

LESSON PLAN: Vaccine Distribution Challenge



Description:

During this lesson, participants work in teams and use their skills as communicators, researchers, collaborators, and creative problem-solvers to assist a city government in developing plans to help immunize their communities. This lesson fits well into Project Based Learning curriculum done in multiple sessions or as a single day design event for a large or small group (in school or during an out of school time program).

Grade Levels: 7 and up

Number of Participants: 8-50

Duration:

One 4-hour session **OR** Four to six 50-60 minute sessions

Outcomes:

- Create solutions that address the needs of their partner city.
- Refine their idea based on feedback from another team.
- Present their solution in a way that defines the problem, describes how their solution addresses the problem, and tells an impact story.

Standards Connections:

This design session is adaptable for any setting and aligns with standards for formal educational settings. Additionally, there are strong elements of math and social science that can be incorporated as students develop their solutions and as suits your focus. Key standard connections and how they are implemented in the challenge are summarized below and include:

Middle School	High School
<p><u>NGSS - Engineering Design Standards (ETS)</u></p> <p>MS-ETS1-1</p> <ul style="list-style-type: none"> • Defining a design problem that includes multiple criteria and constraints. <p>MS-ETS1-2</p> <ul style="list-style-type: none"> • Evaluating competing design solutions using a systematic process. 	<p><u>NGSS - Engineering Design Standards (ETS)</u></p> <p>HS-ETS1-1</p> <ul style="list-style-type: none"> • Analyze a major global challenge using criteria and constraints that account for societal needs and wants. <p>HS-ETS1-2</p> <ul style="list-style-type: none"> • Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. <p>HS-ETS1-3</p> <ul style="list-style-type: none"> • Evaluate a solution to a complex problem based on prioritized trade-offs that take into account reliability, social, and cultural impacts.
<p><u>Language Arts - Speaking and Listening</u></p> <p>(1): Engage effectively in a range of collaborative discussions with:</p> <ul style="list-style-type: none"> • Diverse partners (7th). • Topics and issues (8th). <p>(4) 7&8: Share a summary presentation by:</p> <ul style="list-style-type: none"> • Focusing on salient points. • Including relevant details, facts, and examples. • Using appropriate eye contact, adequate volume, and clear pronunciation. 	<p><u>Language Arts - Speaking and Listening</u></p> <p>(1): 9&10: Initiate and participate in collaborative discussions on topics and issues by building on others' ideas and expressing their own clearly and persuasively.</p> <p>(4): Present information concisely and logically so an audience can follow the line of reasoning, organization, and substance.</p>

This lesson is part of:
The Tech for Global Good

For more information visit:
thetech.org/tech-global-good



Supporting educators to develop
the next generation of problem-solvers

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Prep:

Educator Prep:

- Download and read through four city student booklets (Cebu City, Minneapolis, Rome, Kigoma).
- Download and view [slides](#).
- Download and watch PATH videos.

Materials Prep:

- Gather- laptop for presenting slides to class.
- Create teams of 3-6 students so there are an even number of teams (2 or 4) working on each of the 4 cities.
 - Example: 32 students form teams of 4. There are two teams working on each city (Cebu City, Minneapolis, Rome, Kigoma).
- Print a copy of one city booklet for each participant.
- Listen & Help Protocol worksheet (1 per participant).

Materials at team work stations (per team):

- Recording materials
 - Recording/posting/work surface white board, poster board, wall or window.
 - Post-its (3 colors).
 - Marker appropriate for the work surface.
 - Pencils and pens.
- One laptop for research (or print-outs of information on cities, vaccine distribution, measles vaccine).

Tech Tips:

These one-page guides provide tips and best practices for facilitating design challenges

- Innovation Design Process
- Facilitating Brainstorming



Four Hour Session Sketch

Below is the timing guide for running this design challenge in four hours at your location. There are a few key features to this process that will be elaborated upon in the timing guide below:

	Section
25 min	Introducing the challenge <ul style="list-style-type: none"> • Welcome participants and seat them in their working groups. • Communicate schedule for the day and establish any norms for your group. SLIDES 2-3 • Describe The Tech for Global Good Program. SLIDE 4 • Ask a warm-up question: “What is an important medical invention that you can think of?” SLIDE 5 <ul style="list-style-type: none"> ◦ Have them share a few ideas. • Share basic background on immunizations. SLIDES 6-9 • Take questions. • Frame the design challenge. SLIDES 10-12 <p><i>You and your team run a pharmaceutical company that has developed, tested, and produced a vaccine that can prevent a deadly disease. How will you educate health workers and the general public about your life-saving vaccine and get it to those who will benefit from it the most?</i></p> <ul style="list-style-type: none"> • By the end of the day - Poster Presentation. SLIDE 13
Slides: 1-13	
30 min	Brainstorming & Researching SLIDE 14 <ul style="list-style-type: none"> • Jigsaw Reading (10 minutes): <ul style="list-style-type: none"> ◦ Half the team reads each information section for their team's city. ◦ Team shares out what they learned and questions with teammates. • Frame Brainstorm. (For suggestions on structuring a brainstorm session see Tech Tips: Facilitating Brainstorming.) SLIDE 15 • Brainstorm session (15 minutes): <ul style="list-style-type: none"> ◦ Let teams brainstorm. Encourage anything and everything. ◦ Have teams review ideas and pick or combine ideas to focus on. ◦ Possible facilitation questions: <ul style="list-style-type: none"> ▪ Who needs it? Young, old, etc. ▪ What challenges will you need to confront in order to distribute this vaccine? ▪ What methods are best for sharing information in this community?
Slides: 14-15	
25 min	Create Solutions SLIDE 16 <ul style="list-style-type: none"> • Teams start developing the first iteration of their solutions.
Slide: 16	
32 min	Feedback SLIDE 17 <ul style="list-style-type: none"> • Explain Listen and Help Feedback Protocol. • Pair up teams that are designing for the same city - assign one team as team A the other as team B. • Facilitator is in charge of keeping time for all groups.
Slide: 17	
30 min	Break SLIDE 18 <ul style="list-style-type: none"> • If running a four-hour session, we suggest having food for participants during this break.
Slide: 18	



15 min	Iterating on Solutions <ul style="list-style-type: none"> • Show the PATH Solution & Impact videos. SLIDE 19 <ul style="list-style-type: none"> ◦ Analyze these with the participants to be clear on expectations from their posters. • Teams develop the second iteration of deliverables. SLIDE 20 <ul style="list-style-type: none"> ◦ Incorporating feedback from Listen and Help Protocol and any new thoughts.
Slides: 19-20	
30 min	Preparing a Presentation SLIDE 21 <ul style="list-style-type: none"> • Support teams in: <ul style="list-style-type: none"> ◦ Making posters. ◦ Planning presentation. ◦ Dividing speaking roles. ◦ Practicing presentation.
Slide: 21	
40 min	Presenting SLIDE 22 <ul style="list-style-type: none"> • Poster Presentations (½ & ½ Gallery walk, each group presents to the rest of the group). • Feedback from others (if applicable, e.g., other students, invited adults).
Slide: 22	
13 min	Closure SLIDE 23 <ul style="list-style-type: none"> • Have students answer the questions on the slide on an index card. • Wrap up the day by: <ul style="list-style-type: none"> ◦ Pulling out one thread you noticed as a facilitator from student work and questions. ◦ Explaining how participants can use the booklet to share about today's design session.
Slide: 23	



50-60 Minute Sessions Sketch

Day 1: Setting the Stage (50-60 minutes)

- Anticipatory set: *In your opinion what is the greatest medical advancement* (5 minutes)?
- Introduction: PATH and developing immunizations (5 minutes).
 - Show all 3 videos.
- Teach about immunizations through classroom research (45 minutes).
 - *What is an immunization and how do they work?*
 - *Who are immunizations for? When should people get them? At what age(s) should people get immunizations?*
 - *What is community (herd) immunity and why does it work?*
 - *What is the history of immunization?*
 - Possible Extension: Adding in a text on the philosophy of creating community.
 - "Aristotle: Politics: Book 2." Constitution Society: Everything Needed to Decide Constitutional Issues. Web. 28 Aug. 2018. www.constitution.org/ari/polit_02.htm
- Closing: *What is one thing that you learned or found surprising about immunizations* (5 minutes)?

Day 2: Classroom Discussion or Socratic Seminar (50-60 minutes)

- Today's topic: *How much value do immunizations offer the community?*
- Prepare and set up for the discussion (10 minutes).
- Discussion or Socratic Seminar (45 minutes).
 - Use this opportunity to check and make sure students understand how immunizations work and clear up any possible misconceptions that they developed during their research time.
- Summarize the discussion (5 minutes).
 - Address any misconceptions.

Day 3: Brainstorming and Creating a Solution (50-60 minutes)

- Anticipatory set: *If you could create an immunization for any disease, what would it be and why* (5 minutes)?
- Distribute city booklets (2 minutes).
 - We recommend one city to 3-6 students and to have two teams solving for the same city to provide students with an opportunity to see different ways to solve a problem.
 - There are four city options for your classrooms: Rome, Italy; Kigoma, Republic of Tanzania; Minneapolis, United States of America; Cebu City, Philippines.
- Introduction: Introduce the design challenge (3 minutes).
 - Go over the first two pages in the booklet with students.
 - *You and your team run a pharmaceutical company in San Jose that has developed, tested, and produced a vaccine that can prevent a deadly disease. Your team will use your skills as communicators, researchers, collaborators, and creative problem-solvers to assist the city governments in developing plans to help immunize their communities* (page 2 of the booklet).
- Have teams research the issue (20 minutes):
 - 10-15 minutes to read the background on their city in the booklet.
 - Five minutes to answer and discuss questions, "From your reading" in the booklet.
 - Optional: Provide or allow technology for further research on the topic.
- Have teams brainstorm (15 minutes):
 - Tips on structuring a brainstorm session can be found in Tech Tips: Facilitating Brainstorming.
 - "Brainstorm Notes" section in the booklet has questions and space for students to take notes.
 - Have teams start developing their problem and solution(s) (10 minutes).
 - Exit ticket: *After exploring the problem of your city and participating in the brainstorm, how would you go about solving this problem* (5 minutes)?



Day 4: Solutions and Revisions (50-60 minutes)

- Anticipatory Set: *What questions do you have about immunizations, your city, or what to do next?* (5 minutes)
- Create a Solution (13 minutes):
 - Give students time to combine and develop their focused problem, solution for that problem, and an impact story.
- Listen and Help Protocol (32 minutes):
 - Give each student a “Listen and Help Protocol” worksheet.
 - Pair up teams for feedback. Teach the protocol and explain that the goal for the activity is to get thoughtful and critical feedback from friends.
 - Act as timekeeper for the class.
- Give team’s time to meet and reflect on the feedback they have received to develop the next iteration of their plan (5 minutes).
- Closing: *What is one piece of feedback that you would like to incorporate into your project? How will you incorporate it* (5 minutes)?

Day 5: Create a Poster (50-60 minutes)

- Anticipatory Set: *What does a quality poster include? How can we show and tell an idea using pictures and words* (5 minutes)?
- Give students time and materials to make a poster for the gallery walk (30 minutes).
- Gallery Walk (20 minutes):
 - Split the teams into two groups and let each team present for 10 minutes and then switch.
 - Give students Post-it notes to write feedback to the different teams on their posters.
- Debrief the activity as a class. Discuss what students saw and learned from the process and each other’s work (5 minutes).

Day 6: (Optional) Celebration (50-60 minutes)

- Use Day 5 for making the posters and add the 6th day for sharing their work.
- Have all of the students display their work and invite other classes and parents to come and see their work.
- Book a speaker.
- Work on a community outreach project that relates to immunizations.
 - Example: Raise money for UNICEF’s immunization program
<https://secure.unicefusa.org/donate/support-unicefs-immunization-programs/16083>