



**PROBLEM BASED LEARNING
EDUCATING FOR SUSTAINABILITY.**



FOUNDATION SERIES IMPACT PROJECT DESIGN

**Created by Sustainability Ambassadors, Peter Donaldson and Students
Written for Middle School and High School Courses**

PHOTO SOURCE: Sustainability Ambassadors

PROBLEM STATEMENT

How can I apply my academic knowledge and skills to design a project that would have an actual impact, measurably improving sustainable conditions at home, school, or in my community?

SUMMARY

This lesson supports both students and teachers in following a project design protocol similar to work plans and project scopes that happen in the real-world. Students apply sustainable systems thinking to identify a community need, research about the problem, design for an intended impact that serves community goals, implement an action plan, and report outcomes to stakeholders. This approach requires that students align their work with one or more policies, plans, or performance measures valued by their community. These plans can include city or county climate action plans, equity and climate justice plans, or watershed and natural resource management plans. The elements of this lesson can be dispersed throughout the arc of a larger unit of study, woven throughout a quarter, or even an entire year.

It is organized as a series of steps for empowering students to apply their knowledge and skills to design and implement a project that makes a measurable impact at home, school, or in their community.

Learning Objectives

1. I can apply sustainable systems thinking to identify a community need where I can play a role in improving local conditions.
2. I can apply research skills to benchmark my Impact Project in context of the sustainability goals of my community.
3. I can apply project design and management skills to develop an Impact Project that measurably improves sustainable community conditions.
4. I can apply communication skills to learn from and report to stakeholders.

Formative Assessment

Menu of possibilities...

1. I maintain a project portfolio to document the process of designing and implementing my Impact Project.
2. I have crafted a clear and compelling impact statement that outlines the relationship between actions I will take and the outcomes I am seeking.
3. I produce background research on the community context for the problem I am trying to solve.
4. I demonstrate an understanding of the stakeholders who are already engaged with this issue and those who need to be engaged.
5. I produce an implementation plan that guides my actions in carrying out my Impact Project. My plan is SMART (Specific, Measurable, Attainable, Relevant, Time-Bound)
6. I produce a plan for gathering data on the impact of my project.



PHOTO SOURCE: Sustainability Ambassadors

Summative Assessment

I have presented a final report of my design process and resulting impact to critical stakeholders.

I have completed a personal reflection of my learning process including my sense of accomplishment in improving my community.

Diverse styles and voices are encouraged such as: a formal written reflection, spoken word, photo essay, infographic, or video journey.

Academic Standards

OSPI Environmental Sustainability Standards

Standard 1: Ecological, Social, and Economic Systems

Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

Standard 2: The Natural and Built Environment

Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.

Standard 3: Sustainability and Civic Responsibility

Students develop and apply the knowledge, perspective, vision, skills, and habits of mind necessary to make personal and collective decisions and take actions that promote sustainability.

High School Social Studies C3 Framework (College, Career, and Civic Life)

- Developing Questions and Planning Inquiries
- Applying Disciplinary Concepts and Tools: Civics
- Applying Disciplinary Concepts and Tools: Economics
- Applying Disciplinary Concepts and Tools: Geography
- Applying Disciplinary Concepts and Tools: History
- Evaluating Sources and Using Evidence.
- Communicating Conclusions and Taking Informed Action

Washington State Civics Standards

C2.11-12.1 Analyze citizens' and institutions' effectiveness in addressing social and political problems at the local, state, tribal, national and/or international level.

C4.11-12.2 Analyze and evaluate ways of influencing local, state, and national governments and international organizations to establish or preserve individual rights and/or promote the common good.

C4.11-12.4 Evaluate citizens' and institutions' effectiveness in addressing social and political problems at the local, state, tribal, national, and/or international level.

Next Gen Science Standards - Human Sustainability

HS-ESS3-1 - Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity

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

HS-ESS3-3 - Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity

HS-ESS3-4 - Evaluate or refine a technological solution that reduces impacts of human activities on natural systems

HS-ESS3-6 - Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

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 Recycling/Compost Company

Watershed Salmon Recovery Plan

Puget Sound Regional Council

Puget Sound Vital Signs

Washington Dept of Ecology

Tribal Treaty Rights

Lesson Background and Rationale

While the usual brochure, poster, or research paper at the end of a unit is easy to grade for the teacher, it is the design of meaningful and measurable Impact Projects that awakens student voice and agency. The more relevance that students experience linked to classroom learning, the more intrinsic their pursuit of academic rigor.

Here is a simple equation...

"Academic rigor in context of community relevance generates intrinsic motivation for excellence."

Young people today already know that they are inheriting a wickedly complex set of challenges that will take a generation or two to untangle. They also sense that there are a wide range of very tangible, obvious solutions evolving at a pace commensurate with the need. This is very exciting news. This will be their century.

The future belongs to youth.

INQUIRY

What is the problem here?

What is my role in it?

Am I a stakeholder at some level?

What am I curious about?

What do I need to know?

What can I do?

What scale should my action be so that I can actually achieve it?

What criteria do I use, or data do I collect, to prove my impact?

How does my impact align with the work of other stakeholders already invested in this problem?

How can I best share my impact project with these stakeholders so I can be part of the bigger solution?



ENGAGING STAKEHOLDERS

Here is a [general description of stakeholders](#) who may already be engaged with one or more issues that students gravitate towards. It is also important for students to identify stakeholders who perhaps need to be engaged but are not yet, as well as to reflect on their own bias in making assumptions about stakeholders or neglecting certain groups altogether.

Students can build this list from scratch to practice systems thinking and

connections they already know about. Teachers may also want to explore an expanded Stakeholder Engagement Lesson Plan and helpful Stakeholder Lists, as well as graphic organizers to support students in researching the systemic relationships among diverse stakeholder groups.

[See Foundation Lessons - Engaging Stakeholders](#)

Aligning Impact Projects with City and County Government Needs

Ideas for Impact Projects need to be aligned with the needs of local government because many of our local cities, and certainly King County, have established Climate Action Plans as a way to organize the intersectional relationships among multiple sustainability goals.

These systemic goal areas typically include:

equity, water, energy, food, transportation, buildings, waste management, economic development, and natural resource management.

Teachers can invite students to explore how their emerging ideas for a personal or household Impact Project are nested within one or more sustainability policies, plans, or performance measures valued by the local government of which students are residents.

Here are a few [examples](#) from King County and selected cities.

KEY SEARCH WORDS

My City or County...

Sustainability Plan
Climate Action Plan
Climate Justice
Environmental Stewardship
Environmental Services
Comprehensive Plan
Equity, Diversity, Inclusion
Neighborhoods
Affordable Housing
Transportation Plan

Commute Trip Reduction Plan
Bicycle and Pedestrian Plan
Energy Conservation
Solar Installation / Incentives Plan
Public Works Department
Planning Department
Parks and Recreation
Economic Development
Community Development
Green Building Codes
Green Building Incentives
Waste Management
Water Supply / Quality
Stormwater Plan
Wastewater Management
Tree Canopy
Salmon Recovery
Habitat Restoration
Wildlife Habitat
Natural Yard Care
Community Garden
Farmland / Agricultural Plan
Food Policy / Hunger

know your city



BREAKING DOWN THE PROBLEM STATEMENT



Develop a series of mini lessons around how to break down the problem statement and return to this practice throughout the unit to answer the question, ***“Are we solving the problem?”***

Using the problem statement as another kind of entry event for problem-based learning, as well as a practice in reflective analysis throughout the unit, allows time for students to inhabit the depth of the question in their own way. This practice shifts from being an academic question contrived by the teacher, to being ***an intriguing problem worth solving.***

It also empowers students to begin to craft their own meaningful and measurable problem statements to solve additional community sustainability challenges they encounter.

See additional [**Teacher Tips**](#) for how to develop and explore effective problem statements.

Developing Sub Questions

How can I... apply my academic knowledge and skills... to design a project... that would have an actual impact measurably improving... sustainable conditions... at home, school, or in my community?

How can I...

- Am I responsible as a change agent in this system?
- What is my cultural, gender, racial lens?
- Do I assume that someone else will solve the problem?
- Will scientists solve this problem for us? How does science inform my values and decisions?
- Will engineers? What's my agency as a designer? Innovator?
- Will the business community solve it? What's my agency as a consumer? Employee? Entrepreneur?
- Is it up to the government to solve this? What's my responsibility in a democracy?

apply my academic knowledge and skills....

- What do I need to know to solve this problem?
- What is the point of attaining academic knowledge?
- What is the strongest relationship between the academic knowledge we have been learning in class (so far) and a sustainable systems challenge I have noticed or care in my community?
- What skills do I have or need to develop to solve this problem?

to design a project...

- What are the elements of project design?
- Are these the same elements for adult professionals?
- What does a project manager do?
- Can you think of a career that is not related to "solving a problem?"

that would have an actual impact, measurably improving...

- How will I know if the project I design is successful?
- What is my intended impact? How will I measure actual impact?
- Can I design evaluation criteria into my project from the beginning?
- How will I collect data?

sustainable conditions...

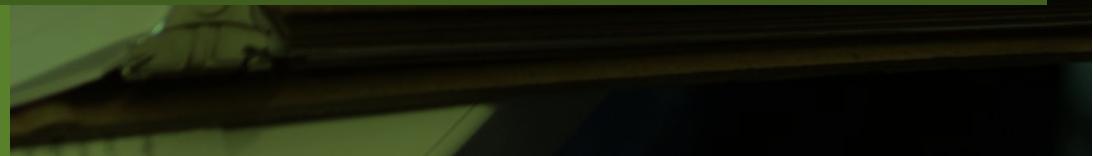
- What does sustainability mean? Is there an accepted definition?
- How would I break down sustainability into subsystems?

at home, school, or in my community?

- Am I a stakeholder in this?
- Is my family already taking action?
- How does my school district improve sustainable conditions?
- How does my city improve sustainable conditions?
- What about grassroots community groups and nonprofits?



LESSON OUTLINE



Materials Needed

Internet access

Time Needed

20-30 minute sessions over multiple weeks
(or assigned as homework)

SA Web Resources

[Impact Project Design](#)

[Project Design Questions](#)

[Impact Project Ideas](#)

[Neighborhood Sustainability Inventory](#)
[Engaging Stakeholders - LESSON](#)

Entry Event Ideas

Trust the original Problem Statement. Let the students reflect, mind map, pair and share their initial thoughts on what they know, what they care about, or what additional questions come to mind. Support students in developing the skill of listing sub questions as they “breakdown” the problem statement.

Analyzing Existing Models

Engage students in analyzing a range of [Impact Projects written by other students](#). Challenge them to scan 3-5 different Impact Projects to see what they notice and what they are curious about.

Ask students to notice:

Which topics interest you the most?

Which of these actions are you already doing personally or as a family?

Could you see yourself expanding on this action?

As you compare a number of different types of Impact Projects, what do you notice about how they are all structured?

What's the template or protocol that each of them follows? Write it out. Why is each element important to success?

[See Project Design Questions](#)

Neighborhood Sustainability Inventory

Students engage in **sustainable systems thinking** and **geographic literacy** by conducting an inventory of the current conditions of their neighborhood. This [place-based lesson](#), which is part of a bigger [protocol outlined here](#), gets students off the computer and outside.

Students select from one or more sustainable systems checklists to observe and inventory human land use decisions that have resulted in the current conditions of a half mile radius surrounding the place where they live, or however else they wish to set the parameters for their sense of **“my neighborhood.”** Through the use of this protocol, students are able to identify and prioritize a range of possible Impact Projects that they may choose to implement. The inventory includes the following sets of checklists:

Human Population and Land Use

Transportation Infrastructure

Food Access

Size and Condition of Green Spaces

Water Bodies, Description by Type and Conditions

Stormwater Infrastructure and Water Pollution

Tree Canopy Inventory

Establishing a Clear Impact Statement

It is important to be able to write a clear **statement of intended impact** so that the project is specific and achievable. A clear impact statement also points to an outcome that is actually measurable, as opposed to students just doing an action but not taking the extra step to know what difference it made. Invite students to analyze this [list of student-written Impact Statements](#).

Notice the use of the standard **thesis structure** using the prompt... “If I take this specific action, then here is the result I expect to produce.”

Notice also how some of these Impact statements extrapolate what would happen if many more people took this same action: “What would be the projected collective impact if everyone in my family, or classroom, or school, did this same action?”

From all of these Impact Statements, which topics interest you the most?

Which of these actions are you already doing personally or as a family? Could you see yourself expanding on this action?

If you are intrigued with a different type of action, try writing your own Impact Statement.

Identifying Problems and Impact Statements via Research

As students are researching websites or articles to build background knowledge and curiosity, have them practice **extrapolating a problem statement** from the information given. Write it out and jigsaw among small groups to refine this skill.

If the website or article also presents data or proposes solutions, have students practice **summarizing** a clear impact statement using the prompt... "The author recommends or is reporting on, this specific set of actions leading to these potential or actual results." Write it out and jigsaw among small groups to refine this skill.

Build in **student-led jigsaws and/or student-written quizzes** based on readings and web searches that students conduct as they develop increasingly sophisticated background knowledge for their Impact Project.

From Inquiry to Project Design

In this phase of the lesson series, students may start to show curiosity or personal passion around a particular topic, lens, or facet of a community sustainability issue or opportunity. Teachers can support this winnowing process by facilitating one or more of the following activities.

Copy an existing Impact Project from the [student examples webpage](#). Consider how to repurpose some or all of it as your own project. Don't worry about plagiarism or copying a good idea. The goal is to make a **measurable impact**. Rename the project and make it your own while being sure to acknowledge the original source and student author.

Practice writing clear impact statements for 3-5 different issues or opportunities you are curious about. Through the exercise of writing strong Impact Statements you may become much clearer about which one of them calls you to action.

Gathering Data

Students can practice gathering data in four ways:

By analyzing the current policies, plans and performance measures used by local governments, agencies, businesses, or nonprofits to see how goals are established and progress is then measured against those goals.

By analyzing readily available data expressed in utility bills, gasoline expenses, grocery bills, etc.

By using an online calculator to assess their carbon footprint or water footprint as a baseline for behavior change.

By setting up a system to directly count or measure current conditions.

To practice these skills invite students to co-create a classroom spreadsheet for collecting good ideas for benchmarking current conditions and tracking progress. An initial brainstorm might include some of the following ideas:

How many gallons of water does my family consume per day?

How many kilowatt-hours of energy does my family consume in a year?

How many students travel by bus to my school, vs. walk, carpool, bike, or travel in single occupancy vehicles?

How many reams of paper does my school consume? What is the percentage of recycled content in the paper that's used?

What percentage of our city is currently covered by the urban tree canopy?

Out of all houses or apartment buildings in my neighborhood, how many have solar panels installed?

What is the current ownership of electric vehicles in my city?

What is the geographic location of current EV charging stations in my community?

How many salmon return on an annual basis to this part of the watershed?

Reporting to Stakeholders

As students gather impact data, they also need to determine how they will **display the data** so it is accessible and impactful to other people who care or need to know. This could be a spreadsheet, a table, a graph, pie chart, or infographic.

Students might also enjoy using analogies or comparisons to demonstrate on a sensory or emotional level the impact they are achieving. For example: "When I stop eating beef for one month compared to how often I used to eat beef, it's like taking (x) cars off the road for (x) days."

Students will need to know how to compose a **professional letter** or email to the stakeholders they are communicating with.

Students might team up with one or more classmates to **role play** a telephone or Zoom conversation, or a radio interview, to make sure that their talking points on the need they saw, the action they designed, and the impact that resulted, are not only succinct and accurate, but tell a compelling story.

Students may also find a range of personal ways to engage with the types of stakeholders they are trying to inform, inspire, or influence. **Some ideas for different platforms and styles might include:** Infographic, video, tiktok, instagram, facebook, blog post, written report, newsletter article, letter to the editor, slides, in-person presentation, virtual presentation, school announcement, classroom announcement, family discussion, other...

Reflection and Recommended Next Steps

In this phase, **Reflect on your experience:** What skills did you gain? How did your understanding expand? How do you feel about the process and the impact you made? What does this project motivate you to do next?

Assessment Strategy (Ideas)

Collaborate with students on **crafting a rubric** for evaluating an exceptional Impact Project. The process of choosing criteria re-enforces the value of designing for impact. Once this rubric is agreed upon by the class, you can apply it throughout the design and implementation phases of the project.

Consider sharing with students the **SMART** framework for assessing the effectiveness of an Impact project design. SMART stands for Specific, Measurable, Attainable, Relevant, and Time-Bound. See [Teacher Tip](#) on SMART goal setting. Students may also want to Google "**SMART Goal Setting**" to see how this concept is applied in various career settings.

View these ready-made **Impact Project Evaluation tools**. Some teachers use these tools (or a variation they have adapted) to have student teams self-evaluate or peer-elevate progress throughout the phases of the project.

GUIDELINES FOR DESIGNING AN IMPACT PROJECT

This one-page guide lays out clear criteria and sequential elements for a successful (and thorough) impact project design.

[Download the guide here.](#)

SAMPLE TOOL FOR EVALUATING IMPACT PROJECTS

This one-page evaluation tool, which tracks with the guidelines above, empowers students to be in conversation with peers and teachers about where they are in their project workflow, what has been completed, what's missing, and quick check boxes for what's needed.

[Download the evaluation tool here.](#)



PHOTO SOURCE: Sustainability Ambassadors

ACKNOWLEDGEMENTS



Thank you **Cascade Water Alliance** for supporting student and teacher research on water resource management issues and opportunities. [We need water!](#) And for supporting the original design of the PBL Curriculum Design Lab and Teacher Fellows Program.



Thank you **King County WaterWorks Grant Program** for supporting curriculum design related to water quality issues in the [Green Duwamish Watershed](#), as well as the [Clean Water Plan](#).



Thank you to **The Russell Family Foundation** for your sustained faith in our organization, innovative grantee support programs in fundraising and storytelling strategies, and for the awesome gift of general operating funds. We thank you for your vision and commitment.

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/](https://www.sustainabilityambassadors.org/)