



**PROBLEM BASED LEARNING
EDUCATING FOR SUSTAINABILITY.**

SNOWPACK COLLECTION

Climate Crisis is a \$26 Trillion Economic Opportunity

Created by Rich Butler, Pine Lake MS, and Issaquah School District

INTERDISCIPLINARY: LASS 8th Grade, HS Geography, Culture, and Current Events, HS Civics, Economic Elective, CTE Business and Marketing, Humanities, Connections to Studies of Industrial Revolution Cycles, Language Arts Research, Speech and Debate

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PHOTO SOURCE: Science in HD, Waterfootprint.org, WSDOT

**CLIME
TIME**
CLIMATE SCIENCE LEARNING



PROBLEM STATEMENT

With a shrinking snowpack and big changes coming in the seasonal patterns of our water cycle due to climate change, are there economic opportunities we could be taking advantage of?

SUMMARY

8th Grade social studies is tasked with introducing students to basic macroeconomic concepts. This unit is designed to do just that, but to do it in the context of an emerging and essential economic model - **The Circular Economy**.

Students will explore the basic principles of consumer demand (needs and wants) along with the macroeconomic principles related to supply and demand within the context of the circular economy. They will compare this model with the economic framework of the industrial revolution - an extraction economy, which is also known as the "Take, Make, and Waste" model.

The unit will challenge middle school students to become aware of their own productive identity, and to ask "What is my place in the economy?" Am I a stakeholder? Do my consumer choices matter? Student learning will be organized around three experiences.

First, students will be able to **explain basic economic concepts** as they manifest within the circular economy model giving special emphasis to identifying needs vs. wants, supply and demand principles, and how government regulation influences economic choices.

Second, students will identify the **three distinguishing principles of a circular economy**: (1) design out waste and pollution from production systems, (2) keep products and materials in use, and (3) regenerate natural systems by emphasizing renewable resources. Students will explore the opportunities that this economic model presents. They will see the necessity of a future built on a circular economy and explore case studies of current businesses committed to sustainable business practices.

Third, students will design an **impact project**, focused on their own community or region, that (1) extends a known practice to other businesses within their community, (2) scales a known practice

to a larger consumer base, or (3) creates a new business practice that replaces an extraction process with a sustainable process.

How does this relate to snowpack levels?

Global warming has created new climate challenges, especially challenges related to water consumption. These new climate challenges can be viewed as new economic opportunities. Consumers and businesses have unique leverage in driving systemic change toward a more sustainable future. We are already seeing a strong current of change in our market economy. Businesses recognize that their customers care about sustainable practices and they are adopting circular economic principles and practices to meet those needs and wants in ways that will secure the health of our planet for future generations.

Learning Objectives

1. Students will explain foundational economic principles – principles common to all economic models – and identify them in real life case studies of sustainable business practices.
2. Students will identify and describe circular economic principles and identify them in those same case studies.
3. Students will be able to explain the role of government regulation as it influences both consumer and business choices, particularly job selection and creation.
4. Students will be able to articulate how tackling climate change represents significant economic opportunities.
5. Students will create an impact project that explores personal and corporate economic opportunities in their region.

Formative Assessment

Menu of possibilities...

1. Students will demonstrate their growing understanding of a circular economy and the opportunities it presents by discussing consumer needs and wants in the context of sustainability principles.
2. They will analyze case studies provided by the [Ellen MacArthur Foundation](#) and by [B Corp.](#) These case studies focus on businesses that have seized opportunities created by circular economic principles and consumer demand for sustainability. Students should be able to identify and explain

how businesses have moved away from the extraction model and embraced the circular principles mentioned in this unit.

3. As they discuss these practices, students should align their own interests and identify future opportunities for their own participation in our global economy.

Summative Assessment

Smaller summative assessments for each learning objective are designed to reveal student understanding of the foundational economy principles in selected local businesses that they frequent. Students will analyze their business practices and identify them as extraction principles or circular principles. They will identify and prioritize recommended actions that can support a transition toward a circular economy.

The Impact Project is the sum of this unit's learning goals. Student impact projects will seek to inform, influence, or inspire steps towards the circular economy model.

Students will focus on one of the following:

Their own personal consumer practices

Their family's consumer habits

Sustainable practices of a local business

ACADEMIC STANDARDS

Washington State Social Studies Standards

CIVICS

C4 - Civic Involvement. Analyze attempts to balance individual rights and the common good.

ECONOMICS

E1 - Understands that people have to make choices between wants and needs and evaluates the outcomes of those choices.

E2 - Understands how economic systems function. The free market economy of the United States is driven by the exchange of goods and services using the principles of supply and demand.

E3 - Understands the government's role in the economy. The way that money is managed by the government, through taxation and spending, impacts the economy.

E4 - Understands the economic issues and problems that all societies face. The management of resources can challenge societal lifestyles.

GEOGRAPHY

G3 - Understands the geographic context of global issues and events. Societies must learn how to manage and replenish their resources in order to maintain their way of life, their culture, and their diversity.

NGSS:

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

[Clarification Statement: Emphasis is on the conservation, recycling, and reuse of resources (such as minerals and metals) where possible, and on minimizing impacts where it is not. Examples include developing best practices for agricultural soil use, mining (for coal, tar sands, and oil shales), and pumping (for petroleum and natural gas). Science knowledge indicates what can happen in natural systems—not what should happen.]

BIG PICTURE

[NGSS Global Climate Change](#)

[NGSS Human Sustainability Standards](#)

[OSPI Environmental Sustainability Standards](#)

[OSPI Social Studies Standards](#)

[College, Career, and Civic Life \(C3\)](#)

[Common Core State Standards](#)

COMMUNITY CONTEXT

My family's sustainable practices

My Neighborhood Association

Nonprofits focused on this issue

My School and School District

My City Climate Action Plan

My City Equity Strategy

My County Climate Action Plan

My County Equity Strategy

My Energy and Water Utility

My Waste, Recycling, Compost
Company

Watershed Salmon Recovery Plan

Puget Sound Regional Council

Puget Sound Vital Signs

Washington Dept of Ecology

Tribal Treaty Rights

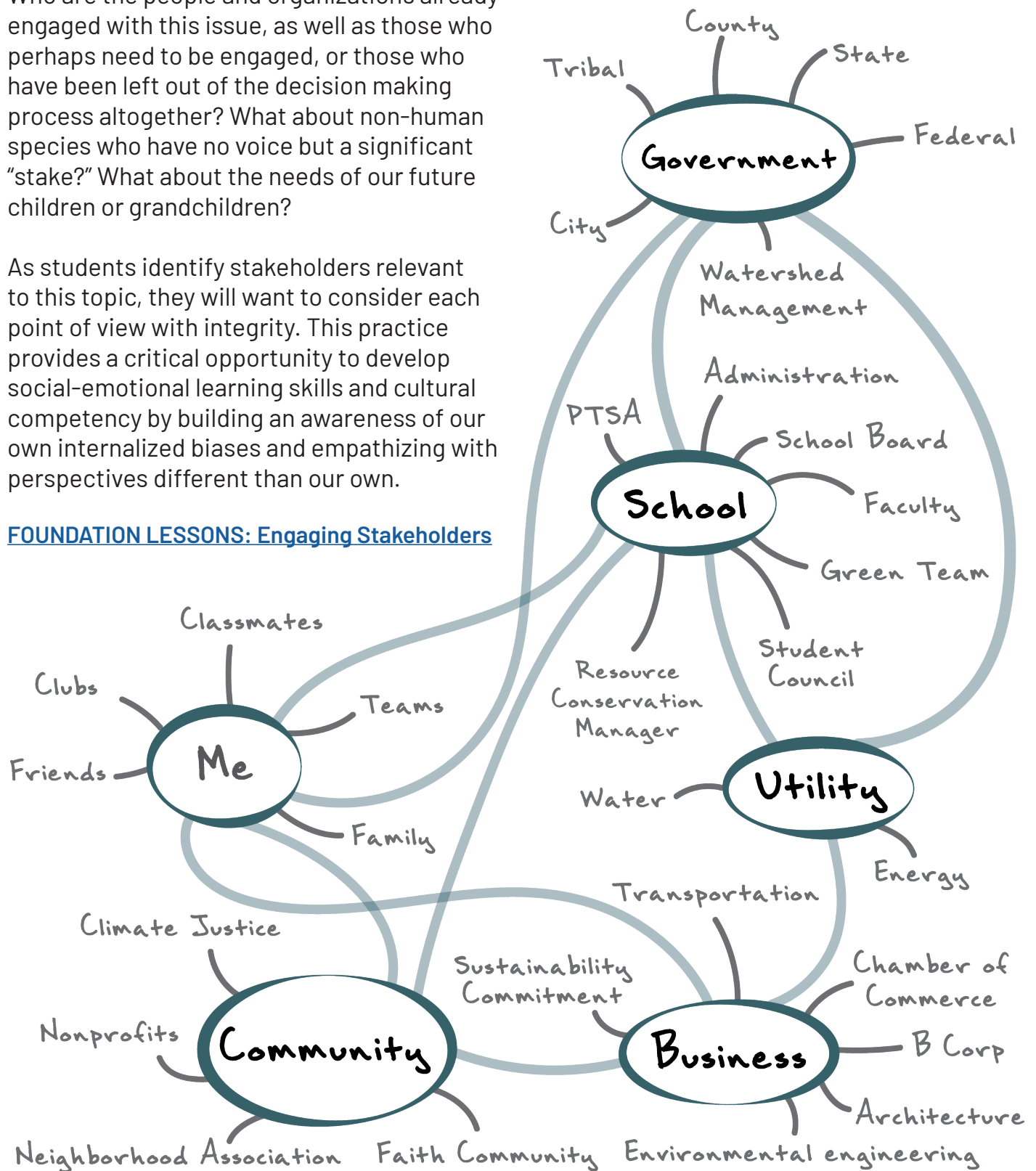


Stakeholders

Who are the people and organizations already engaged with this issue, as well as those who perhaps need to be engaged, or those who have been left out of the decision making process altogether? What about non-human species who have no voice but a significant "stake?" What about the needs of our future children or grandchildren?

As students identify stakeholders relevant to this topic, they will want to consider each point of view with integrity. This practice provides a critical opportunity to develop social-emotional learning skills and cultural competency by building an awareness of our own internalized biases and empathizing with perspectives different than our own.

FOUNDATION LESSONS: Engaging Stakeholders



BACKGROUND

We Depend on Snowpack

We have built our economy, here in the Pacific Northwest, around the assumption of a sustained snowpack. **Our snowpack is shrinking** due to human-caused climate change.

Get the latest science from the University of Washington [Climate Impacts Group](#).

Study the [Climate Change infographics series](#) from King County.

We depend on snowpack. Over the last hundred years, we have constructed dams across a number of our cascade alpine canyons to hold water in huge man-made reservoirs that serve the water supply needs of millions of people. In our region it rains a lot, especially at the higher elevations. This rain can be captured and held in our system of reservoirs.

What is not known by most people, is that we have been depending on a certain depth of snowpack each year to serve as a **second, natural reservoir** of water... **A frozen one.** This is important, because as we enter the summer months with little or no rainfall until October, our reservoirs would be drained by the water consumption demands of millions of people if not for our snowpack. The snow that packs down through the long winter will **slowly melt through the summer.** We count on this phenomena to supplement and sustain water levels in our reservoirs. We drink snow in August.

But with a shrinking snowpack over the next several decades, water resource managers, policy makers, and each of us within our own families, schools, and cities, need to make critical decisions about how to conserve water right now.

The same amount of precipitation. Part of this strange new reality is that we will actually have the same amount of annual precipitation. The water cycle will continue to lift vapor from Puget Sound and the Pacific Ocean and drop it across the landscape. But the science points to a much different annual pattern.

We can expect **much more rain in the winter** (when we don't need it) along with bigger storm events, which can cause flooding and mudslides. And we can expect **much less rain in the summer** (when we do need it) which can lead to droughts, forest fires, parched streams for salmon, and dangerous heat waves for humans. We will experience the same total amount of precipitation. It's just that, as each decade continues to bring warmer temperatures, less of this precipitation will be held in the form of snow. Diminished snowpack throughout the winter means diminished water supply late in the summer.

At the same time that we are grappling with how to adapt to our shrinking snowpack, we will need a **thousand good ideas** for how to slow, stabilize, and reverse the effects of climate change. This will take a century or more. It is critical to understand the science and make wise decisions together at all scales right now. We are all stakeholders in this challenge.

SNOTEL stations. Water resource managers carefully monitor our snowpack by analyzing daily and weekly data reports from a series of remote sensing SNOTEL stations built on ridgelines throughout the Cascades. The Natural Resource Conservation Service manages a [Snow Survey Program](#) that provides “mountain snowpack data and streamflow forecasts for the western United States. Common applications of snow survey products include water supply management, flood control, climate modeling, recreation, and conservation planning.”

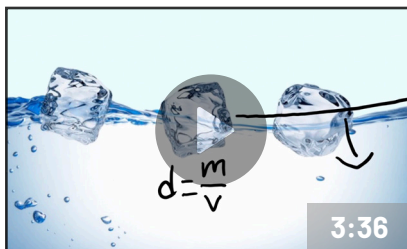
The Washington Snow Survey website includes **snow survey data, products, and reports** that students can use to understand the science and math behind the need to monitor our snowpack and make critical decisions for the current season as well as 10-30 years out.

Inquiries Across the Curriculum

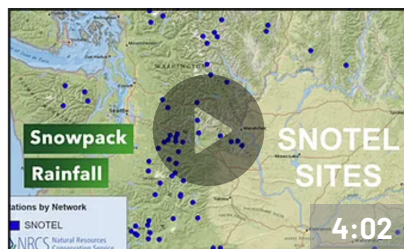
To understand more about the breadth and depth of curricular concepts using snowpack as catalyst, explore a rich set of [additional inquiries](#).

Youth-voiced tutorials

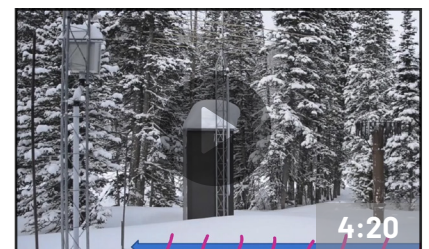
For additional support, student teams with Sustainability Ambassadors have researched and produced a series of [short videos on snowpack issues](#). All of these videos are voiced by students.



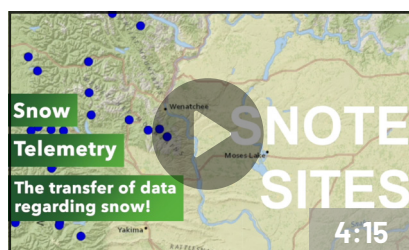
[What is Snow Water Equivalent?](#)
[Harini Baskar](#)



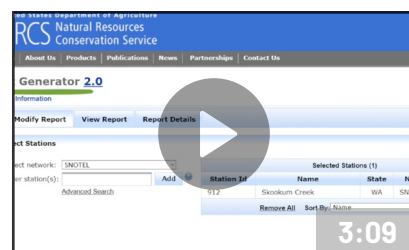
[Introduction to SNOTEL](#)
[Rishi Hazra](#)



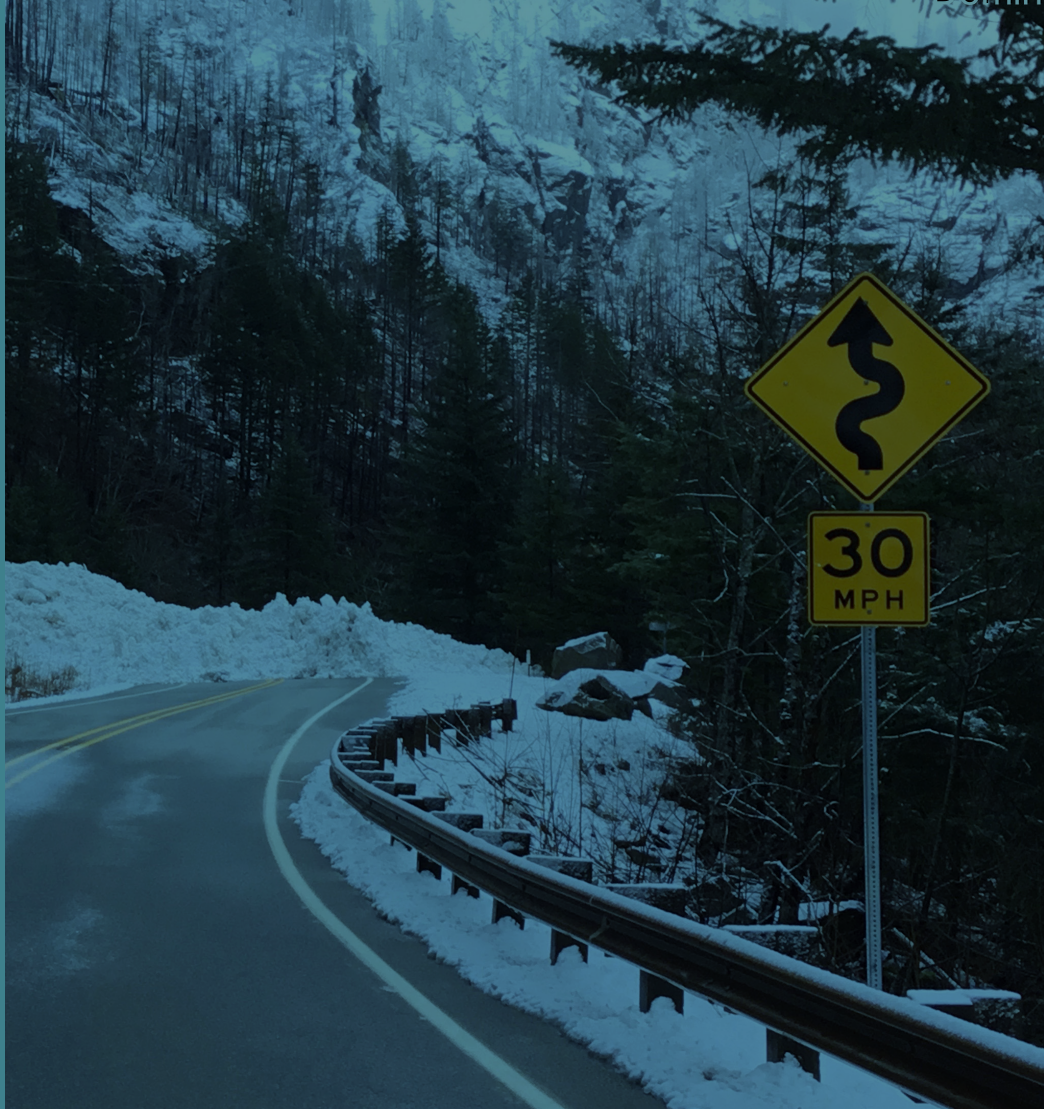
[How do SNOTEL Sites Work?](#)
[Santoshi Pisupati](#)



[Locate Your SNOTEL Station](#)
[Rishi Hazra](#)



[Generating SNOTEL Data Reports](#)
[Rishi Hazra](#)



LESSON OUTLINE

Materials Needed

Internet Access, Embedded Links

Time Needed

2-3 week unit or dispersed as a thematic framework over a full course

Lesson Sequence for Objective #1:

Basic Economic and Sustainability Principles

ENTRY EVENT

Water, Climate Change, and Economic Opportunity

Start with an inquiry discussion that predicts the consequences of a shrinking Snowpack for businesses and therefore consumers. Start with the question, “What are the consequences of a shrinking snowpack?” Students should realize that it will mean less water during summer and fall months which will have consequences for a range of things: Recreation, wildfires, landscaping, etc. Follow this up with the question “What will consumers (especially homeowners) need as a result of this and what opportunities are there for businesses to meet these new wants and needs?” Start with a simple scenario: “You are the owner of a landscaping and irrigation business.” Homeowners will want to reduce their water use. How can you meet their needs?

Activity 1

Needs vs Wants Discussion

This activity is designed to introduce students to two key concepts: The basic principles of sustainability and the foundational principles of all economic activity.

Start the discussion with a brief introduction of Sustainability. Have students watch one of the YouTube videos listed at the end of this activity. Make sure to point out the definition and how it emphasizes conserving resources so as to meet the needs of future generations. Also emphasize the 3 Pillars: “Society, Environment, and Economy, or “People, Planet, Profit”. It is especially important to emphasize economy and profit since it will be the focus of this unit.

When you feel that students have a strong grasp of the basic principles of sustainability, tell them that you need their opinion. You need to know what they think they and their family’s “Needs and Wants” are. Ask students what the difference between a “Need” and a “Want” is. Then show them the PowerPoint on [Sustainability and Needs vs Wants](#). Go through the slides twice. The first time through, let students respond quickly and impulsively. Then, go through a second time, but this time tell the students they will first consider how the item shown impacts sustainability.

Resources

[What is Sustainability?](#) A YouTube video that gives an animated definition and description.

[What is Sustainability?](#) A basic definition and description of Sustainability. Combines visuals and text. It is hand drawn by “Alex” for Sustainability Illustrated.

[4 Questions and Answers About Sustainability.](#) Another Sustainability Illustrated that gives a broader description of sustainability principles.

Activity 2

Supply and Demand Discussion

Start with an inquiry discussion on this question: “How does a business determine what the price is going to be of any item?”

After some responses, explain the foundational principle of economics known as Supply and Demand.

Show [Supply and Demand YouTube Video](#).

Students need to be acutely aware of the power that consumers have. In most school districts, middle school students are studying American history, and at some point they will learn about the boycott known as The Boston Tea Party.

Make the connection to consumer demand for them and the power of a boycott. Ask them if they know of any other boycotts or examples of consumer buying power and how supply markets respond.

Then go to the [Wind Energy Growth](#) page and have them look at the map of all of the wind farm sites. Ask the question “How is the principle of supply and demand affecting the growth of energy from wind farms?” Ask the students, “why should we care about where the electricity comes from to power your smartphones?”

Activity 3

Formative Assessment of Foundational Economic Principles

Students should now have a clear understanding of these two principles: Needs vs Wants and Supply and Demand. They should begin to see how these two principles are key to their power as a consumer and how businesses react in a market economy to meet those demands.

To assess student understanding, have students read about one of the businesses involved with the [Ellen MacArthur Foundation](#). These businesses are all practicing sustainability principles while participating in a market economy. [Explore Circular Economy Business Case Studies](#). Visit the [Learning Hub](#) for a set of curated learning experiences that are intended to expand understanding of the circular economy and how the concept can be applied to different parts of the economy.

Assess student understanding by having them answer these questions after reading the case study. The app, **Padlet**, is a useful way to display their answers. Other assessment tools include a jigsaw activity, a discussion, or a short written test.

Resources

[Splosh](#) - This EMF case study examines a company that is rethinking and redesigning packaging using sustainability principles. Have students read through the study and then answer the questions.

Questions

What is the product that Splosh is supplying?

Why would consumers “demand” this product?

Do you see this product as a need or a want? Why?

How is this product “sustainable”?

Invite students to explore [other case studies](#) at Ellen MacArthur Foundation and try their hand at the same set of questions with a business that intrigues them.

Lesson Sequence for Objective #2: What is a “Circular Economy”?

ENTRY EVENT

How Climate Change is Providing Economic Opportunities

The Global Commission on the Economy and Climate produced a 2018 report titled “[The New Climate Economy](#).” An excerpt from this report, [\\$26 trillion economic opportunity?](#), explains the economic opportunities coming from and necessitated by climate change.

Start the activity by helping students see the different ways that climate change and human activity is impacting our world, especially our economies:

Carbon and methane emissions from factories, cars, planes - even cows - are heating the atmosphere (global warming).

Weather patterns are changing with more extreme events - heat waves, reduced snowpacks, changing water supplies, catastrophic destruction by hurricanes, etc.

Production of "single-use" items is using up resources and creating waste disposal problems - plastic items are a particular problem.

Deforestation, mining and other extraction practices are using up valuable resources and impacting climate (trees and CO2 cycles).

Melting ice caps are affecting sea levels and threatening coastal ecosystems and population centers.

The text in the report is sophisticated, college level. Read through the report and identify areas of economic opportunity the report targets. Create a jigsaw activity that puts students in groups of 3-4 and ask them to come up with a list of 5-10 items for each of the target areas the report identifies.

Products and Services. What are things that companies are currently making that can reduce the impact of climate change? What are NEW services that companies are providing? Think energy, water, waste reduction, etc.

Investment Opportunities. If you were going to invest money now, what companies would you choose? Think of the impact of climate change from our previous discussion. Which industries and companies are producing products and services that are designed to lessen the impact of climate change?

Infrastructure Creation. If we change to electric vehicles, what kinds of things will these vehicles need? What companies can provide them?

Supply Chains. Think of how and where we get our items from. Think of how companies get those items to us. What opportunities are there for companies to do this sustainably?

Labor. What are the next new jobs going to be? What will ALL people need in order to get ready for these jobs?

Additional Study

Along with the above excerpt, teachers might want to consider three more resources to add historical background and a futuristic perspective on the rapid changes happening in our economy... along with a little literary perspective.

[The Fourth Industrial Revolution.](#) This intriguing article describes the evolution and next iteration of industrial revolution cycles, focusing on the 4th which is rapid development and deployment of digital innovation - AI, robotics, genetics, etc.

[The Fourth Industrial Revolution Video.](#) An 11 minute video that summarizes the ideas of the article.

[The Surprising Link Between Science Fiction and Economic History.](#) Another thought provoking article from WEF, that students will love - mentions *Frankenstein*, *Star Trek*, and *Star Wars* and their influence on innovation and economics.

Activity 1

The Circular Economy

Start with a short review of the 3 main economic models that are used in the world. You can use this YouTube video: [Types of Economic Systems](#). It also provides a review of needs vs wants and supply and demand. Ask students this question afterwards: *What kind of economy does America have?*

Next, discuss with students how things are made in our market economy and what happens to them after they are made. Watch this video created by a student on ["Fast Fashion."](#) Introduce the Extraction Economy model: Take, Make, Waste. Again, middle school students are learning about the rise of the Industrial Revolution. This revolution created the extraction model. Then introduce a new type of economic model that is emerging. Watch [Explaining the Circular Economy - YouTube Video](#). Review the Basic principles of a Circular Economic Model. This model replaces the take-make-waste extraction industrial model with these key principles:

*Designing out waste and pollution
(Rethink/Redesign)*

*Keeping products and materials in use
(Innovation/Enablers)*

*Regenerating natural systems
(Reverse Cycles/Biologic Systems)*

Activity 2

Identifying Circular Economic Principles – Fast Fashion and Water

Students will need to practice identifying these principles. Fashion is an engaging topic for students. [B Corporation](#) is an organization that is dedicated to identifying, recruiting, and promoting companies that embrace sustainability and circular economic principles.

Have students read B Corp's ["Declaration of Interdependence"](#) and how they "certify" companies as members of a sustainable, circular community. Ask students, "Should all companies be this way? Why or why not?"

Next, have students research the fast fashion industry through a series of informative articles. As they read these articles, ask students to record the ways that these companies are/are not embracing and practicing circular economic principles and how those practices will lead to a sustainable future.

Principles

Identify the ways the company designs out waste (especially water waste)

Identify the ways that the company keeps materials in use

Identify ways it regenerates natural resources

Resources

Article: ["9 B Corps Companies leading with Ethical Fashion."](#)

NY Times Article: [How Fast Fashion is Destroying the Planet](#)

Newsela Article: [Forever 21 popularized fast fashion, but it's no longer what teens want](#)

CNN Article: [The World is Paying a High Price for Cheap Clothes](#)

Activity 3

Formative Assessment of Circular Economic Principles

Students should have a basic understanding of the principles of a Circular Economy. To assess that understanding, have students make a graphic chart that demonstrates how a company **acquires resources, employs labor, manufactures a product, handles waste materials, markets the product** in a way that consumers will want to purchase the product (meet demand), and accepts responsibility for what consumers do with that product when they are finished with it (end-of-life). Students can use one of the case studies from the EMF or B Corp websites. Here are a few examples that students should already be familiar with:

[Splosh](#) - Rethinking and Redesigning packaging

[Cotopaxi](#) - B Corps company making fashion sustainable

[Patagonia](#) - B Corps company making fashion sustainable

[Bundles](#) - Rethinking throwaway consumer goods

For advanced students, consider having them tackle a Washington state based company:

[PCC Community Markets](#) - Local grocer with strong sustainability commitment

[Homegrown](#) - Makes sustainable sandwiches with their own farm

[Taco Time](#) - Has made a huge commitment to composting.

[Mod Pizza](#) - Has made a commitment to social equity in hiring practices

[Costco](#) - Has a sustainability mission statement and principles

[Seattle Good Business Network](#) - Local companies with sustainable practices

Lesson Sequence for Objective #3:

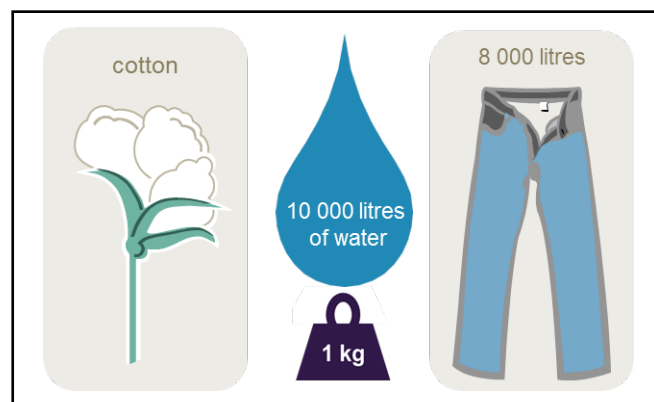
How Can the Government Steer the Economy Towards Circular Principles, especially through Job Creation?

ENTRY EVENT

In this unit, students should become aware of their power as consumers. They should also become aware of their political power and how that power can also influence businesses to embrace circular economic principles. This objective is designed to help students see how they can influence government to in turn influence business.

For starters, teachers can identify the methods that governments can use to encourage sustainable water use practices in this article: [What can governments do?](#) Before talking to kids, it's important to become familiar with the tools and methods available to all three levels of government - local, state, and federal.

Then, introduce students to concepts of government regulation. The PBS Crash Course, [Government Regulation](#), introduces students to some of the basic ways that the government influences economic policy. The narrator moves quickly and it may be necessary to stop the video in places to rehearse the tool or method mentioned.



Activity 1

A Case Study

California's Solar Panel Law

One of the best examples of how the government influences economic decisions is California's Solar Panel Law. Have students read the NPR report, [California Gives Final OK to Require Solar Panels on New Houses](#). Ask students if they think Washington State should pass a similar law. Then ask students if they are aware of any similar laws, especially in Washington.

This could be a good moment to ask students their own opinion on how involved the government should be involved with the economy. Middle school students are learning about the political spectrum and how liberals and conservatives have different views on government involvement. They should be aware of how this spectrum is also an important element in circular economic decisions.

One activity that provides a simple and effective platform is called [Hot Seat](#). It gives students a platform to voice their opinions and to begin to develop a set of principles called the [Art of Arguing](#). Check out these instructional tools and see if it would work with your instructional approach.

Activity 2

Government Influenced Private and Public Sector Jobs... "Will I Work in a Green Industry?"

Secondary students become acutely aware of their future career. In this activity students will explore the specific jobs that are becoming available as a result of the sustainability movement and circular economy. Government is playing an outsized role in the development of these jobs.

Generally, the first place to start is with city and county governments and their departments. And one of the best ways for students to influence governments is by working for one. To do that, students will need to explore what types of careers they may be interested in. Read through this website, [TheBalanceCareers](#), and find an aptitude test that will work for your students. Have the students take the test and share their results – you could do it on Padlet.

Next, have students look at possible jobs both in the public and private sector. Explain briefly the difference between the two; it is an important economic distinction. Here are some websites that students can go to to research different jobs that will be prominent in a circular economy. As the students research jobs that are attractive to them, have them answer this question: What can government do to promote these jobs?

[Sustainability Ambassadors: Green Jobs Youth Pathways](#)

[5 Emerging Jobs in a Green Economy](#)

[National Solar Jobs Census](#)

[Circular Economy Sustainability Jobs at Indeed.com](#)

[Government Sustainability Jobs at Indeed.com](#)

Background Resources For Instruction

[Article on "What Are Circular Jobs"](#)

[Workforce Development Council of Seattle-King County](#) | See [Map Your Career](#)

[Effects of the Circular Economy on Jobs](#) pamphlet by the International Institute for Sustainable Development

Activity 3

How to Contact Government Officials

Students can do amazing things. That includes working with elected officials to accomplish goals. In the last part of this unit, Objective #4's Impact Project, students will be asked to identify a problem that can be solved with circular economic principles. Collaborating with government officials may be a requirement for implementing sustainable solutions. This activity is designed to help students see some of the ways that they can do just that.

Begin by having students research their local city officials. Who is their mayor? Read the bios of each city council member. Does their city have a Sustainability Director? Is there an Environmental Stewardship Plan? A Climate Action Plan? Who is coordinating these efforts?

Next, have students research their local legislatures – specifically their city council members and their county council members. Read the bios of each city council member. Learn about the County Executive.

In middle school, through Constitutional studies, students are learning about the Levels of Government. This activity will give students the opportunity to explore the local level of government – the level that most impacts their lives. Make sure students know what these levels of government are. This is an excellent opportunity for a jigsaw activity where different groups are assigned local government agencies, their responsibilities and how to contact them.

And contacting government officials in a way that is most likely to get a response is the trick. Use the template, [Communication with a Government Official](#), to have students write sample messages about a sustainability problem. This is just a practice exercise; some students may have to use this skill for their impact project.

Lesson Sequence for Objective #4: A Circular Economy Impact Project

ENTRY EVENT

At this point, students should have a clear understanding of the basic principles of a market economy, the three key principles of a circular economy, a curiosity about what jobs may be possible for them as they enter into a circular economy, and an awareness of the importance and influence of government in helping our country transition to a circular economy.

It's time now to make it personal.

Students awaken to their power as consumers and change agents in their local economy. But to do this, they must first be aware of the breadth and depth of their local economy.

Begin by reminding students to think about what they, their family, and their friends **spend money on. What do they “consume”?** Have students create a list of local businesses and services. Again, you could use a jigsaw approach or use the **Padlet** app. To prime the pump, post these prompts:

What local stores do you shop at for food?

What local stores do you shop at for clothing?

What online businesses do you shop with?

What local stores does your family shop at for household and yard supplies?

What kinds of things do you or your family buy that are NOT sustainable? Think plastic.

What local stores display signs that say “We follow sustainable practices”?

What products do you buy that do NOT promote social equity? Think video games.

It's important to have students or groups of students share their responses. Generally, students are not aware of these issues in such specificity. You can also show these videos to help raise student's consumer and career awareness:

[Sustainable Life Hacks: Tips to Low Waste Living.](#) GREAT video with ideas like "look in your recycle bin and not your refrigerator to see what you can change."

[The Best Sustainable Products for Zero Waste Living - Lucie Fink.](#) Lucie takes us through her day and all the eco-friendly products she uses. She does display a "menstrual cup" product that she uses, so heads up.

[What If We Don't Buy Products and We Buy Services.](#) Animated video presenting the idea of exchange services and contract goods. Ask students what companies they could start using this performance model. A great video for discussing "planned obsolescence."

Activity 1

Introducing the Impact Project Templates and Student Examples

These templates, created by my colleagues at Pine Lake Middle School (PLMS) and Sustainability Ambassadors (SA), will help guide your students through the process of creating a project that impacts their local economy and perhaps inspires them to a career in the circular economy.

Teacher Templates: These first templates are for teachers, designed to provide philosophy and background for the impact project.

See Sustainability Ambassador's [FOUNDATION LESSONS - Impact Project Design.](#) This lesson framework gives an in depth explanation of the what, how, and why of impact projects. It details the essential parts of a project and provides links to student examples.

[5 Scales, 5 Lenses.](#) "Scalability" is a key economic term and it refers to how broad a product or service can extend. This document targets 5 scales from "Household" to "State." It gives links to key sites that provide information about these "markets." Lenses refers to sustainability systems that the project can impact: Economic, Environment, Societal, Engineering, and Education.

[Examples of Student Impact Projects.](#) This webpage also features great examples of how to write an effective impact statement that supports students in setting up an hypothesis for their project using the suggested prompt... "If (proposed solution) then this (impact) will result."

Student Templates: These templates should be used to help guide students through the planning process for their impact project.

[Student Planning Template.](#) This template provides a step by step, fill-in the blanks process for students. The following activities are designed to help fill in the blanks as students plan.

[Selection Criteria.](#) This handout is designed to help guide students as they narrow their choice of a problem to address with their project.

Student Templates: These templates should be used to help guide students through the planning process for their impact project.

[Fast Fashion](#) - Cleo's YouTube video on the impact of fast fashion, especially on water use, is delivered with a mixture of fun and powerful images and her voice over narration.

[Sizing Down My Carbon Footprint](#) - Kendra's Prezi video follows the project plan format with engaging graphics and her narrative voice over.

[Meaningless Meat](#) - Rounak's Prezi does not have a voice over, but the graphics and information are excellent, detailing the impact of meat on sustainability.

[Let's Ditch Plastic Bottles](#) - Anna's Sway presentation not only has strong research, it has an actual implementation project based on a neighborhood survey with data.

[Transforming Into Green Buildings](#) - Nithya's Sway is a personal impact project that starts with general information on green buildings to the ways that she and her family converted their home into a more sustainable building.

Activity 2

The Problem Statement

The problem statement starts with a "Driving Question." We want students to see a problem with the extraction economy and ask a question along the lines of how can we apply sustainable principles and transition this problem into a circular economy?

For example, single-use plastic and fast fashion are two problem areas that students tend to be aware of. An example of a driving question that deals with these problems is, "How can we convince fast food restaurants to stop using plastic straws?" or "How can I convince my friends to start shopping at second hand clothing stores and extend the life of a clothes article?"

This document, [Driving Questions](#), was created by PLMS and SA colleagues for the PLMS Speech and Debate Tournament. It is a wide ranging list of driving questions derived from problems of sustainability. Your students might find ideas here.

The key is to connect student's with a problem area they are passionate about.

Once they have a Driving Question, students should list what they know and what they need to know about the problem - access Background Knowledge. Then, students should identify what the current conditions are for their problem or question. What is the status quo?

Activity 3

Possible Solutions

This is the heart of the project: Possible solutions that embrace sustainable, circular economic principles. In this activity, students should discuss with one another and then complete the section of their project plan entitled "Solutions."

Remind students to first of all choose a **scale** they are comfortable with. Most students will focus on a personal or household impact. Other, ambitious students will want to go to local businesses and talk to managers and owners with an idea to help their business go "circular." Assure students that they can plan a major campaign or even project themselves into a career where they can make an impact. "Hypotheticals" are OK. Grand visions are encouraged.

Also, remind students that their solution can be to **extend** a current product, service, principle to other markets or manufacturing processes. And there will always be those one or two students who are true visionaries and entrepreneurs that **create** an entirely new product or process.

At the same time, students should analyze the realities their local businesses face and list the challenges and obstacles that may come with their solution. Encourage students to contact and discuss their solutions with business owners, workers, and even government officials. Use the contact letter above to help students reach out. This analysis of how to implement a change is one of the key learnings.

Activity 4

Stakeholders

Any change will have an impact on people and systems both biologic and technical. Again, this analysis is a key learning. As students are filling out this part of the project plan, a few history questions can be applied. For example, why did America build whole industries on fossil fuels? Did we know in the 1800s how bad it was for the environment? Why was plastic invented and then used so widely? What are the intended and unintended consequences?

These are the kinds of questions that make students stop and ask, "Who and what will be affected by my solution?" Will it harm others? Harm the environment? Make sure that students have access to a list of possible stakeholders (like the stakeholder graphic on page 7) to guide them as they consider the

Activity 5

Predicted Impact

Impacts can be both good and bad, beneficial and harmful. The key is to make sure the benefits far outweigh the drawbacks. Before students fill this part of their plan out, have them make a two column list of what could happen - one column of benefits and one column of drawbacks, concerns.

After they have imagined possible outcomes, students should make a **claim statement** as to what they believe will happen. This is very similar to a scientific hypothesis. But since this is economics, the claim statement should focus on what **consumers** will do, and what **producers/businesses** will do. Check to make sure that student claim statements incorporate circular economics principles.

Once students have made the prediction on their planning sheet, the next response is a description of what type of evidence they will look for. Examples of collected data and evidence are:

Statistics on product choices

Consumer testimonies

Waste reduction statistics

Supply changes - businesses stocking different products

Manufacturing process changes

Repeat customer statistics

Product longevity statistics

Activity 6

Implementation and Presentation

In this part of the project plan, students will have to make a choice as to what type of implementation plan they want to make.

Plan A is an actual implementation plan. The student contacts stakeholders, proposes the solution, monitors the performance of the solution and gathers evidence.

Plan B is a proposed implementation plan. If the project is too big in scope, or if the student does not have the means to put it into action, then the claim and the evidence are projected or predicted.

The Presentation. When implementation is complete, students will prepare a presentation to an identified audience. The presentation should include the following and can be presented to students as a checklist.

There is a clear problem statement that includes a driving question.

The project uses data and narrative analysis to benchmark current conditions showing a clear need for the project.

Key stakeholders (representative individuals or groups) who have an interest in the outcome of the project have been identified.

The intended impact of the project is clearly aligned with one or more specific community or local government policies, plans, programs or performance measures.

The project work plan lays out the steps taken to implement the project. Consider constraints, challenges, surprises, adjustments, successes...

The project uses data and narrative analysis to describe the actual, measurable impact especially as compared to the benchmark data.

The project communication plan clearly describes the number and diversity of audiences you reached with your impact report, your methods of communication, and evidence of any feedback or response received.

The project includes a statement of personal reflection explaining how this experience changed you; your outlook, your knowledge, or your skills.

Audience. Students need to identify who they are sharing their plan with and why. Remind them that one of the main reasons for this whole unit, including their Impact Project, is to raise awareness of the need for a transition to a circular “sustainable” economy. Students can target specific groups like their family, their peers, local business owners and managers...

Activity 7

Personal Reflection

The final part of the project plan is intended to have students do a self-evaluation of their own activities. The key question is: “Has this project changed ME?”

Give students this list of prompts to help with their reflection:

“After completing this project, I believe that a circular economy...”

“My greatest challenge was...”

“My greatest success was...”

“My biggest ‘Aha’ moment was...”

“Because of this project, I will change my own behavior in this way...”

Activity 8

School Wide Symposium

At PLMS, the 8th grade Language Arts team is in the process of creating a school to community symposium that will allow students, staff and community members to exhibit, examine, and discuss their impact projects and what the next steps can be for the Pine Lake community.

This document, [Outline of a School Sustainability Symposium](#), has basic information on PLMS plans for their symposium in 2022.



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About Sustainability Ambassadors

Sustainability Ambassadors is a professional development program for student leaders, teacher leaders and community leaders committed to rapidly advance a sustainable future by aligning classroom rigor with community relevance for real world impact.

We support a year-round training program for over 60 highly motivated youth, a paid Equity Advocacy Internship, a Green Jobs Youth Pathways Portal, and a Teacher Fellows Program, working with hundreds of educators to design new models of problem-based, place-based learning around a shared vision of **educating for sustainability**.

We focus on middle school and high school youth, the teachers and school districts that guide their learning, and the community stakeholders, local government and business leaders who are relying on the next generation to be engaged voters, informed taxpayers, conscious consumers, and employees who can create and lead sustainability initiatives.

Visit: <https://www.sustainabilityambassadors.org/>

