# Lesson 1 - Rocks and Minerals

**Teacher Directions for Rocks and Minerals Activity**

This should be used at the end of your rocks and minerals unit following the testing of minerals with your class. Show the video: <https://www.youtube.com/watch?v=CmCHSj2wTCI>

Students need their science notebooks or both blank and lined paper to complete this. This is a two session activity with one part being completed with during each session. Between these two sessions, your student partners should meet one time to create a blueprint to share. This is meant to bring engineering design, an important piece of the Next Generation Science Standards into your classrooms.

# Lesson 2 - Erosion

**Teacher Directions for Erosion Activity**

This lab will look at the effects of wind, water, and ice on rocks and minerals. Students will be given the task to design a solution to an erosion problem. This project is divided into 2 sessions. After watching a video ([**https://www.youtube.com/watch?v=OgcX5L\_6E-E**](https://www.youtube.com/watch?v=OgcX5L_6E-E) **)** describing the effects of erosion, students should discuss variables that affect erosion (Possible tests may include the angle of slope in the downhill movement of water, amount of vegetation, speed of wind (use a fan or leaf blower), and volume of water flow.) Groups of students will test different variables of erosion using large trays filled with sand, dirt, and/or rocks. While students test different variables, they should collect data in their notebook about which variables have the greatest effects on erosion.

In the second session, students will design (in their science notebooks) a possible solution to an erosion problem. Provide students with the following image: <https://upload.wikimedia.org/wikipedia/commons/d/d6/Happisburgh_and_eroding_cliffs_-_geograph.org.uk_-_76825.jpg>

Tell students that they will be taking the role as an engineering specialist for the Army Corps of Engineers to prevent any more erosion on this beach. Allow students time to work in groups to collaborate on designs. Also, provide time for groups to give each other feedback, and additional to for redesigns. This is meant to bring engineering design, an important piece of the Next Generation Science Standards into your classrooms.

# Lesson 3 - Adaptations

**Teacher Directions for Adaptations Activity**

Watch the video - <https://www.youtube.com/watch?v=Y_Ps9XqqrDI>

After the video ask students what kind of information a zoo/aquarium would need to know about an organism before it arrives. Allow students time to develop a list of questions. Make a visual list of questions that can be shared with the whole class. (questions may include what temperature does the animal need, what food do they eat, do they live alone or in groups)

 Students will take on the role of a zoologist to research the needs of a specific animal to design an enclosure to meet that animal’s needs for survival. Students will use internet and print resources to answer questions about their organism. They will then use their science notebooks to design a habitat that meets their organism’s needs. Provide opportunities for students to share ideas with a partner and receive/provide feedback. The final designs may then be built into a physical model using materials from outside.

# Lesson 4 - Environment Change

**Teacher Directions for Environment Change Activity**

Display the video: <https://www.youtube.com/watch?v=U6lWv8enIAw>

Discuss how changes in an environment can cause problems for organisms. Allow students to investigate animals that have gone through changes in their habitat and has lead to them becoming endangered/threatened. They may choose one provided for them, or investigate other animals at: <https://www.worldwildlife.org/species/directory>

In this design project students will design a solution for an organism who has undergone a change in their habitat. Allow students time to brainstorm ideas. Students will then design solutions in their science notebooks. Be sure that designs are labeled and explain their thinking with words and pictures.

Provide opportunities for students to provide and receive feedback on their designs. This will allow students to redesign or make adjustments to their solution.

When a final design is created (using paper or digital resources), students will present their designs. The class should make claims about the merit of each other's solutions.