



Classroom Activity | Grades 6-8

Make It All Better!

GUIDING QUESTION

Where are innovations? How can we identify and solve problems in our school and community to help someone in need or make a space/place more accessible for all?

LEARNING OBJECTIVES

Students will be able to:

- draw conclusions about how innovations can often be designed to solve practical problems.
- explain how innovations/technology at their school have been designed to solve problems.
- identify problems in their own community.
- design an innovation to solve a problem that impacts those in their community.

OVERVIEW

Innovations can make a real difference in people’s lives, especially in times of need. In this lesson, students will identify innovations at their school that were created to help people or solve specific problems. Then, they will identify problems facing their community and create a prototype of an innovation that could be designed to “make it better.”

NEXT GENERATION SCIENCE STANDARDS

- ETS1.A: Defining and Delimiting and Engineering Problem
 - The more precisely a design task’s criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (MS-ETS1-1) (secondary to MS-PS3-3)
- ETS1.B: Developing Possible Solutions
 - A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) (secondary to MS-PS1-6)



- There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (MS-ETS1-2, (MS-ETS1-3) (secondary to MS-PS3)(secondary to MS-LS2-5)
- Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3)
- Models of all kinds are important for testing solutions. (MS-ETS1-4)

LESSON TIME FRAME

2-3 class periods, time outside of class.

BACKGROUND INFORMATION

Innovation is the “process of making improvements by introducing something new.”

Innovations are often designed to solve a problem, help someone in need, or make a positive difference to a person or place. Is a fire extinguisher an innovation? It helps the entire school in case of a fire. What about a ramp? It can help those who struggle to or cannot walk upstairs to access a higher or lower surface.

MATERIALS

Teacher Materials/Prep

- 10 pieces of flip chart paper or a collaborative 10-slide presentation that can be shared with students, each paper/slide should have one of the following words written on it: Social, Environmental, Educational, Medical, Children, Safety, Financial, Technological, Animal & Other
- Print copies of the Innovation Hunt Student Capture Sheet, per person
- Print copies
 - Making a Difference in my Community Student Capture Sheet
 - Home Connections Resource to send home with students
- Print copies and cut out
 - Six Word Story Summary Student Capture Sheet

Student Materials

- Pencil
- Innovation Hunt Student Capture Sheet
- Making a Difference in My Community Student Capture Sheet
- Six Word Story Summary Student Capture Sheet
- Home Connections Resource



Materials per Student Group

- Pencils
- Markers
- Access to the Internet
- Local newspapers/magazines (can be physical or accessible on-line)
- Art/building materials, e.g., masking tape, paper clips, clay, rubber bands, glue, Styrofoam, etc.

CLASSROOM ACTIVITY

Day 1

1. Divide students into small groups and hand each group enough pencils for each member. Ask them to discuss and present answers to the following questions:
 - What is the object you have been given?
 - What is it used for?
 - Would you call this object an “innovation?” Note: An innovation is “something that is newly introduced.”
 - What did people likely do/use before it was invented?
 - What might you use instead if this had never been invented?
 - Does it have any limitations? What if you could not hold it in your hands?
2. Tell student groups to imagine that someone in the class has broken both hands. Their hands are in casts and they do not have use of them. They must still be able to use a pencil for their schoolwork! Challenge groups to come up with an innovation that could help their classmate write. Their idea could be something added to a current pencil or a brand new innovation. It must be practical, safe, affordable, and portable. Most of all, it must solve their classmate’s problem. Encourage students to use the building materials (see materials list) to help them come up with/test their ideas.
3. Have each group present their idea and how it works. Then have students vote on the innovation that best meets the requirements, justifying their choice. Leave ample class time for discussion.
4. Remind students that innovations often come about in order to help solve a problem or make life better for someone. In the case of the introductory activity, they were helping to solve a problem for someone with a temporary need. What other innovations help those with temporary special needs? What about those with permanent special needs such as physical challenges or lack of resources? What about innovations to protect people in the event of an emergency?
5. Distribute the Innovation Hunt Student Capture Sheet. Read the directions to students. The activity challenges student groups to go on an innovation hunt around their school in search of innovations that help people in some way.



6. Give groups a set amount of time for their innovation hunt. Then have them come back together and present their lists.
7. What conclusions can they draw about the innovations at their school designed to help people?

Day 2

8. Share with students that the innovations students found on their Innovation Hunt help those in their schools but what innovations help people in the community? What problems in the community could be solved or fixed by a new innovation? Could they come up with an idea that could do just that?
9. Write the word, “community” on the board. Ask students to define what their community means to them. Is it their neighborhood? Their town? Their city? Work together as a group to come up with a common definition.
10. Challenge students to write a sentence that describes their community. Ask them to share their sentences with a partner, identifying similarities and differences in the way that each one views the same place. Challenge pairs to come up with both strengths and problems in the community.
11. Hang the 10 signs around the room or share the collaborative slides (see materials list) with students to add to digitally. Tell students that each sign/slide represents a different category of possible problems or challenges in their community.
12. Direct student pairs to list the problems they identified on the sign/slide with their appropriate category. Review the list. Do students agree with these problems? If not, challenge students who wrote the problem to justify it.
13. Distribute the Making a Difference in My Community Student Capture Sheet. Read the directions for Part 1 - Identify the Problem with students. Part 1 asks students, individually or in pairs, to identify two problems or issues in the community, based on credible sources. You may want to review examples of credible sources, including interviews with parents, community leaders and members; local news sources; community meetings; and community websites.
14. Give students ample time to complete Part 1. Then have them come back together and share what they’ve learned. Direct them to list each problem they’ve identified on the appropriate sign from earlier in the lesson. Review all of the problems with students and challenge them to circle those that they heard most frequently. Review all of the circled problems/issues. Highlight those that students believe could be positively impacted by a new innovation.
15. Based on the lists, ask each group to choose one problem to focus on.



Day 3

16. Review Part 2 - Learn About the Problem of the student capture sheet which asks student pairs to learn as much as they can about the problem they've selected. Again, provide ample time for research.
17. Once students have completed their research, direct them to complete Part 3 - Design an Innovation That Could Make a Difference, which challenges them to develop an idea for an innovation that could positively impact the problem they've chosen. For this part, students will need time for research as well as time to brainstorm and develop their idea.
18. Once students have completed Part 3 of the capture sheet, have them present their ideas to the class. Have the class evaluate:
 - Which innovations are most practical?
 - Which innovations could make the greatest difference?
 - Which innovations would they be most interested in actually designing?
 - How can continued innovation make a real difference in their community?

Extensions

- Have students design prototypes of their innovations and present them to community leaders.
- Brainstorm other possible innovations related to "How we Make a Difference."

Evaluation

You can evaluate your students using the following three-point rubric:

- Three points: Identified at least 2 authentic community problems using credible sources; thoroughly researched factual information using credible sources; developed an original idea that could positively impact the problem they identified; able to explain how the idea could positively impact the problem they identified.
- Two points: Identified at least 1 authentic community problem using credible sources; adequately researched factual information using credible sources; developed an original idea that could positively impact the problem they identified; difficulty explaining how the idea could positively impact the problem they identified.
- One point: Not able to identify authentic community problems using credible sources; difficulty researching factual information using credible sources; unable to develop an original idea that could positively impact the problem they identified; unable to explain how the idea could positively impact the problem they identified.

REFLECTION

Young scientists will reflect on their learning by completing the Six Word Story Summary. Print off the Six Word Story Summary Student Capture Sheet, cut them out, and distribute one to each student. Alternatively, students may create this reflection activity in their science journal:



SIX WORD STORY SUMMARY

Exit Ticket:

Summarize your learning in **six** words.



INNOVATION HUNT

Here's your challenge! Take a walk around your school and try to find innovations that solve a problem or help people. In the chart below, write each innovation, as well as the problem it solves or the person/group it helps. Two examples are done for you. See which team can find the most "helpful innovations!"

Name of Innovation	Problem it Solves or Person/Group it Helps
Ex: Fire Extinguisher	Helps the entire school if there is a fire. Releases chemicals that help put the fire out
Ex: Ramp to get on stage	Helps those who struggle or cannot walk up the stairs to access the stage.



MAKING A DIFFERENCE IN MY COMMUNITY

Innovation can touch our lives in many ways, especially in times of need. How much do you know about the problems in your community that relate to those in need? Problems could be related to people, safety, education, health, or shelter, in addition to many others. In this activity, you will learn about problems that impact those in your community and design an innovation that could help to make a difference.

Part 1- Identify the Problem

Define your community. Is it a neighborhood, town, city, borough?

What are the positive qualities that describe your community?

What problems or issues exist in your community that relate to those in need? To help you answer this question, you must use a source other than yourself! Your source can be a parent, community leader, newspaper, news magazine, website, or other fact-based resource. In the chart below, list at least two problems or issues your community faces, along with your source.

Name of Innovation	Problem it Solves or Person/Group it Helps



Part 2- Learn About the Problem

In order to figure out what innovation could make a difference, you should learn as much as you can about the problem. This could include research online, at the library or with interviews. In the space below, write what you learned about the issue or problem you have identified. Think about how many people are impacted, where the problem is greatest, what has already been done, and what the greatest need is.

Part 3- Design an Innovation That Could Make a Difference

Now that you are an expert, it's time to make a difference. In the space below or a separate sheet of paper, describe or draw and label a picture of the innovation that you could design to help make a difference with the problem you've identified. Explain how it will work, and justify how it will make a difference based on your research.



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HOME CONNECTIONS

Innovation is the “process of making improvements by introducing something new.” Innovations are often designed to solve a problem, help someone in need, or make a positive difference to a person or place. Students went on an “Innovation Hunt” to identify innovations around the school. Some examples of innovations we shared were the fire extinguisher that helps the entire school in case of a fire. It releases chemicals to help put the fire out. Another example is the ramp to get on stage. It helps those who struggle or cannot walk upstairs to access the stage.

Activities to do with your young scientist

1. Share: Ask your young scientist to share what they discovered during the “Innovation Hunt.” What are problems they identified that they are interested in finding a solution to? What ideas did they come up with?
2. Brainstorm other possible innovations related to “How we Make a Difference.” Are there ways we can help our neighborhood, family members or friends?
3. Research possible solutions using available resources.
4. Support your young scientist’s design solutions by encouraging them to create prototypes.
5. Support your young scientist with next steps as they are ready to test their prototype and propose solutions to family members and community members.