

ADVISORY 1, UNITS 1-3, LESSON 5 SPACE SCIENCE

Summary

- In this lesson, students will read "It's Your Turn!" (pp. 56-61) to learn how everyday people can use technology to help scientists learn more about the universe.

Science Background

Citizen science is a practice in which everyday citizens collect and share data with scientists to aid them in their work.

Typically unpaid for their efforts, citizen scientists may be volunteers, amateur scientists, students, teachers, or anyone else who wants to help out. Sometimes people volunteer as individuals, and sometimes they participate as part of a group.

The first known call for citizen science occurred in 1833. Astronomer Denison Olmsted asked people to send him reports on meteor showers. The first formal citizen science study took place in the late 1800s. Ornithologist Wells Cooke enlisted the help of fellow citizens to study patterns of bird migration. But citizen science projects took off with the advent of the Internet. In 1999, SETI@home, which linked citizens with scientists in the search for extraterrestrial life, was one of the first projects to enlist help via the web.

In 2012, citizen scientists Robert Gagliano and Kian Jek didn't find extraterrestrial life, but they did find an exoplanet that orbits four suns. The two made their discovery using the online program Planet Hunter to study data collected by NASA's Kepler space telescope.

National Geographic is no stranger to citizen science projects either. Thousands of online explorers have helped National Geographic Explorer Albert Yu-Min Lin examine photos in his search for the tomb of Genghis Khan.

ENGAGE

Encourage students to flip through the articles and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about citizen science projects and technology scientists use to explore the universe.

EXPLORE

Instruct students to examine pages 56-57 of their Readers. **Ask:** *What does this photo show?* (Scientists exploring 3D images.) *What do those images show?* (distant regions of Mongolia) Brainstorm ideas about where the images came from and what the scientists might be searching for.

EXPLAIN

Point out to students that the scientists in this article are searching for two very different things: Genghis Khan's tomb and exoplanets. **Ask:** *What do their projects have in common?* (Both are using information (images/graphs) captured from space to find what they are looking for.) Have students turn and talk as they review the article for details about the two projects, including how citizen scientists are helping with each. Challenge students to explain why the information from space is vital to each project. (Project 1: narrows the search area; Project 2: identifies potential exoplanets) Then have them turn and talk as they discuss what the scientists do after they narrow their search. (Project 1: Go to Mongolia and search prospective sites on the ground; Project 2: Use Kepler to study eye winks.)

ELABORATE

Invite students to learn how to use star brightness to find planets with National Geographic's "Hunting for Planets" activity (www.nationalgeographic.org/activity/hunting-planets/). Students will use interactive models, explore the effect of data noise on detection, and challenge each other to find planets.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare their results in small groups.

CONTENT ASSESSMENT: Space Science, Lesson 5

Use information from the article to answer each question.

	Project 1	Project 2
What are they searching for?		
How are they searching?		
How are citizen scientists helping?		
What have they found so far?		