



TEACHER GUIDE

MULTICELLULAR ORGANISMS GRADES 6-8

COMMON MISCONCEPTIONS

- **Organs are made from one kind of tissue.**
Although many organs get referred to as being made of a single tissue (e.g., heart tissue, lung tissue, or stomach tissue) organs are actually made of several different kinds of tissue. The heart, for example, is made from muscle tissue, connective tissue, nerve tissue, and epithelial tissue.
- **Systems work independently.**
Systems have to work together in order for organisms to survive. If one system is not working properly, it will eventually affect another system or maybe *all* other systems.
- **Plants do not have organs or systems.**
Plants have four major organs that make up their systems: roots, stems, leaves, and reproductive structures. Plant systems also have to work together to keep the plant alive.

MULTICELLULAR ORGANISMS

All multicellular organisms are organized in a similar way. Groups of specialized cells create tissue, different tissues work together to make organs, organs make up the different systems, and the organism's systems work together to sustain the organism.

SYSTEMS AND SUBSYSTEMS

In general, an organism can be described as a system, such as the human body or a tree. Each system can then be broken down into specific subsystems that all contain different structures (organs) that perform specific functions within the system. Humans and many other mammals are made up of many different subsystems. Plants, however, have only a few subsystems.

SYSTEM STRUCTURES

Systems are composed of organs and other structures that work together and work with other systems to keep the organism alive and able to function properly. When a system is not functioning properly, it can affect other systems and the organism in many different ways.

TEACHER TIPS

The goal in middle school is for students to develop an understanding of how systems and subsystems are organized. The focus is on how the different systems within an organism work together to keep it alive and functioning properly. Although students may look at individual systems, the goal is not to memorize the different systems and their organs. Instead, students should focus on the important relationships between the systems when the systems are functioning normally and when they are not.

ABOUT THIS LESSON

This lesson was created by the National Science Teaching Association (NSTA) to pair with the Generation Genius video and support NGSS.

They have requested we provide the following background with this lesson:

The Next Generation Science Standards (NGSS) are the national standards on how students learn science, and they are based on contemporary research presented in *A Framework for K–12 Science Education (the Framework)*. The shift in science teaching and learning required by the Framework is summarized in this infographic: [A New Vision for Science Education](#).

At the start of each Generation Genius lesson, students are presented with a phenomenon, then they try to explain it. Students will notice they have gaps in their knowledge and ask questions, which motivates them to build ownership of science ideas they need in order to explain how or why the phenomenon occurred. The way students build ownership of science and engineering ideas is through active engagement in the science and engineering practices (SEPs). This process of sensemaking, or doing science to figure out how the world works, is one of the major shifts the *Framework* encourages.

To engage in the SEPs, students should be part of a learning community that allows them to share their ideas, evaluate competing ideas, give and receive critiques, and reach consensus. Students can start by sharing ideas with a partner, then with a small group, and finally, with the whole class. This strategy creates opportunities for all students to be heard, build confidence, and have something to contribute to whole-class discussions. Each Generation Genius lesson provides conversational supports to facilitate such productive student discussions to contribute to sensemaking.

Excited to continue your shift toward the new vision for science education? Check out the [Generation Genius Teacher Guide](#) page on the NSTA website for resources and strategies to engage every student in your classroom in **doing** science.

