

# Small Cells, Big Findings

Bring your students down to the molecular level and uncover cool findings and applications for emerging cellular research.

## Objective

Students will reflect on informational text and conduct inquiry to gain a greater understanding of what can be learned from the cellular subsystems of research organisms.

## Time

60 minutes

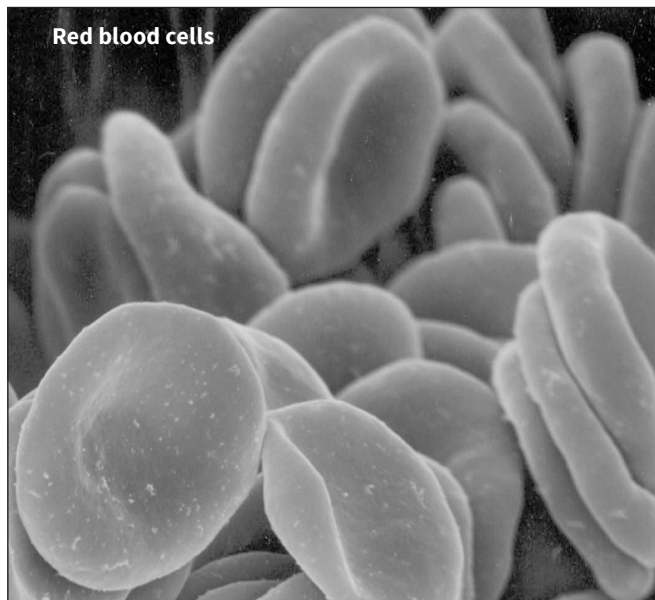
## Materials

- ▶ Uncover the Secrets of Cells activity sheet
- ▶ Vocabulary list at [scholastic.com/pathways/vocablist](https://www.scholastic.com/pathways/vocablist)
- ▶ The Fascinating Cells of Research Organisms video at [scholastic.com/pathways](https://www.scholastic.com/pathways)

**1** Show the video and discuss research organisms. Include the following points:

- a. Much of what we know about biology comes from studying research organisms.
- b. A research organism can be any creature that scientists use to study life, from single-celled organisms, like bacteria, to more complex animals like mice.
- c. The most valuable research organisms have a genetic makeup that is similar to humans or behave in a manner that allows scientists to make important comparisons to the functioning of human cells.
- d. Because of genetic, cellular, or other similarities, researchers can learn more about human function and health by studying research organisms.

**2** Distribute the Uncover the Secrets of Cells activity sheet. Ask students to read the passages and answer the focused reading question: Why do scientists study cells?



**3** Introduce the culminating challenge. Using the information from their activity sheets, students will create an infographic, a quiz, or a set of fun-fact flash cards that could be featured online to help kids learn more about cells, research organisms, and the possible human health applications of scientific research on cells. Generate a list of success criteria together on the board. Prompt for ideas such as: fun to read or use, easy for younger students to read and understand, and/or includes accompanying illustrations.

**4** Have students share their infographics, quizzes, and flash cards with one another in small groups.

### Supporting All Learners

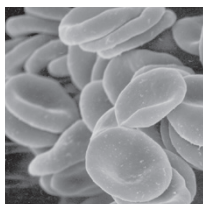
Have older students do additional research to profile research organisms that were not included in the reading passage. Encourage them to explore and expand on ideas such as circadian rhythm, regeneration, CRISPR, DNA chip, and gene sequence.



# Uncover the Secrets of Cells

Read these passages below. Then answer the critical-thinking question at the end.

## Humans have more than 200 types of cells.

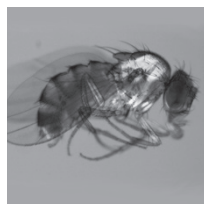


Red blood cells carry oxygen. White blood cells defend against germs. Intestinal cells release molecules that help digest food. Nerve cells send messages that produce

thoughts and movement, and heart cells contract in unison to pump blood. A person's genes help create proteins that carry out specialized tasks for each cell. But sometimes things malfunction. If the genes inside a cell change or "mutate," a cell may have difficulty dividing, making proteins, removing waste, or performing its job properly. These mutations can lead to defects and diseases.

## Fruit flies heal wounds with supersize cells.

If a human falls and scrapes their knee, cells around



the injury divide and grow until a scab forms to cover the injury. Fruit flies on the other hand, heal with the help of polyploid cells, giant cells that grow to cover the entire

site of the injury. Research scientists are interested in the fruit fly's strategy for healing because it may help humans who suffer from non-healing wounds.

## Flatworm cells have superpowers.

Humans have the capacity to repair and regenerate



some parts of their bodies with the help of a few types of cells.

Though we can regenerate blood and skin cells and regrow cells to repair our intestinal lining,

we are not able to replace a limb or regrow an organ that has been severed. The flatworm, however, has dividing cells called neoblasts which allow it to regrow an entire body from a single cell. If a flatworm is cut in half, the tail end can grow a new head and the head end can grow a new tail! Research scientists are interested in the flatworm's regenerative powers to see if something similar might help humans recover from physical damage.

## Lamprey cells take out the trash.

Though human cells turn genes "on" or "off" to



regulate their function, every cell in the human body will maintain its particular genes from birth to death. This is not the case for the lamprey fish, which discards

20 percent of its DNA while still at the embryo stage and continues to undergo programmed genome (the complete set of genetic information in an organism) rearrangement throughout its lifetime. Research scientists are interested in the lamprey's ability to discard DNA from its cells because it may be protecting the animal from disease. Lamprey cell function may hold clues about how to cure human diseases like cancer.

### Think It Through

On a separate piece of paper, give a focused and detailed response to the following question: **Why do scientists study cells?** Your answer should include evidence from the text.