

How to Get Started

1 Getting Set Up

You will need:

- a. A device for the teacher, or “guide” (preferably a tablet)
- b. A mobile phone and compatible VR viewer device (like Google Cardboard™) for the student, or “explorer”
- c. A Wi-Fi® network that is peer-to-peer enabled. It may be helpful to go through a router or hotspot.

Download the FREE Google Expeditions app to your devices from Google Play™ (for Android™) or from iTunes® (for iOS®). The first time you open Google Expeditions, you’ll be offered a brief demonstration of the app. In the demo, tap **Full Screen** to see how the app works without a viewer.

Teachers can start Field Trips, guide students through multiple panoramas, access notes, and highlight points of interest throughout the Field Trip. Students can insert the phone into the viewer and start exploring! The Field Trip must be started by the teacher.

2 Selecting HMH Field Trips

HMH has developed a variety of Field Trips that can be accessed through the Google Expeditions app, and more are coming all the time. Using the search function in the app, type in the exact title as it appears in the Lesson Plan (for example: **Carmen’s Hot and Cold Cap**).

3 Using the HMH Teacher Guides

HMH has developed Teacher Guides for HMH Field Trips with Google Expeditions that correspond to several of our programs. You can access these guides through your HMH Online Teacher Resources and incorporate them into your lessons.

I like it! How can my school purchase the hardware?

Your school can purchase the recommended equipment through any hardware provider or work with a Google-certified provider like Best Buy® Education (bestbuy.com/googleexpeditions). With Best Buy Education, you can purchase a ready-made kit or build your own, depending on what suits your needs.

Expeditions Guidelines

These guidelines must be reviewed and accepted before using the Expeditions app.

- Expeditions is only for users older than age 7. Students should not use Expeditions without adult supervision.
- Make sure that users participating in Expeditions in a Google Cardboard viewer have enough space to look around freely and do not attempt to walk around.
- Take frequent breaks while using Expeditions and Cardboard. If you experience nausea, discomfort, eyestrain, or disorientation, immediately discontinue using Cardboard.
- If you or any users participating in the Expedition session have had or could be prone to seizures, consult a doctor before using Cardboard.
- Ensure that any employees, agents, or contractors who are leading an Expedition have reviewed and understand these guidelines.

Carmen's Hot and Cold Caper

Overview

Temperature is the measured amount of heat in an environment. Solar energy is Earth's main heat source and the primary factor that affects temperatures on the planet. Different locations receive various amounts of sunlight, causing some places to be warmer than others. As Earth rotates, solar energy strikes only the half of Earth facing the sun. Warmth and light from the sun create daytime. At the same time, the half of the planet facing away from the sun experiences cooler temperatures and darkness of night.

A location's latitude, the distance north or south of Earth's equator, affects the amount of solar energy it receives. Low-latitude areas are closer to the equator and receive more direct rays from the sun all year, producing warmer temperatures. High-latitude regions are farther from the equator and receive indirect rays from the sun, resulting in colder temperatures. As they move heat around Earth, wind and water can also affect temperature. Solar energy drives the general circulation of wind in the atmosphere. In addition, temperature decreases with elevation, the height above sea level on Earth's surface.

In this activity, students will take an HMH Field Trip to some of the hottest and coldest locations on Earth. They will explore the incredible range of temperatures on our planet and learn about what makes a place hot or cold. They will journey to the world's highest mountain, see a volcano up close, and explore the most frigid continent on Earth. Then students will plan their own expedition to a location from the HMH Field Trip.

Objectives

In this lesson, students will learn to:

- explain how a place's location on Earth affects its temperature
- summarize how different geographic features affect temperature
- produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience

Classroom Activity

- Two 45-minute class periods

Introduce

Ask students, "What are the hottest and coldest places you have been to? What was the temperature there?" (*Student responses will vary. Allow time for a variety of experiences to be shared. You may wish to record responses on a T-chart or a classroom map.*) Then ask, "Why are there temperature variations on Earth?" Discuss student responses. (*Responses will vary, but students may discuss the following topics or ideas: exposure to different amounts of the sun's most direct rays; relative location to the poles or equator; the effects of various landforms and elevations.*) Explain that many factors cause differences in temperature on Earth. Solar energy is the primary factor that affects our planet's temperature because different locations receive various amounts of sunlight. As Earth rotates, solar energy strikes only the half of Earth facing the sun. Warmth and light from the sun create daytime. At the same time, the half of the planet facing away from the sun experiences cooler temperatures and darkness of night. Elevation, wind, water, and a location's latitude also contribute to Earth's temperature variations. It is also important to note that the temperature of a place changes all the time. The daily high and daily low temperatures constantly fluctuate. Tell students that on this HMH Field Trip, they will travel to places that experience some of the most extreme temperatures found on Earth.



Teach

1. Guide students through the HMH Field Trip **Carmen's Hot and Cold Caper**. As students look at each scene using their viewers, read the information that appears to the class. Tap on each point of interest to direct students' attention, then share the additional information. Each scene includes a set of leveled questions that you can use to check students' understanding. At the end of the field trip, have students put their viewers down. Briefly discuss with students what they learned.
2. Have students turn to a nearby classmate and discuss their hottest and coldest outdoor temperature experiences in greater detail. Provide five minutes for student discussions. Then ask students to independently create a T-chart to list pros and cons for hot and cold environments. Tell them to consider several factors for each type of environment. For example, students can think about their daily lives and activities and any hazards associated with each environment.

Then students will decide if a hot or cold environment suits them best. Encourage students to be thorough and thoughtful with their charts as they will be referenced for the main activity.

3. Introduce the task. Students will assume the role of geographers who have been asked to conduct research in one of the locations from the expedition. Their mission is to learn more about the factors that contribute to the area's temperatures. Have students refer to their pros and cons T-chart to help them decide where they want to go. After selecting their destination, instruct students to plan out a week-long expedition and write a summary which includes the information below.
 - Destination choice for the expedition
 - Reasons for selecting the location
 - What challenges will be presented by the area's physical geography?
 - What location features will you explore for research?
 - What do you hope to learn or discover?
 - What are you excited to see and experience on your expedition?

Students will also create a supply list for their travels on a separate page. Tell them to consider the duration of their stay, any equipment required for their work, along with items needed for the area's specific environmental features.

Close

Call on students to share their summaries with the class. Ask students if they hope to actually experience their expedition in the future. Follow up with a discussion where students identify the specific environmental features that impact temperatures for each expedition's location. *(Student responses will vary based on location. Examples may include: Antarctica—located around the South Pole and receives indirect rays from the sun; Tolbachik Volcano—created by a break in Earth's surface where deep beneath the temperature is thousands of degrees; Mount Everest—the air is thinner and holds less heat at higher elevations, which makes it extremely cold; Danakil Depression—lots of volcanic activity with very little rain; Gobi Desert—some reasons for extreme temperature highs are lack of rain, dry winds, and cloudless skies that allow for long exposure to direct sun; some reasons for extreme temperature lows include sections of higher elevation in the Gobi, wind patterns, and the cloudless sky allowing heat to escape after sundown.)*