



ACTIVITY

SDG 11 AND MARKET FAILURE

Time: 360-400 minutes

Days of Implementation: 6 weeks, one day a week

Grade Level: Upper Secondary

Designed by: Sudha Rakesh

Alignment with STEAM subjects

Science: Learning how pollution and other externalities can affect the environment.

Technology: Exploring how technology can solve environmental challenges.

Engineering: Brainstorming how new, sustainable infrastructure can reduce negative externalities.

Arts: Developing infographics or films to convey challenges and solutions.

Mathematics: Employing mathematical models and data analysis to assess the economic repercussions of market failures and the success of policy interventions.

Related or achieved SDGs

- SDG 9: Industry, Innovation, and Infrastructure: Showcases how industry contributes negative externalities to society; promotes critical thinking on urban ecosystems and infrastructure.
- SDG 11: Sustainable Cities and Communities: Supports learning on what constitutes a sustainable city.
- SDG 13: Climate Action: Centers the importance of considering environmentally friendly urban practices.

Objectives

By the end of the class, students will be able to:

- Understand the implications of market failures and externalities, including pollution from industrial activities and urban development, and how they lead to social costs.
- Assess the importance of government intervention and collaborative approaches.
- Think critically about the necessary strategies to build sustainable cities.
- Formulate strategies to address urban environmental issues, focusing on proposing and evaluating potential solutions that promote sustainable development.
- Learn to apply economic, scientific, and technical reasoning to analyze the relationship between urban growth, environmental quality, and community well-being.

Materials Needed

- Digital devices (such as computers and tablets)
- Art supplies, including markers and paper

Lesson Plan

Introduction

Market failures arise when the decisions of businesses and consumers result in social problems like pollution or traffic congestion instead of optimal outcomes for everyone. Conversely, externalities refer to the unintended consequences of economic activities that affect individuals not directly involved in the decision-making process. For instance, when a factory produces goods, it may also emit pollutants that negatively affect nearby residents—this is known as a negative externality. In contrast, a positive externality occurs when someone gets vaccinated, protecting others from disease. In urban development, market failures—such as pollution, construction, and industrial output—result in the misallocation of resources. Building sustainable cities requires government intervention, creative financial solutions, and collaboration among stakeholders to address negative externalities.

1. Inquiry & Exploration

- Students examine the following information:
 - [Addressing Negative Externalities Associated with Urban Development](#) e.g., pollution in Delhi (MDPI).
 - [Market Failures and Externalities](#), (Professor Jon Gruber, MIT)
 - [SDG11 Targets](#), (United Nations).

Discussion Questions:

- How do these externalities conflict with SDG 11's targets (e.g., air quality, affordable housing)?

2. Investigation & Research

- Students conduct hands-on research by interviewing city planners, builders, and other relevant professionals to discover the current practices used in city construction.

Interview and Investigation Questions:

- City Planners:
 - What strategies can we introduce to reduce industrial pollution?
 - How can we monitor and implement these regulations effectively?
 - What incentives can we establish to motivate businesses to adopt cleaner technologies?
- Businesses:
 - What economic effects do stricter pollution regulations have?
 - How can the government assist us in transitioning to more sustainable practices?
 - What technologies can we implement to stay competitive?
 - What actions can businesses take to reduce pollution?
- Residents:
 - How does pollution impact our health and the environment?
 - How will the proposed solutions improve the quality of life in our community?
 - What actions can individuals take to help reduce pollution?

3. Implementation & Design

Debate:

Following the research phase, students assume roles such as city planners, business owners, or residents and propose solutions for reducing pollution and enhancing air quality. Within their group, each student should take on a specific role.

- Each student selects and proposes a specific solution. Some ideas could include:
 - Subsidies for new green technologies or research into clean technologies
 - Policies to address a negative externality (e.g., carbon taxes announced by the Indian Government)
 - Pigouvian taxes (these are taxes on negative externalities in society, such as pollution, noise, or congestion)
 - Partnering with local NGOs to draft a memo on improving sustainability in student cities.
 - Running a campaign to encourage walking and taking public transportation.
 - Creating car-free zones.
 - Avoiding burning wood or trash.
 - Enforcing strict environmental standards for factories and other polluting industries.
- After coming up with a proposal, have the students engage in a debate where they share and negotiate their ideas, taking the perspective of their assumed role as community leaders. They should seek to discuss and balance interests to create a cleaner, healthier city.
- Together in their groups, students come up with a plan for the city, incorporating the ideas discussed.

4. Testing & Reflection

Reflection Questions:

- How does your city plan combat negative externalities such as pollution, congestion, or others (e.g., carbon taxes, renewable subsidies)?
- What trade-offs exist between ensuring items are affordable and reducing pollution?

5. Presentation & Action

Each group presents their final proposals to the entire class, and the class votes on the proposal that is the best for the city.

Criteria

- Peer evaluations of policy proposals.
- Class debates with rubrics for argument clarity and evidence.
- Policy Brief: Students submit a 1,500-word report addressing a real-world urban externality, integrating SDG 11 targets and economic theory.
- Team Collaboration (25%)

Reflection

- Did students fully understand?
- What should be improved for next time?
- Was the lesson interesting enough for the students?