

RESOURCE LIBRARY
LESSON

Spread the Word to Make an Impact

As the culmination of the unit, students leverage what they have learned about recycling lithium-ion batteries and circular economies to peer review, finalize, produce, and present their video challenges for the unit project.

GRADES

6 - 8

SUBJECTS

Biology, Health, Earth Science, Social Studies, Economics, Storytelling, Filmmaking

CONTENTS

3 Activities

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ACTIVITY 1: PEER REVIEW: VIDEO STORYBOARD | 50 MINS

DIRECTIONS

Closing the Loop: Towards a Circular Economy unit driving question: How can we make our economy more circular, and why does it matter?

Spread the Word to Make an Impact lesson driving question: How can we create a culture of battery recycling in our community?

1. Demonstrate the peer review process by modeling with an exemplar.

- Elicit students' experiences with giving or providing feedback, in order to generate ideas on how to do so during peer review.
- Introduce peer review specifically by explaining how it is a process by which colleagues provide useful, critical, and honest feedback, in order to improve a final product. The peer review process is used by both scientists and engineers to improve articles, presentations, and designed objects.
- Use the *Video Storyboard and Script: Peer Review Feedback Sheet* and *Final Product Checklist and Rubric* as you provide feedback on a storyboard and script that you have created or on student work from a different section (make sure it's anonymous or that you have permission from the group).
- Show students how you would mark up the sheet and share what you are thinking as you work through the review.
 - Demonstrate how to provide clear, respectful, and concise feedback that addresses both what the author asked for feedback on and your own perspective.

2. Guide students to provide peer review on another group's storyboard.

- Organize students into their project groups. If needed, provide time for individual students to finish completing the top section of the *Peer Review Feedback Sheet*. Then have groups share their *Video Storyboard and Script* handout with a different group, in a way that you have pre-determined. Individual students should receive another student's *Peer Review Feedback Sheet* so that they can provide targeted feedback on the same storyboard that they are reviewing with their group.
- Encourage students to attend to the request for feedback at the top of the sheet, and provide clear feedback with compliments and suggestions rooted in evidence from the *Final Product Checklist and Rubric*.
 - Students can highlight or use sticky notes to indicate with one color areas of the rubric that are met, and with another color, areas that are not met. They can also list evidence that the criteria has been met on the *Peer Review Feedback Sheet*, and provide a summary of their feedback in written or digital form.

3. Facilitate students' collaborative review of feedback from their peers.

- Prompt students to give the feedback sheets back to the group whose work they reviewed. In their project group, students should review the feedback, ideally from three to four reviewers. Then, they should decide which aspect(s) of feedback they will focus on in their work time in the next step, and record this in the last section of the *Peer Review Feedback Sheet*.
 - Provide guidance on what kinds of feedback students can and should incorporate at this point, versus which feedback it is not necessary to acknowledge in their final drafts. For example, feedback they can and should incorporate should relate directly to how to make their storyboards best align to the rubric and how to create clear messaging to the target audience. Feedback related to unnecessary wording changes, opinions on visuals, or other aesthetic changes that are not barriers to the viewer are optional to be incorporated.
- 4. Preview the details for the Video Challenge Festival and support project groups in finalizing their storyboards.**
- To build students' excitement and motivation for finalizing their storyboards, share the details for the Video Challenge Festival that will culminate the unit (see Setup for more details).
 - Provide time for project groups to finalize their storyboards and scripts, based on peer feedback.
 - Emphasize that they should be ready to produce their videos in the next activity. Share the technology and/or options that they will have to create their videos.

Modification

Step 2: Consider having students collaborate in their project groups rather than individually to provide feedback to their peers, especially to support EL and other students who may need extra support in reading, interpreting, and analyzing the scripts and storyboards.

Informal Assessment

Students' feedback on their peers' storyboard drafts demonstrates their ability to critically assess science communication skills and content from the unit related to circular economies and recycling lithium-ion batteries.

Extending the Learning

To help students broaden and monitor the impacts of their social media video messages, consider having them create a user survey for their target audience about use and disposal of devices powered by lithium-ion batteries. Survey questions should be student-generated and focused towards their target audience and what they already know about recycling lithium-ion batteries, and include questions to understand how many devices and lithium-ion batteries a user typically disposes of over the course of the year. Analyzing the survey results can help students refine and focus the action steps that they include in their videos.

OBJECTIVES

Subjects & Disciplines

Biology

- Health

Earth Science

Social Studies

- Economics

Storytelling

- Filmmaking

Learning Objectives

Students will:

- Provide specific and useful feedback to peers that is connected to evidence and the criteria for the project.
- Use the feedback received from peers to improve their group's storyboard and script.
- Prepare for creation of the video challenge that comprises the final product for the unit project

Teaching Approach

- Project-based learning

Teaching Methods

- Discussions
- Modeling
- Peer tutoring

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Learning and Innovation Skills
 - Communication and Collaboration
 - Creativity and Innovation
 - Life and Career Skills
 - Leadership and Responsibility
 - Productivity and Accountability
 - Social and Cross-Cultural Skills
- 21st Century Themes
 - Environmental Literacy
- Critical Thinking Skills
 - Applying
 - Creating
 - Evaluating
- Science and Engineering Practices
 - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- CCSS.ELA-LITERACY.W.7.4:

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

- CCSS.ELA-LITERACY.WHST.6-8.2.D:

Use precise language and domain-specific vocabulary to inform about or explain the topic.

NEXT GENERATION SCIENCE STANDARDS

- MS-ESS3: Earth and Human Activity:

MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

- Science and Engineering Practice 8:

Obtaining, evaluating, and communicating information

Preparation

BACKGROUND & VOCABULARY

Background Information

In today's internet-driven society, short videos are an ideal format for communicating information and ideas, especially in regards to changing individual behaviors to contribute to broader social change. For videos to have maximum impact, they need to:

1. quickly capture the attention of a target audience,
2. clearly communicate a key takeaway message,
3. provide ideas about how the viewer can take action
4. be brief and visually appealing.

Peer review is a process by which colleagues provide useful, critical, and honest feedback, in order to improve a final product. The peer review process is used by both scientists and engineers to improve articles, presentations, and designed objects. For engineers, one of the primary justifications for peer review is safety. The process of peer review can also help engineers satisfy applicable laws, meet clients' financial goals, attend to the needs of the community, and mitigate environmental impacts. Incorporating the peer review process in science classrooms enables students to consider these same goals, take pride in and ownership of their final products for the unit project, and position themselves with expertise to share with their peers.

Prior Knowledge

["Environmental and health impacts of mining lithium","How and why to recycle lithium-ion batteries","Circular versus linear economies"]

Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
circular economy	<i>noun</i>	a system of production that extends the lifespan of consumer goods by maximizing reusing and recycling, and minimizing throwing things away.
linear economy	<i>noun</i>	system where raw materials are collected and transformed into products, which are eventually discarded as waste.
peer review	<i>noun</i>	the many ways in which students can share their creative work with peers for constructive feedback and then use this feedback to revise and improve their work.
recycle	<i>verb</i>	to clean or process in order to make suitable for reuse.

ACTIVITY 2: CREATE YOUR VIDEO CHALLENGE | 50 MINS

DIRECTIONS

Closing the Loop: Towards a Circular Economy unit driving question: How can we make our economy more circular, and why does it matter?

Spread the Word to Make an Impact lesson driving question: How can we create a culture of battery recycling in our community?

1. Review the video guidelines and prepare students for producing their video challenge.

- Welcome students to class by announcing that the time to create their video challenge has finally arrived. Motivate them to succeed by reminding them about all they have learned

about circular and linear economies, lithium-ion batteries, and how increasing battery recycling can have positive societal and environmental impacts.

- If you haven't done so previously, provide them with the details for the Video Challenge Festival, at which their video proposals will be shared with the community and experts.
- Organize students into their project groups and ensure they have access to their group's [Video Storyboard and Script](#) handout, which should be finalized.
- If necessary, also prompt them to consult the [Peer Review Feedback Sheet](#) to incorporate feedback from their peers.

2. Support students as they create their video challenge.

- Introduce and provide access to the options available to students for creating their video challenge, including but not limited to: online animation tools, digital cameras or tablets for creating short live action or stop motion films, and digital slide software.
- Encourage group members to take on different roles as they create their video challenge. Roles can include Fact Checker, Actor/Narrator, Video Producer, Animator/Illustrator.
- Given the limited time that students have to create their video challenge, emphasize execution over perfection. Ensure that they address each part of the storyboard, to create a narrative arc that fits the online video genre.

3. Provide options for students to finalize their videos and promote their culminating presentations.

- As students finish their videos, consider different options for them to finalize and prepare for the culminating presentations. Some options include:
 - Pointing students towards the [Final Product Checklist and Rubric](#) to make sure their videos fulfill the criteria.
 - Create promotional materials for the Video Challenge Festival, including hashtags and other online materials, especially if the festival will be held virtually.
 - Have students create a digital pledge that festival audience members and later viewers can sign to change their behaviors in regard to lithium-ion battery use and disposal.
 - Brainstorm types of experts and community members, both within and outside of the school, who should be invited to attend the festival. If possible, invite members of the

target audiences that students have decided on for their videos.

- Determine roles for facilitating the festival, which students will fulfill. These could include: Emcee, Tech Support, or Audience Circulators.
- Once students' videos are complete, upload them to a shared video platform so that students and audience members can easily access them to share in the next activity.

Modification

Step 1: For classrooms with limited access to recording devices, have students create a slideshow presentation with recorded narration. This can be downloaded as a video file and shared via social media.

Tip

Step 3: Explore different options for sharing students' videos on social media in safe and appropriate ways; this may entail you as the teacher uploading to a shared platform rather than having students share on their personal accounts, especially if not all students have access.

Rubric

Students' videos demonstrate their mastery of all concepts and standards taught in this unit. Use the standards-aligned *Final Product Checklist and Rubric* to assess groups' videos.

OBJECTIVES

Subjects & Disciplines

Biology

- Health

Earth Science

Social Studies

- Economics

Storytelling

- Filmmaking

Learning Objectives

Students will:

- Create a short video challenge directed at a particular audience to communicate the benefits of recycling devices that use lithium-ion batteries.

Teaching Approach

- Project-based learning

Teaching Methods

- Discussions
- Hands-on learning
- Self-directed learning

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Information Literacy
 - Information, Communications, and Technology Literacy
 - Learning and Innovation Skills
 - Communication and Collaboration
 - Creativity and Innovation
 - Life and Career Skills
 - Leadership and Responsibility
 - Productivity and Accountability
 - Social and Cross-Cultural Skills
- 21st Century Themes
 - Environmental Literacy
- Critical Thinking Skills

- Applying
- Creating
- Science and Engineering Practices
 - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- CCSS.ELA-LITERACY.WHST.6-8.2.D::

Use precise language and domain-specific vocabulary to inform about or explain the topic.

NEXT GENERATION SCIENCE STANDARDS

- MS-ESS3: Earth and Human Activity:

MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

- Science and Engineering Practice 8:

Obtaining, evaluating, and communicating information

Preparation

BACKGROUND & VOCABULARY

Background Information

In today's internet-driven society, short videos are an ideal format for communicating information and ideas, especially in regard to changing individual behaviors to contribute to broader social change. For videos to have maximum impact, they need to:

1. quickly capture the attention of a target audience,
2. clearly communicate a key takeaway message,
3. provide ideas about how the viewer can take action
4. be brief and visually appealing.

Having an authentic venue and audience for students' final products builds their motivation through the creation process and increases engagement during the culminating presentations. Bringing outside community members and disciplinary experts into the classroom (whether in-person or virtually) also helps students make connections between their project work and possible STEM career pathways.

Prior Knowledge

["Environmental and health impacts of mining lithium","How and why to recycle lithium-ion batteries","Circular versus linear economies"]

Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
circular economy	<i>noun</i>	a system of production that extends the lifespan of consumer goods by maximizing reusing and recycling, and minimizing throwing things away.
linear economy	<i>noun</i>	system where raw materials are collected and transformed into products, which are eventually discarded as waste.
recycle	<i>verb</i>	to clean or process in order to make suitable for reuse.

ACTIVITY 3: VIDEO CHALLENGE FESTIVAL | 1 HR 15 MINS

DIRECTIONS

Closing the Loop: Towards a Circular Economy unit driving question: How can we make our economy more circular, and why does it matter?

Spread the Word to Make an Impact lesson driving question: How can we create a culture of battery recycling in our community?

1. Welcome community guests to your classroom and launch the Video Challenge Festival.

- Provide name tags for each stakeholder, student, and yourself.
- Facilitate introductions (or have a student facilitate, depending on the roles they decided on at the end of the Create Your Video Challenge activity), having students and external guests introducing themselves.
- Prompt students to explain the reason for embarking on their project and key highlights from what they learned about the circular economy and lithium-ion batteries.
 - If the timing of the festival is around National Battery Day on February 18 or International E-Waste Day on October 14, be sure to promote these dates and associated local events.
- Explain the format for viewing the Video Challenges, including any hashtags associated with the event and how audience members can access and share the videos on social media.
 - If students created the optional user survey in the Peer Review: Video Storyboard activity, share the survey results as a way to introduce the problem of lithium-ion battery use and disposal in the local community.

2. Have each project group present their video challenges and respond to feedback.

- Distribute copies of the Closing the Loop Video Challenge Audience Feedback Form. If needed, assign audience members to specific project groups, so that each group gets feedback from multiple viewers.
- After each group shows their video challenge, model how to ask appropriate questions about the group's understanding of linear versus circular economic systems, and how recycling lithium-ion batteries contributes to making a more circular economy with positive impacts. Press students to consider and share other ways besides recycling to make the system more circular. Prompt audience members to also ask questions and have students respond.
- Ensure students invite audience members to commit to e-waste recycling and to share this commitment on social media, now and every year on February 18 (National Battery Day) and October 14 (International E-Waste Day). If students created a digital pledge in the Create Your Video Challenge activity, prompt audience members to access and sign the pledge to broaden the impact of students' videos.
- As appropriate, encourage audience members and/or students (see Tips) to share and promote students' video challenges and pledges on social media.
- As the festival culminates, collect the feedback form from audience members and thank them for their participation.

3. Support students in determining the impact of their project.

- Elicit students' ideas about how they could calculate how many devices powered by lithium-ion batteries will be diverted from the waste stream as a result of their final products.
- Decide as a class which idea they think will give an accurate representation; there are genuinely multiple ways to do so!
- If students need guidance, one way would be to add up the total number of people in attendance at the festival and the number of likes, comments, or pledges from students' social media posts. Then multiply this number by the average number of devices powered by lithium-ion batteries in American households, using data from the [Digging into Lithium](#) activity, or look up a reliable source for current data. In 2020, this average was 10.37, according to this consumer electronics survey by [Statista](#).
- If students created the optional user survey in the *Peer Review: Video Storyboard* activity, they should use their findings to determine this number.
- In a shared public document, lead students through this calculation. Be sure to revisit it over time as students' video messages and pledges circulate on social media.

4. Lead a debrief discussion to reflect on the unit and next steps that students could take to have a positive impact on the environment.

- Either at the end or after the film festival, consider the following options for leading a debrief on the unit:
 - Collectively revisit the class *Know and Need to Know* chart from the opening activity, [There's No Such Place as Away](#). Highlight how students can likely now answer many of the questions that they had at the beginning of the unit.
 - Show [The Story of Electronics](#) (7:47) and revisit the [Zero-Waste Hierarchy](#) infographic to brainstorm ideas for how students could reduce the impacts of lithium-ion batteries use and disposal, even more than just recycling.
 - Ask students to respond individually to some of the following prompts:
 - What will you remember most about creating your video challenge? Why?
 - What would you change about this unit and the project? What would you keep the same?
 - How was your experience of working with your group in this unit?
 - How did your group work well together? What could your group have done better?

- What is the most important thing you learned during the *Closing the Loop: Towards a Circular Economy* unit?
- Use a collaboration rubric, such as [6-12 Collaboration Rubric \(CCSS Aligned\)](#) from PBLWorks, for students to assess themselves and/or peers on their collaboration skills.

Tip

Step 2: Provide different options for sharing students' videos on social media in safe and appropriate ways; this may entail you as the teacher uploading to a shared platform rather than having students share on their personal accounts, especially if not all students have access.

Rubric

Students' videos demonstrate their mastery of all concepts and standards taught in this unit. Use the standards-aligned *Final Product Checklist and Rubric* to assess groups' videos. Optionally, use a collaboration rubric, such as [6-12 Collaboration Rubric \(CCSS Aligned\)](#) from PBLWorks, for students to assess themselves and/or peers on their collaboration skills. Finally, consider incorporating feedback from the *Closing the Loop Video Challenge Audience Feedback Form* as part of the assessment of project groups' abilities to successfully communicate their messages.

OBJECTIVES

Subjects & Disciplines

Biology

- Health

Earth Science

Social Studies

- Economics

Storytelling

- Filmmaking

Learning Objectives

Students will:

- Present their video challenges to an audience of peers, community members, and experts in order to communicate why and how to recycle lithium-ion batteries and e-waste through the lens of a circular economy.
- Calculate the total amount of lithium that can be recovered through their efforts in order to monitor their environmental impact.
- Reflect on their learning during the Closing the Loop: Towards a Circular Economy unit and brainstorm next steps for increasing positive impacts.

Teaching Approach

- Project-based learning

Teaching Methods

- Discussions
- Experiential learning
- Reflection

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Information Literacy
 - Information, Communications, and Technology Literacy
 - Learning and Innovation Skills
 - Communication and Collaboration
 - Creativity and Innovation
 - Life and Career Skills
 - Leadership and Responsibility

- Productivity and Accountability
- Social and Cross-Cultural Skills
- 21st Century Themes
 - Environmental Literacy
- Critical Thinking Skills
 - Applying
 - Creating
 - Evaluating
- Science and Engineering Practices
 - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **CCSS.ELA-LITERACY.SL.7.4:**

Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.

- **CCSS.ELA-LITERACY.SL.7.5:**

Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

NEXT GENERATION SCIENCE STANDARDS

- **MS-ESS3: Earth and Human Activity:**

MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

- **Science and Engineering Practice 8:**

Obtaining, evaluating, and communicating information

Preparation

BACKGROUND & VOCABULARY

Background Information

Having an authentic venue and audience for students' final products builds their motivation through the creation process and increases engagement during the culminating presentations. Bringing outside community members who represent their target audience(s) and disciplinary experts into the classroom (whether in-person or virtually) also helps students make connections between their project work and possible STEM career pathways.

After presenting their videos, students are invited to reflect on what they learned during the unit. This type of reflection is a crucial part of the learning process that encourages insight and complex learning through synthesizing and evaluating the content and practices that students took on over the course of the unit.

Prior Knowledge

["Environmental and health impacts of mining lithium", "How and why to recycle lithium-ion batteries", "Circular versus linear economies"]

Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
circular economy	<i>noun</i>	a system of production that extends the lifespan of consumer goods by maximizing reusing and recycling, and minimizing throwing things away.
linear economy	<i>noun</i>	system where raw materials are collected and transformed into products, which are eventually discarded as waste.
recycle	<i>verb</i>	to clean or process in order to make suitable for reuse.



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