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ACTIVITY : 1 HR 30 MINS

Sharing Our Solutions

As the final product of the *Germ Problem-Solvers: Using Engineering to Develop Solutions* unit, students prepare for presenting their designed solutions to keep germs from spreading. For their final presentation, they identify the target audience for their solution, prepare outlines of their presentations, and practice. Students present their designs and complete a reflection of their work in this unit.

GRADES

1, 2

SUBJECTS

Biology, Health, Engineering

CONTENTS

3 PDFs

OVERVIEW

As the final product of the *Germ Problem-Solvers: Using Engineering to Develop Solutions* unit, students prepare for presenting their designed solutions to keep germs from spreading. For their final presentation, they identify the target audience for their solution, prepare outlines of their presentations, and practice. Students present their designs and complete a reflection of their work in this unit.

For the complete activity with media resources, visit:
http://www.nationalgeographic.org/activity/sharing-our-solutions/

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DIRECTIONS

This activity is part of the *Germ Problem-Solvers: Using Engineering to Develop Solutions* unit.

1. Assist students as they identify their audience and learn basic principles of public speaking in preparation for presenting their design solutions.

- To prepare for their presentations, students should decide who their audience will be (or you should share the audience you have arranged for them) when they present their products and tools later in this activity. This audience could be their classmates, peers in their school, school administration, their family, experts in public health, or their broader community.
    - Once the audience is identified, have students work in their project groups to discuss the following questions:
        - What would this audience want to know?
        - How would our designed solution help them stay healthy?
        - How can we tell the story of how we designed our solutions?
- Next, reconvene the class. Explain that in this activity, they will be preparing to present their solutions to an audience. They will present as a project group. You will share how they will be presenting (in-person to an audience in their classroom, virtually in real-time, via videoed presentations shared online, etc.) Ask students to share what they know about speaking to an audience. Depending on their previous experiences presenting in your class, you might ask questions such as:
    - *What do our voices sound like and not sound like?*
    - *What are our eyes doing and not doing?*
    - *What are our hands doing and not doing?*
    - *What is our message like and not like?*
- Keep a public record of students' ideas on your whiteboard, in a digital document, or on chart paper. (Students may share ideas like:

- When we present, our voices are strong and clear. We use specific and accurate words to describe our problem and solution. We use school-appropriate words and speak slowly and clearly so that our audience can understand us.
- When we present, we do our best to look at (or just over) our audience.
- When we present, our hands can gesture to demonstrate our point, or they can be relaxed at our sides.
- Our message should be clear and presented in an organized way so the audience can follow along.
- When we present, we should stand tall and not slouch.)

- Show students the TED-Ed video titled *What Adults Can Learn From Kids* (7:57). Ask students to pay attention to how Adora speaks to her audience, how she gestures, how she stands, and how she uses the visuals to support her speech.

  - Add the principles from the video or article to the students' existing list from the discussion above.
  - Encourage students to utilize these principles when they practice their presentations in the next step.

2. Support students as they write their scripts and practice their presentations.

- Explain that one way students can prepare for their presentation is by writing out the main ideas in an outline, or by writing out a script that includes exactly what they will say. Remind students that they are telling the story of how they came to their solutions. If students are presenting in groups, they may decide to have each group member write a different part of the presentation script, but all students in the group should know how the script fits together and provide feedback on the content of their group members' contributions.
- Students should utilize their *Final Product* handout from the previous activity, *Designing Our Products*, to develop their script or outline.
- After developing their script or outline, give students time to practice their presentations with their groups. Remind students of the *Project Checklist and Rubric*, pointing out the final row on the presentation.

3. Lead students in the presentations of their designs.

- Students present their designs using the method most appropriate for your context.
- For external audience members, be sure to introduce (or have students explain) the project and engineering design process that students undertook to design their solutions.
- Provide opportunities for audience members and peers to ask questions of presenting groups.

4. Facilitate students' reflection on the unit.

- Distribute the *Project Reflection* handout. Review the prompts with students. Ask students to complete a self-evaluation/reflection of their work in this project. You may decide to have a whole-class discussion in which students share one or two of their reflections with the class.
- Celebrate the conclusion of the *Germ Problem-Solvers: Using Engineering to Develop Solutions* unit!

Rubric

Public Speaking Discussion: Use the discussion about public speaking to evaluate students' ability to follow agreed-upon rules for discussions, build on others' talk in conversations, and participate in collaborative conversations.

Presentation of Final Product: Use students' presentations of their final product to assess students' ability to ask questions, make observations, and gather information about a problem that can be solved through the development of a new or improved object or tool (K-2-ETS1-1), as well as their ability to develop a simple sketch of their tool or product (K-2-ETS1-2).

Reflection: Use the *Project Reflection* handout to assess students' ability to recall information from experiences or gather information from provided sources to answer a question

Extending the Learning

Students could create, test, evaluate, improve, and redesign their prototypes of their solutions.

OBJECTIVES

Subjects & Disciplines

- **Biology**
  - Health
- Engineering

Teaching Approach

- Project-based learning

Teaching Methods

- Discussions
- Modeling
- Reflection

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information, Communications, and Technology Literacy
  - Learning and Innovation Skills
    - Communication and Collaboration
    - Creativity and Innovation
  - Life and Career Skills
    - Social and Cross-Cultural Skills
- 21st Century Themes
  - Health Literacy
- Critical Thinking Skills
  - Analyzing
  - 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.1.1.A:**
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
- **CCSS.ELA-LITERACY.SL.2.1.A:**
Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
- **CCSS.ELA-LITERACY.SL.2.1.B:**
Build on others' talk in conversations by linking their comments to the remarks of other's.
- **Writing Standards K-5:**
Research to Build and Present Knowledge, W.2.8
- **Writing Standards K-5:**
Research to Build and Present Knowledge, W.1.8

NEXT GENERATION SCIENCE STANDARDS

- **K-2-ETS1-1:**
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- **K-2-ETS1-2:**
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Preparation

What You'll Need

REQUIRED TECHNOLOGY

- Internet Access: Optional
- Tech Setup: 1 computer per classroom

PHYSICAL SPACE

- Classroom

SETUP

Before this activity, set the date of your presentation day and invite community members to serve as authentic audience members. The setup of your classroom will depend on how students present their work. You may decide to have students share in smaller table groups with various adults present as their audience, or you may decide to display student work outside the classroom. You may want to arrange the classroom differently in each step of the activity if you have flexible seating available, as some of this activity is more conducive to small-group configuration of tables and other steps are best suited for whole-class seating in rows.

GROUPING

- Heterogeneous grouping
- Large-group instruction
- Large-group learning
- Small-group work

ACCESSIBILITY NOTES

Step 1: Ensure that captions are on in the video. This may benefit students who use captions to follow along as they listen.

Provide additional time and support for students who may need more practice for their presentations.

BACKGROUND & VOCABULARY

Background Information

Scientists communicate their findings with authentic audiences. Additionally, having students share their work with an authentic audience is one of the distinguishing features of project-based learning that makes it authentic and impactful for both students and the community. In short, going public means that the audience for students' work is not confined to their own

classroom. They share their work with others, who in turn can provide meaningful feedback about students' ideas, suggestions, and concerns. A public product is a powerful motivator for students. In order to publish a product that they can present to outsiders, students understand that they must hold themselves and their teams to a high standard.

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
engineering design process	*noun*	series of steps that guides engineers as they solve problems.

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