

Today I Learned About Carbon Pricing

Description:

Carbon pricing, including cap-and-trade and carbon taxes, is one tool in the toolbox governments have to reduce the impacts of climate change. What kind of a tool is it? After an introduction to carbon pricing, students use an online simulator to investigate multiple pathways to a cooler future.

Skills & Objectives

SWBAT

- Explain the basics of a cap-and-trade and carbon tax system.
- Understand some impacts from carbon pricing systems.

Skills

- Graph reading
- Analyzing simulation data

Students Should Already Know That

- Governments use tools such as taxes, policies, laws, and negotiation to affect the behavior of businesses, industries, and organizations.

Standards Alignment:

HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions.

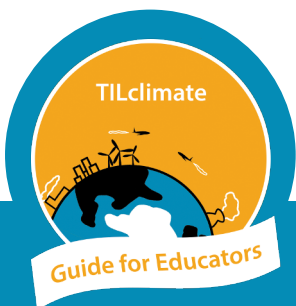
HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem.

RST.11-12.9 Synthesize information from a range of sources into a coherent understanding of a process, phenomenon, or concept.

Disciplinary Core Ideas:

ESS3.C Human Impacts on Earth Systems

ESS3.D Global Climate Change



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How To Use These Activities:



Pages with the circular “TILclimate Guide for Educators” logo and dark band across the top are intended for educators. Simpler pages without the dark band across the top are meant for students.

Each of the included activities is designed to be used as a standalone, in sequence, or integrated within other curriculum needs. A detailed table of contents, on the next page, explains what students will do in each activity.

A Note About Printing

All student pages are designed to be printable in grayscale.

The worksheets do not leave space for students to answer questions. Students may answer these questions in whatever form is the norm for your classroom – a notebook, online form, or something else. This allows you, the teacher, to define what you consider a complete answer.

Podcasts in the Classroom: Throughout these Guides for Educators, we invite students to think about how they would share their learning with family and friends. One way to do this is to encourage your students to create their own podcasts - they're shareable, creative, and have multiple options for embedded assessment. We would love to hear any podcasts or see any other projects you or your students create! Email us at tilclimate@mit.edu, Tweet us @tilclimate, or tag us on Facebook @climateMIT.



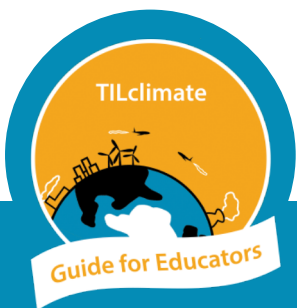
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Detailed Table of Contents

Page	Title	Description	Time (min)
	Podcast Episode	Students listen to TILclimate: TIL about carbon pricing, either as pre-class work at home or in the classroom. https://climate.mit.edu/podcasts/e7-til-about-carbon-pricing	10-15
1-2	Carbon Pricing	Reading: An introduction to carbon pricing	10-15
3-4	En-ROADS Climate Model (internet required)	Using the En-ROADS model, students investigate which actions have the largest effect when trying to reduce warming below 2°C.	30+



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Carbon Pricing

This Educator Guide includes a reading and an online simulation tool. Educators may pick and choose among the pieces of the Guide, as suits their class needs.

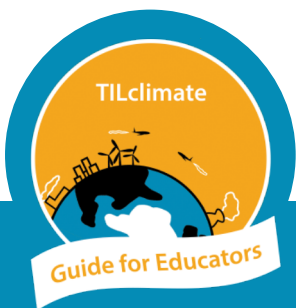
Parts of this Guide may align with the following topics:

- Physical science: Impacts of carbon dioxide on the atmosphere.
- Life/environmental science: Climate change and policy.
- History/social science: International agreements, policy, and diplomacy.
- ELA/nonfiction: Describing a complex economic and scientific theory.

MIT Resources

We recommend the following as resources for your own better understanding of climate change or as depth for student investigations. Specific sections are listed below:

- Climate Science, Risk & Solutions, an interactive introduction to the basics of climate change. <https://climateprimer.mit.edu/>
 - Chapter 02 The greenhouse effect and us
 - Chapter 06 Predicting climate
 - Chapter 09 How long can we wait to act?
 - Chapter 10 What can we do?
- MIT Climate Portal Explainers are one-page articles describing a variety of climate topics. <https://climate.mit.edu/explainers>
 - Carbon Pricing
 - Greenhouse Gases
 - Climate Models
 - Climate Targets
 - Carbon Offsets
 - The Paris Agreement



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Wrap-Up Discussion Questions

- How could you encourage the biggest emitters to innovate, while protecting households and small businesses from higher costs?
- What kinds of innovations can transportation, electricity generation, and industry use to reduce their CO₂ emissions?
- Which actions had the most dramatic effects on 2100 temperature? Did any of the results surprise you? Why or why not?
- How effective is carbon pricing as a tool in the toolbox? Which other tools does it work best with?
- Imagine your region was considering creating a new price on carbon emissions. Who might support this policy? Who might oppose it? How might you balance these sides?
- Develop a spreadsheet or game to model a cap-and-trade system in an imaginary country.

Climate Solutions

Climate solutions can be thought of as falling into four categories outlined below. Across all categories, solutions at the community, state or federal level are generally more impactful than individual actions. For example, policies that increase the nuclear, solar and wind mix in the electric grid are generally more effective at reducing climate pollution than asking homeowners to install solar panels. For more on talking about climate change in the classroom, see “How to Use This Guide”.

• Energy Shift

How do decision-makers make the switch from carbon-producing energy to carbon-neutral and carbon-negative energy?

• Energy Efficiency

What products and technologies exist to increase energy efficiency, especially in heating and cooling buildings?

• Adaptation

How can cities and towns adapt to the impacts of climate change?

• Talk About It

Talking about climate change with friends and family can feel overwhelming. What is one thing you have learned that you could share to start a conversation?

What solutions are the most exciting in your classes? We would love to hear from you or your students! Images, video, or audio of student projects or questions are always welcome. Email us at tilclimate@mit.edu, Tweet us @tilclimate, or tag us on Facebook @climateMIT.

