mystery science

Lesson: “How can the Sun tell you the season?”

VIDEO TRANSCRIPT

ACTIVITY INTRODUCTION VIDEO 1

Today we're going to play a game to test your detective powers. Imagine a guard leads you into a room with no windows, and this room is kept at an even and comfortable temperature. Your job is to answer a simple question: what season is it outside? With no windows, no doors, and no temperature changes—just a brick wall to stare at—how could you ever guess? Luckily, you look around and find a clue. The guard left his camera on the table. You see on the camera that he had just taken a photo a few hours earlier. Can you tell the season from a single photo? We will give you five photos to practice on. Each image is from a different time of year. Take 30 seconds to analyze each image, then write down your guess of the season. Figure out two or three reasons why you think it's that season. After each picture, we will discuss your reasons. OK, here we go.

EXPLORATION VIDEO 2

You already know that the days are longer in the summer and shorter in the winter. That's because the Sun is out longer in the summer than it is in the winter. This affects how warm it gets. If the Sun is out longer, the day can be warmer. That's important for living things. But why is the Sun out longer? What's going on? In this challenge, you're going to watch a two-minute video. It's a sped-up video showing the outdoors. It starts in the spring, then goes through

summer, fall, and winter. Your job is to identify something in the daytime sky that changes over the course of the year. Remember, in earlier lessons you learned that the Earth spins, making the Sun appear to move across the sky every day. But in this sped-up video, you're going to need to look for something different, a slower change, something happening with the Sun over the course of many days. Watch closely. Here we go. Here's springtime. OK, and here's summer. All right, coming up is fall. OK, and finally, winter. OK. That's it. So, what did you notice?

EXPLORATION VIDEO 3

When you watched the video, maybe you noticed an important difference between a summer day and a winter day. In the middle of a summer day, the Sun was very high in the sky. So high that you couldn't even see it on the screen. In the middle of a winter day, the Sun was much lower in the sky. If we look at the position of the Sun at noon every day over the year, we will notice it's high in the sky during the summer, and gradually it begins to fall in the sky until it's quite low in the sky in winter at noon. Because the Sun follows a lower path in the winter, it doesn't stay in the sky as long. This is why the days are shorter in winter. See, look at when the Sun rises and sets in winter. On December 21st in San Francisco, where I live, the Sun came up at 7:21 AM and the Sun set at 4:55 PM. The day, in other words, was nine hours long. And in the summer, the Sun follows a higher path, so it stays in the sky longer. This is why the summer days are longer. Notice summer days are longer than winter days. It gets light earlier and stays light later in summer. That's because the Sun comes up earlier and sets later. Again, for San Francisco on June 21—this is where I live—the Sun came up at 5:48 AM and the Sun set at 8:35 PM, so the day was 13 hours long. Now, let's return to that bench photo.

ACTIVITY INTRODUCTION VIDEO 2

Remember the game we started with? Now that you know about how the Sun changes positions with the seasons, let's play another round with harder to guess photos this time.