STEM CAREER ADVENTURES

Orthopedist: Designing A Cast for Bones

Adventure Description:

In this adventure, you will think like an orthopedist and design a cast for a broken bone.

Activity

Step 1: Background Information (5 minutes)

- Have explorers take a quick vote on the following: how many bones are in the human body?
  Less than 50 bones; 50-100 bones; 100-300 bones; More than 300 bones
- Tell explorers that there are 206 bones in the human body!
- Ask explorers if they know what type of doctor focuses on bones.
- Explain that orthopedists are doctors who specialize in bones (show Discovery Picture: Orthopedist at Work).
- Ask explorers if they know what bones are made of. Explain that bones are not just made of one, hard material. There are actually many layers inside of a bone.
- Pass out Handout: Layers of Bone or display on a smart board. As a class, read about each layer of bone.
- Ask explorers why bones would have multiple layers. Explain that each layer of bone has a different purpose. For example, one layer protects our body while another layer helps us move.

Step 2: Build a Bone Model (15-20 minutes)

- Explain to explorers that they will now build their own model to show what the inside of a bone looks like (show Discovery Picture: Model of Bone.
- Explain to explorers that they will look at the handout with information about each layer of bone. Then, they will choose art supplies and building materials to make each layer.
- Provide explorers with art and building supplies to build their bone models.

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Step 3: Casts for Broken Bones (15 minutes)

- Ask explorers if they have ever had a broken bone. What happened? What did the doctor do?
- Explain that most broken bones can be fixed with a cast. A cast holds a bone in a place for a long time so that it will heal (show Discovery Picture: Casts for Broken Bones).
- Ask explorers if they know what materials make up a cast. Explain that casts are made of plastic or fiberglass.
- Explain to explorers that they will now create a cast for their bone. To create their casts, explorers will use materials that are durable or strong.
- Provide explorers with art supplies and building materials to create their cast. Explorers should wrap their bone model in the cast once completed. Explain to explorers that they will be testing their casts to see how strong they are, so it is important to use durable materials!

Step 4: Testing the Casts (5 minutes)

- Explain to explorers that they will now test their casts to see if they are strong and keep their bone models safe.
- Explorers will first vigorously shake their model that is in the cast.
- Then, explorers will carefully stand on top of a chair or a staircase and throw their model to the ground.
- After explorers shake and throw their cast to the ground, they should open their cast and see if their bone model is in the same condition before the drop. Did it break? Did it stay the exact same? What could be changed about the cast design to make it more durable?
- Have explorers fill out Discovery Page: Results from Cast Test as they conduct their tests.

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Materials List

Provided online:

- Discovery Picture: Orthopedist at Work
- Handout: Layers of Bone
- Discovery Picture: Model of Bone
- Discovery Picture: Casts for Broken Bones
- Discovery Page: Results from Cast Test

Not provided (each explorer needs):

- Art supplies and building materials

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