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GRADES 6–12

PATHWAYS

TEACHING GUIDE

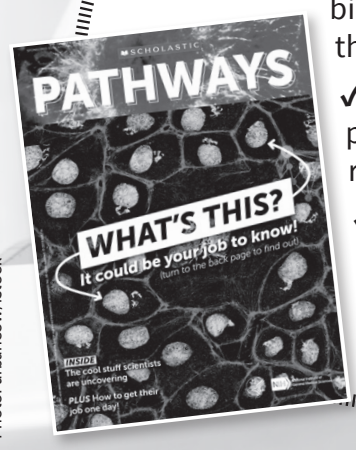
Student Magazine and STEM Activities
About Basic Science Research and Our Health

Visit **scholastic.com/pathways** for more classroom resources.

Dear Teacher,

In this guide you'll find:

- ✓ Lesson and activity sheets on basic biomedical science and the wonder of biology
- ✓ Class set of magazines profiling intriguing research careers
- ✓ Access to four dynamic videos to support learning



National Institute of General Medical Sciences

Photo: urbancow/iStock

Exploring the Science in Our World

Spark your students' curiosity about their world by introducing them to the science of living systems and how its study can improve our health.

Objective

Students will ask questions and define problems, plan a research project based on focused questions, and demonstrate an understanding of basic science.

Time

60 minutes

Materials

- What Is It? video at **scholastic.com/pathways**
- Go on a Science Scavenger Hunt activity sheet
- What Fascinates You? activity sheet
- Vocabulary list at **scholastic.com/pathways/vocablist**

1 Display the following image. Find it in color here: **bit.ly/skinbow**.

After students guess what the image might be, explain that it is a zebrafish scale. Scientists have inserted genes that make cells brightly glow in different colors to highlight different types of cells. Each colored speck is an individual cell.

2 Play the What Is It? video and have students complete the Go on a Science Scavenger Hunt activity sheet. After students share their thoughts on the video, write one of the following facts on the board.

- People who live in high altitudes have genetic adaptations that allow them to survive in thin air.
- Bacteria on your skin help heal injuries.
- You lose between 30,000–40,000 skin cells every minute.
- If you stretched out the DNA inside one human cell, it would be more than 6 feet long.

3 Ask students what the fact you displayed makes them wonder about. As a class, compile a list of questions the fact generates. Push students to question the science behind the fact, as well as to consider how the fact could connect to another environment or organism.

4 Explain that the brainstorm the class just completed is an example of how basic science research begins. Basic science is the practice of figuring out how and why things work (in contrast to applied science, which applies knowledge gained from basic science to make advances in fields like technology or medicine). Science researchers work to uncover the mechanisms and structures that power our world to understand life processes and treat diseases.

5 Display the other facts from step 2 and distribute the What Fascinates You? activity sheet. Instruct students to develop a basic research plan using one of the facts as a starting place. Allow them to refer to the student magazine for guidance.

6 Have students share their research plans and challenge their classmates to build on their ideas, generate new questions, or think of alternative applications for their investigations. Acknowledge that there are many different pathways into research questions.

Using the *Pathways* student magazine

Explain to students that there are many different research pathways within basic science as well as many possible pathways to a successful career. As a class, read the researcher profiles in the student magazine. Discuss the researchers' inspiration and interests, and emphasize the importance of students using their own skills and interests to find a career that is the best fit for them. Challenge students to identify quotes from the profiles that align with a growth mind-set (the belief that abilities can be developed through hard work and resilience). Discuss how a growth mind-set can serve students now. Emphasize the fact that the study, teamwork, and critical-thinking skills that students are developing right now can be the basis for a future career in STEM research.

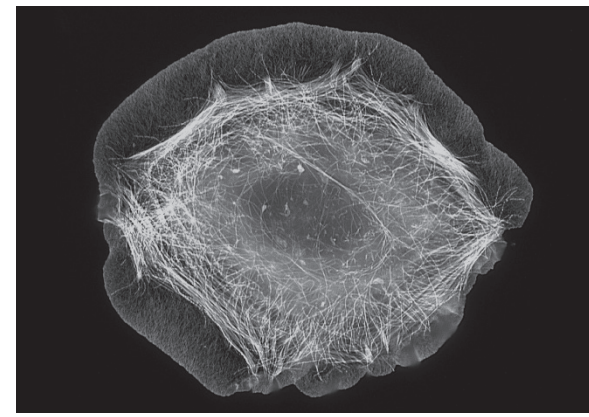
Answers to "Cool Tools in Science" student magazine quiz: Image 1: Gel Electrophoresis, Image 2: Cryo-Electron Microscopy, Image 3: Confocal Microscopy.

PHOTO: Chen-Hui Chen and Kenneth Poss, Duke University

Name _____

Go on a Science Scavenger Hunt

Use the fantastic facts you learned from the What Is It? video to answer the questions below.



1. What kinds of living things are made up of cells? Can you name some of the organisms used in basic science research?

2. Why is it so important for scientists to understand how cells work?

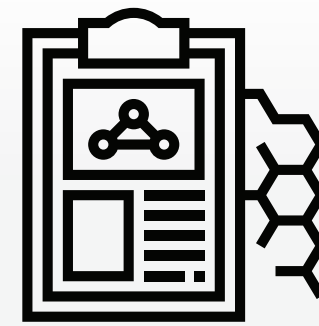
3. What big-picture issues does Dr. Bracewell hope his study of cells can help address?

4. What are two key ways you can think like a scientist?

PHOTO: Torsten Wittmann, University of California, San Francisco

Name _____

What Fascinates You?



Basic science is driven by curiosity. The answers may lead to innovations—and the creation of new questions! Dig into something you've wondered about with a research plan to help you learn more.

Basic Science Research Plan

Fascinating fact	
You wonder...	
What type of experiments or research could be done?	
What *might* you learn?	
Possible ways your research can be applied to everyday life	