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

**Engage**

In the last two tasks, you explored all the different body systems that work together when we move objects. But where do our bodies actually make the energy that we transfer to these objects? In this task, we will begin to explore this question by first zooming in to look at these body systems up close.

Many of you have likely heard that we are made up of cells, but what is a cell?

1. First, individually record your own ideas to answer this question: What is a cell?

We often use the word, **cell**, to describe other everyday things, not just scientific things.

|  |  |
| --- | --- |
| Macintosh HD:Users:laurenstoll:Downloads:solar-energy-solar-cell2.jpg  Solar Panel **Cells** | Macintosh HD:Users:laurenstoll:Downloads:pbox.jpeg  Crossword Puzzle **Cells** |
| Macintosh HD:Users:laurenstoll:Downloads:sheet1.png  **Cells** in an Excel Spreadsheet | Macintosh HD:Users:laurenstoll:Downloads:6cm-acoustic-foam-panels-eggcrate-soundproof-sponge-sound-absorber-ebest-1506-05-EBEST@1.jpg  Open **Cells** in Foam Insulation |

1. Take a look at these non-scientific examples of cells above. With a partner,
   1. Describe any similarities between the four non-scientific examples of cells.
   2. Based on the similarities, write a group definition for **cell**.

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**Explore**

**Scale, Proportion, and Quantity**: While the images above helped you figure out what a cell could look like, those objects were viewed at a macroscopic scale (with the naked eye). To see if objects are truly made up of cells in the scientific sense, we need to zoom in using a microscope. **Planning and Carrying Out Investigations:** With your group, visit the lab stations to analyze both macroscopic and microscopic images of various specimens and record your observations in the chart below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Specimen** | **Macroscopic Observations:**  What does this specimen look like with the naked eye? | **Microscopic Observations:**  What does this specimen look like under a microscope? | **Do you think the specimen is made up of cells?**  Explain your reasoning. |
| Human Blood |  |  |  |
| Human Skin |  |  |  |
| Human Bone |  |  |  |
| **Specimen** | **Observations:**  What does this specimen look like with the naked eye? | **Observations:**  What does this specimen look like under a microscope? | **Do you think the specimen is made up of cells?**  Explain your reasoning. |
| Cotton Thread |  |  |  |
| Printed Paper |  |  |  |
| Moss Leaf |  |  |  |
| Cork Tree Bark |  |  |  |

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**Explain**

**Scale, Proportion, and Quantity**: All of the specimens you observed looked very different with the naked eye, but once you zoom in with the microscope, it tells a different story! With your group, compare and contrast the various specimens by filling out the chart below and discussing the conclusion question.

|  |  |
| --- | --- |
| **Grouping 1** | **Grouping 2** |
| Which images were similar? List the specimens here: | Which images were different from the majority? List the specimens here: |
| Describe what these images have in common. | Describe how these images were different from the majority of other images. |

**Conclude**: Look back at your two groupings above and use your own prior knowledge to draw conclusions.

* What do you know about the specimens in Grouping 1 vs. Grouping 2?
* Based on this knowledge and what you observed through the microscope, what types of specimens are made up of cells?

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**Elaborate**

**Scale, Proportion, and Quantity:** In the *Engage*, you saw non-scientific examples that use the word “cell” to describe objects able to be observed with the naked eye. Imagine you are researching beehives online and read the following statement: “Beehives are living things because I can see with my naked eye that they are made up of wax cells.” Now that you have investigated what types of things are made up of cells, critique this statement using the Critique, Correct, and Clarify technique below.

Prompt: Are beehives living things? How do you know?

In pairs:

1. Critique: Analyze the statement below. Identify the error(s), doing additional research if necessary. Share your ideas with a partner.

*Beehives are living things because I can see with my naked eye that they are made up of wax cells.*

1. Correct: Individually write an improved statement below.
2. Clarify: With a partner, discuss and describe how and why you corrected the statement.

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**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. In the last task, you described the different subsystems of the body that are involved in your activity.

* Research and identify the types of cells that make up the body systems you identified.
* Why do you think these different types of cells look so different?
* Even though they appear different, why are they all called cells?

This should be individually in your Project Organizer.

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**Reflection**

Individually reflect on Task 4, using the questions provided:

1. At the beginning of this task, you were looked at non-scientific examples of cells. What makes these examples of cells similar to the ones you saw in the rest of the task? What makes them different?
2. In this task, we focused on the crosscutting concept of:

* **Scale, Proportion, and Quantity**:Phenomena that can be observed at one scale may not be observable at another scale.

Where do you see examples of **Scale, Proportion, and Quantity** in this task?

1. Now that you have learned more about the cells that make up all the subsystems of our body, what questions do you still have?