

Radiologist: Learning about the Body

NGSS Standard: 4-PS3-4



Adventure Description:

In this adventure, students will think like a radiologist and design a new portable X-Ray machine for animals!



Activity

Step One: Background Information on Radiologists and Portable X-Ray Machines (5-7 minutes)

- Ask students what a radiologist does.
 - Explain to students that radiologists use machines that can look inside of human and animal bodies! These machines take pictures of what is going on inside of the body. Radiologists look at these pictures to determine if there is a bone broken, or a torn piece of connective tissue. This is important because broken bones and torn tissues can cause the patient a lot of pain, and if it's not treated, can cause infections!
- Explain to students that radiologists use several different machines to look inside the human body. Show [Handout: Medical Imagery Devices](#). Walk through the handout together as a class. Discuss the different kinds of machinery that are used by radiologists.
- Explain to students that they will think like a radiologist and take a look at different x-ray images on [Handout: X-Ray Images](#). Tell students that these images are taken by an x-ray machine, which is a type of machine that radiologists use to look at the bones of humans and animals.
 - Explain to students that an x-ray machine works by shooting a beam of x-rays, which are high energy waves, like light waves. X-rays are more useful because they can penetrate things that light can't.
 - Tell students that solid materials, like bones, will show up white. Squishy materials, like muscles, will look gray. The air in the lungs will look black.
 - Have students guess what animal is featured in each x-ray image.
 - Teacher Note: Please see [Handout: X-Ray Key](#) for the correct animals for each image.

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- Tell students that radiologists are experts on x-ray machines, and as a result, are often asked to consult with people in many different careers. For example, veterinarians and wildlife specialists are scientists that specialize in treating animals that are hurt or sick. Recently, these specialists have been asking for a portable x-ray machine. A portable x-ray machine could travel with the vet or wildlife specialist, which would enable them to take x-rays in remote locations, like the middle of a field or in the jungle!
- Explain to students that they will think like a radiologist and create a portable x-ray machine for veterinarians and wildlife specialists to use in the field!

Step Two: Choose an Animal (5-7 minutes)

- Explain to students that they will first choose an animal that they will design an x-ray machine for.
- Divide students into pairs or small groups.
- Provide students with [Handout: Building a Portable X-Ray Machine](#). Walk through the steps together as a class.
- Have students complete Step 1, choosing an animal.

Step Three: Building a Portable X-Ray Machine (20 minutes)

- Explain to students that they will now build a prototype of a portable x-ray machine for the animal that they selected. A prototype is a small, pretend version of a final product.
- Provide students with art supplies and building materials to build their portable x-ray machine. Examples of materials include:
 - Recycled materials like cardboard, egg cartons, and plastic containers
 - Crayons, colored pencils, markers
 - Tape and scissors
- Have students move on to Step 2 on the handout, building their portable X-Ray machine.
- While students are working, ask them the following questions:
 - How will your x-ray machine fold up to be portable?
 - How will your machine communicate with radiologists to let them know if the machine is broken?

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Step Four: Discussion (5-7 minutes)

- Have students show their x-ray machines to the class. Have them explain how their device communicates with radiologists and how their machine folds up to be portable.
- Have a concluding class discussion about how x-ray machines use energy that is stored in electrons to convert the energy into x-ray beams. These x-ray beams can penetrate the body of a human or animal, but are stopped by the bones inside the body. The images that are developed from x-ray machines can be used to find broken bones inside the body of an animal.

Materials List

Provided online:

- Handout: Medical Imagery Devices
- Handout: X-Ray Images
- Handout: X-Ray Key
- Handout: Building a Portable X-Ray Machine

Not provided (each pair of students needs):

- Art Supplies and Building Materials (ex. cardboard, pipe cleaners, recycled materials, markers, etc.)

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