

Eating and Exercise PhET: Body Systems grade 4-5
by Molly Martin

Essential Questions:

- *How are organs impacted when different body systems fail to work correctly?
- *What do the organs of the human body need in order to survive?

Students will understand that:

- *Body organs have basic needs to function e.g. take in air, food, eliminate waste, respond to environment etc...
- *Human body systems are interdependent

Students will know:

- * Key Vocabulary: body systems, circulatory system, nutrition, interdependent, structures, functions, hypothesis
- * Interdependence of human systems

Students will be able to:

- *Develop an evidence based explanation regarding how humans address their basic survival needs
- *Use data to justify how the human body systems are interdependent e.g. circulatory – respiratory systems, digestive – circulatory systems, circulatory – urinary systems.

Prior Knowledge:

Eating and exercise are basic human needs. Eating and exercise involve all major systems of the body: circulatory, digestive, musculoskeletal, and respiratory. These body systems are interdependent and allow the human body to function.

Materials:

- * PhET Eating and Exercise simulation:
<https://phet.colorado.edu/en/simulation/eating-and-exercise>
- * desktop, Chromebook, tablet, or laptop for each student or pair of students
- * Goal Accounting Template

Introduction:

- * Teacher will model how to access phet.colorado.edu, Elementary School, Eating and Exercise sim.
- * Students will have the opportunity to explore the Eating and Exercise sim independently or in pairs for about 5 minutes, and share with others what they discovered about the navigation and tools, etc.
- * Teacher prompt(s) may include:
 - 1. Which parts of the sim relate to which body systems (Example: Exercise Log – respiratory and muscular systems, Heart Strength – circulatory system)?**
 - 2. How do the line graphs relate to each other?**
 - 3. What do the plate and foods represent?**
 - 4. What can you set up on the sim (gender, activity level, etc.)**

Guided Exploration:

- * Using Eating and Exercise sim, the learning targets, and the self-assessment sheet, the students will explore and monitor their own learning of each target. This GAT (Goal Accounting Template), or self-assessment form, can be used with any content. The purpose for this lesson is self regulation and self monitoring of own learning while exploring a human body sim which focuses on interdependence of human systems. The teacher will need to teach how to fill out the form as well as set expectations for complete responses.
- * This particular form has the targets included. A blank form requires students to write in the learning targets. This lesson requires that the students have had previous experience with being independent, self-directed learners. The PhET Eating and Exercise sim lends itself well to scientific exploration, cause and effect, making connections, and the scientific process.

Interventions/Extensions:

* Students can pair up strategically (by the teacher) or by choice to share their responses. Turn and Talk is a cooperative learning structure that allows students to discuss learning targets and clear up misconceptions. Peers can be supportive 'student teachers' in order to deepen learning and self-assess personal growth and learning.

* According to the book, *Feedback: The Hinge That Joins Teaching and Learning* by Jane E. Pollock, goal setting, cooperative learning, and note-taking create engaged learners. In addition to the GAT form and the Turn and Talk, students can take two-column notes on how the body systems work together:

Muscular and Circulatory	The heart is a muscle (smooth, cardiac muscle) that is strengthened when a person exercises.
Respiratory, Muscular, and Circulatory	When a person exercises and increases their breathing and heart rate, the muscles need more oxygen, and the heart pumps faster.
Digestive, Respiratory, and Circulatory	The blood transports oxygen (that a person breathes in) and nutrients (from what a person eats) to the body's cells.
Muscular and Skeletal	Muscles and bones work together to move a body.