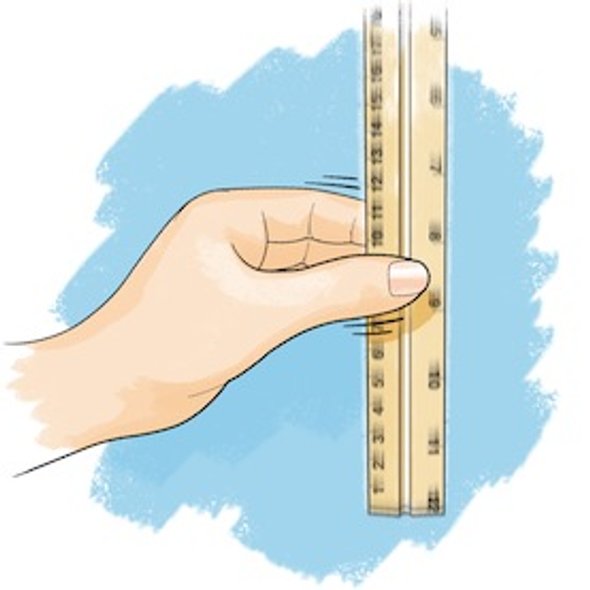
**Unit Essential Question:** *How do our bodies produce and use the energy needed to move objects?*

**Engage**

In Task 1, you explored the energy involved in moving different objects, like a kickball. But how are you able to kick a kickball? How does your body move objects in these specific activities?

To help us think about how our bodies take action, let’s try a simple game called “Catch the Ruler.” Your goal is to catch the ruler with less than 7 cm left at the bottom. With a partner, follow the procedure below:

* + - 1. Partner 1: Hold the ruler vertically so that 0 cm is at the bottom and 30 cm is at the top.
      2. Partner 2: Place your thumb and index finger at the bottom edge of the ruler.
      3. Partner 1: Tell your partner you will release the ruler without telling them and it is their job to catch it as quickly as possible. Then release the ruler when you are ready.
      4. Partner 2: Try to catch the ruler as quickly as possible. Note the cm where your fingers catch the ruler.
      5. Repeat Steps 2-4 three times and then switch partners.

After the game, debrief the following questions:

1. Were you or your partner able to catch the ruler with less than 7 cm at the bottom of the ruler? If not, what was the average distance (in cm) that you and your partner were able to catch the ruler?
   1. Hypothesize: Why do you think you got these results?
2. Describe the process you think your body goes through to be able to catch a ruler.

**Unit Essential Question:** *How do our bodies produce and use the energy needed to move objects?*

**Explore**

**Obtaining, Evaluating, and Communicating Information:** To help us understand the process our bodies go through to catch a ruler, we need to gather some more information. As a group, use the resources provided to learn more about a system in our body called the nervous system. Take notes in the table below.

|  |  |
| --- | --- |
| **Resource** | **Notes on the Nervous System** |
| **Definition Cards** | Label the diagram below with the nervous system terms and summaries of their definitions. |
| **Video** | 1. What are the three principal functions of the nervous system? 2. Organization of the Nervous System    1. What two organs make up the central nervous system?    2. What two divisions of nerve cells make up the peripheral nervous system? 3. Describe the steps in your nervous system pathway when you feel a spider on your leg. Underline terms that you think are important to the nervous system. |
| **Relay Race**  **Simulation** | Create a numbered list or a flowchart to describe the nervous system pathway you modeled in the simulation. |

**Unit Essential Question:** *How do our bodies produce and use the energy needed to move objects?*

**Explain**

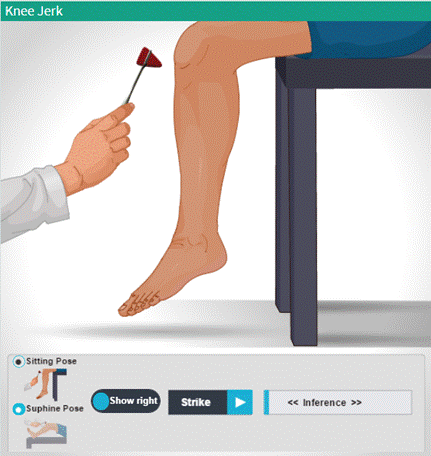
Now that you know more about the process our bodies go through to do different actions, let’s return to the “Catch the Ruler” game from the *Engage*. Individually, respond to the following questions:

1. How did your nervous system allow you to catch the ruler? Draw a flowchart of the nervous system pathway using words, images, and arrows.
   * Use the *Nervous System Definition Cards* to help you decide what to include in your flowchart.
2. **Cause and Effect**: Now that you know more about the nervous system, why do you think no one was able to catch the ruler quickly enough to have less than 7 cm left at the bottom?

**Unit Essential Question:** *How do our bodies produce and use the energy needed to move objects?*

**Elaborate**

To accomplish an action, like catching a ruler, your body senses an object and makes a decision to take action. What about when there isn’t a conscious decision but an action happens anyway?



1. Try this out with an example you have likely experienced before. With a partner, follow the procedure below:
   1. Have your partner sit on the table so their legs can swing freely.
   2. With a reflex hammer or the side of your hand, firmly tap one leg just below the knee.
   3. Record observations below:
2. **Cause and Effect:** How do you think this knee-jerk response was able to occur so quickly and without the person thinking about it?
   1. What step/component do you think is missing from this pathway that was present in the “Catch the Ruler” pathway?
   2. Draw a flowchart of the knee-jerk nervous system pathway using words, images, and arrows.

* Use the *Nervous System Definition Cards* to help you decide what to include in your flowchart.
  1. *Think about it*: Why do you think our bodies have developed a reflex response to certain stimuli?

**Unit Essential Question:** *How do our bodies produce and use the energy needed to move objects?*

**Evaluate: Connecting to the Culminating Project**

You have been asked to teach people how their bodies make the movement of objects possible in a specific activity. Your presentation and brochure will include showing how the body’s nervous system allows it to move objects in your chosen activity.

* Describe the nervous system pathway involved in your chosen activity. You may draw a flowchart, like you did in this task, or describe the pathway in a numbered list or paragraph.

This should be individually in your Project Organizer.

**Unit Essential Question:** *How do our bodies produce and use the energy needed to move objects?*

**Reflection**

Individually reflect on Task 2, using the questions provided:

1. At the beginning of this task, you were asked to describe the process you thought your body was going through to catch a ruler. Look at the flowchart you drew in the *Explain* after learning more about the nervous system. How does your first description in the *Engage* differ from your later description in the *Explain*? What did you learn over the course of this task?
2. In this task, we focused on the crosscutting concept of:

* **Cause and Effect**: Cause and effect relationships can be used to predict phenomena.

Where do you see examples of **Cause and Effect** in this task?

1. Now that you have learned more about nervous system pathways, what questions do you still have?