W D T A X G H
U A O I U F V N U K G Q Q Q X X H N Q K Q F R E I D O J
X G G F K N I A E S S F I Q Y T O L A R X R A R U E Q V
C P Z M S Y A T S L I E D Q Z F J Z H F Z D I N B U H X
D Z G C V Y N I O Z P N W U G W T O K T N S N A U M R X
Q T A I Z P T O C W D A T H Z B O Z K I U O D L L C W S
G M C K L A A N I Z J B Q Y K Z V X H M S X K I B U T N
N Q H T I F X X A S T K D I W L K K M N C K L T Z K I C
O I N C A Z P A L H H J K W J N F R I B P K W Y F E T D
L C H N P O E A C U Q N K J A Y O T T D H V U F F P S P
W T N P Z N D Q O D R P I T V U U H P N X J J N M M W I
H U J U B K Z W S U A H B C A V F K E K Q C C R T R E Y
L L W E S E M U T N F I W I G Z V G N Q U M V C B D L F
T B G S E R P O S I T I V E E X T E R N A L I T Y R H X
W K Y M J Y Z U Z U F E V X L L Z U A M F P F I A U W O
T O C W B U U P K H I V T R G U P P G M O R Q O H G S L

FIND THESE WORDS

acid rain
pollination
true social cost

positive externality
herd immunity
negative externality

externality
Pigouvian tax

carbon tax
subsidy