Fast Fixes

Objective:

In this module, students will discuss the value of repair and their personal experience with repair. Students will work in groups to choose something that needs fixing, research and design a repair, then document and share that repair procedure.

Deliverable:

Written reflection and repair procedure

Core Concepts:

Repair • Technical Communication • Engineering Design • Sustainability

Standards Correlations:

This activity correlates to the following Next Generation Science Standards. These standards incorporate the Common Core Literacy Standards. This activity may correlate to other standards, but these are the best fit:

NGSS Engineering Design - Performance Expectations:

- ◦ MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- ◦ MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- ◦ MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Materials:

- A broken thing—encourage students to choose something simple, like a scratched CD, a running toilet, or a hole in drywall.

○　For ideas and safety tips, see K-12 Safety Tips
- Any required tools
- Computer to access the internet
- *Optional*: Digital camera or smartphone with camera

Procedures:

Activity 1: Understanding Repair

As a class, brainstorm what repair means. Have students talk as a class (or with their families) and write a reflection on the following questions:

- What is broken in your life?
- What things have been broken in the home? Why did they break?
- What things have been fixed in the home? What was the cost?
- What things have been thrown away? Could they have been fixed? Why or why not?

Activity 2: Fix something!

- Choose one physical item in your life that needs fixing, preferably one that has a simple solution. (For example: a scratched CD or a leaking sink.)
- Design a solution for fixing the item.
- Evaluate the solution based on cost, safety, reliability, aesthetics, and environmental impacts—research and compare methods.
- Create a guide with both written instructions and illustrations (or photographs, if cameras are available) so that others can repair similar items based on what you've learned.

Discussion Topics:

1. How can we encourage people to repair their things?

2. Why is repair important for us as people?

3. How does repair impact the environment?

4. What can we do as a society to repair things? What can we do as individuals to help?

Other Resources:

- ◦ iFixit.com/right-to-repair: iFixit's resources on repair and sustainability
- ◦ edu.iFixit.com/k12: iFixit's K-12 education site
- ◦ about.ifixit.com/Tech_Writing: iFixit's Tech Writing Handbook
- ◦ Screwdriver Best Practices: Tips and tricks on how to properly use screwdrivers
- ◦ How to Remove Stripped Screws: Accidents happen, and this handy guide demonstrates how to remove stripped screws
- ◦ nextgenscience.org: Next Generation Science Standards site