WELCOME TO ONE STEP™

TEACHER'S GUIDE

educational **ideas**, inc.

GETTING STARTED WITH ONE STEP INSTRUCTIONAL RESOURCES

One Step is a video-based program focused on **climate science, environmental issues, sustainability, and so much more.** This one-of-a-kind program features innovative technology and environmental solutions that are not only helping to make our planet a better and safer place, but doing so in an engaging and immersive way.

The One Step topics and content are appropriate for students in grades 4–12 and are correlated to Next Generation Science Standards (NGSS). One Step provides a multitude of instructional resources to help you bring the program to life in your classroom, including:

- **CLASS TALK** documents designed to spark predictions, debate, analysis, and reflection about video topics.
- **5E LESSON PLANS** in three grade bands (4–5, 6–8, 9–12) designed to engage students directly in the hands-on science/engineering surrounding the science phenomena and technological innovations presented in the videos.
- **STUDENT PROJECTS** that inspire and empower students to be more sustainable in their homes, classrooms, and communities.

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ONE STEP PROGRAM PHILOSOPHY

Students today are ***"the first generation to feel the effects of the climate crisis, and the last who can do something about it."***

–Mike McGinn, former Seattle mayor

One Step was created for science teachers and non-science teachers alike to bring climate change alive in the classroom. This curriculum was designed with the underlying belief that students are smart–they can see and feel the effects of climate change now–and that approaching this topic in an inspiring, yet still realistic manner inspires them towards productive action. One Step curriculum is structured around three core instructional tenets:

- **Student-centered, experiential learning:** All One Step lessons include hands-on components and ample opportunity for reflection on their observations. Whether they're engineering a seed planting machine to fight deforestation, designing an experiment to understand where condensation droplets come from, or collecting data about plastic waste in their school and designing a social media campaign to address it, students are actively engaged in the process of learning.

- **Inquiry-based learning:** One Step learning begins with the introduction of a question, problem, or scenario. We believe that students learn best when they're given the opportunity to critically think through these scenarios, and the teacher acts as a facilitator, not the arbiter of knowledge.

- **Learning situated in students' lived experiences:** One Step curriculum invites students to share what they've noticed about their environment and changing climate. We also expand their understanding by introducing them to people and places that may have different challenges from their own, building students' empathy.

CLASS TALK

Resource Type: Student discussion (partnerships, small groups, whole class). One Class Talk document is provided for each video, and an asterisk (*) is used to indicate prompts appropriate for older students (6–12).

Focus Skills: Depending on the specific video, students might be asked to analyze data, make predictions, explain scientific concepts or models, share reactions, or generate questions.

Time Commitment: 30–45 minutes of discussion, plus video run time. (Class Talk prompts are written to be as comprehensive as possible; select prompts that best fit the needs of your students and timing concerns, or use them all!)

Embedded Teacher Supports: Instructional notes are embedded throughout the document. These notes include potential student responses, student misconceptions, and guidance around when to confirm/deny student predictions.

Instructional Flow:

BEFORE THE VIDEO: The purpose of these questions are to activate prior knowledge and to engage students in the scientific phenomena and/or technological innovations presented in the video. These questions may ask students to describe what they already know about a topic, their experience with a topic, or to make a prediction.

These sets of questions are designed to mirror the "Engage" portion of a 5E lesson plan. You may see the instructional note *"Do not confirm or deny any student predictions at this point"* in this section. This instructional strategy is used in inquiry classrooms to support students in growing their understandings in an organic and lasting way. The topics embedded within these predictive questions will be discussed in the video. Don't worry, there will be time to revisit student ideas after watching the video!

Example

Evaluate the following claim: "All people around the world use about the same amount of energy." Do you agree or disagree with the claim, and why? *(**Note:** The goal of this question is to activate prior knowledge and encourage students to make predictions. It's suggested to record student responses, and then revise responses after watching the video.)*

Source: Carbon Footprint Class Talk, pg. 3

AFTER THE VIDEO: The purpose of these questions is to build an understanding around scientific phenomena and/or technological innovations presented in the video, and extend understanding by applying it in new settings. These questions may ask students to revise their earlier predictions, explain how an innovation helps the environment or organisms, or to analyze data and debate how to best implement an innovation in a community.

These sets of questions are designed to mirror the "Explain" and "Elaborate" portion of a 5E lesson plan. While many of these questions do not have a singular "right" answer, you may see instructional notes that advise what elements a student response should include (and even follow-up prompts to use to elicit these responses).

Example

Re-evaluate the following claim: "All people around the world use about the same amount of energy." What evidence from the video can you use to prove (or disprove) this claim?

Source: Carbon Footprint Class Talk, pg. 3

NOTE-TAKING (During the Video): The purpose of these questions is to promote accountability while watching the video and to highlight important parts of the video. Unlike discussion questions before and after the video, these questions are designed to be answered independently by students while watching the video. Students should know the answers to their note-taking questions after watching the video, as these answers can provide the evidence needed to justify responses to "After the Video" questions.

Example

In the video, Laura-May tells us that carbon is a very important element that forms our bodies. What else does carbon form?

Source: Carbon Be Gone Class Talk, pg 5

"I really appreciated that I could put closed captioning on in Spanish because I have EL students in my classroom with no support"

–Katherine Nelson,
High School Science Teacher, NJ

ONE STEP LESSON PLANS

Resource Type: Student-led experiments, engineering projects, and/or research projects all following the 5E format (see below for an explanation regarding 5E lesson plans). One lesson plan is tailored for each grade band (4–5, 6–8, 9–12).

Focus Skills: Focus skills for each lesson plan is determined by the Science and Engineering Practices (SEPs) embedded within NGSS performance expectations. K–12 SEPs include:

- Asking Questions and Defining Problems
- Developing and Using Models
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Using Mathematics and Computational Thinking
- Constructing Explanations and Designing Solutions
- Engaging in Argument from Evidence
- Obtaining, Evaluating, and Communicating Information

Students may be asked to design an experiment testing a claim, analyze data, and then debate the implications with their peers. They may also be asked to create a model to understand a scientific phenomena, research it, make a presentation about the environmental impacts of an industry, or they may be asked to engineer a device to solve a problem in their community—and so much more!

Time Commitment: 2–4 hours, including video run time. (Lesson plans vary depending on the focus skills; notes are embedded throughout lesson plans suggesting ways to divide the lesson plan components over several classes, if needed.)

Embedded Teacher Supports: "To Prepare" notes list all materials and steps for teachers to complete before beginning the lessons with students.

Instructional notes are embedded throughout the lesson plans. These notes include potential student responses to prompts, student misconceptions, and guidance around when to confirm/deny student predictions. You may also find notes directing you to another lesson plan. Since the topics within climate change are overlapping, these notes provide guidance on where to find hands-on experiments or demonstrations about scientific phenomena mentioned in a lesson plan (examples: the greenhouse effect or the effects of carbon dioxide in water) if students are unfamiliar with the phenomena.

Teacher-specific support documents are also provided as needed. These documents are usually created to support teachers in facilitating student-created research or engineering projects by providing examples and prompts to use with student groups that are "stuck."

Instructional Flow–The 5Es

(Adapted from the BCSC 5E Instructional Model)

ENGAGE: The purpose of this section is to assess students' prior knowledge and engage their curiosity about a topic through short learning activities. These learning activities will focus students on an event, phenomenon, object, or situation. They will also organize student thinking towards the desired learning outcomes and will likely uncover student misconceptions that should be addressed in later parts of the lesson. By the end of this section, students' interests should be piqued, and they should be actively invested in finding the "answer" to the event, phenomenon, object, or situation.

Example

Students observe a plastic bottle that has a large water balloon inside and discuss the "science mystery" in small groups: "How do you think it's possible to get a water balloon inside the bottle without breaking the balloon? Write or draw how you think it happened."

Source: Weather vs. Climate, Grades 6–8, pg. 5

EXPLORE: The purpose of this section is to provide time for students to investigate, explore, and make meaning of the topic at hand. These activities, including research activities and experiments, provide common, concrete experiences for students, which will provide the foundation of student understanding. The teacher plays the role of a facilitator, and by the end of this section students should be ready to share observations and patterns with their peers as a way to construct explanations.

Example

After students observe how carbon dioxide impacts the pH of water, students are asked to set up an experiment to determine how the altered water impacts organisms with shells. Students use vinegar, water, and chicken eggshells in their experiment, record their findings in a provided lab notebook, then infer what the results tell them about marine organisms with shells.

Source: Oceans, Grades 4–5, pg. 5–6

EXPLAIN: The purpose of this section is to construct and demonstrate understanding through explanation. This section also provides an opportunity for teachers to directly introduce scientific concepts related to engagement and exploration activities. By the end of this section, students should be able to explain how scientific concepts influence their engagement and exploration activities.

Example

After watching a One Step video about fossil fuels, students debate the meaning and relevance of the following quote from Van Jones: "If we keep pulling death from the ground, we will reap death from the skies." Students then explore an interactive map of coal fields to understand more about the distribution of fossil fuels.

Source: Fossil Fuels, Grades 6–8, pg. 5

ELABORATE: The purpose of this section is to challenge students to extend their learning goals by applying what they've learned in a new situation or context. By the end of this section, students have deepened their understanding of learning goals and demonstrate the ability to generalize concepts and/or skills.

Example

After engineering a product that utilizes plastic waste, students are challenged to create a "pitch" of their product for future investors, including a demo of their product prototype.

Source: Ecoboats, Grades 9–12, pg. 10

EVALUATE: The purpose of this section is to evaluate students' progress towards their learning goals, and for students to self-reflect on their learning. Learning activities in this section might include a poster presentation, a classroom debate, or a written explanation of a concept or model. One Step provides suggested rubrics to support teachers in evaluating learning.

Example

After creating a greenhouse effect model and analyzing data about atmospheric carbon dioxide levels, solar irradiance, and fossil fuel emissions, students write a claim with evidence and reasoning that answers the question "Is the greenhouse effect mostly due to human activities or nature?"

Source: Greenhouse Effect, Grades 6–8, pg. 10

OTHER ONE STEP CONTENT

For more details about the One Step videos, projects, and app, see the **GETTING STARTED GUIDE**.

Visit the **USER RESOURCES** for additional teaching support.

