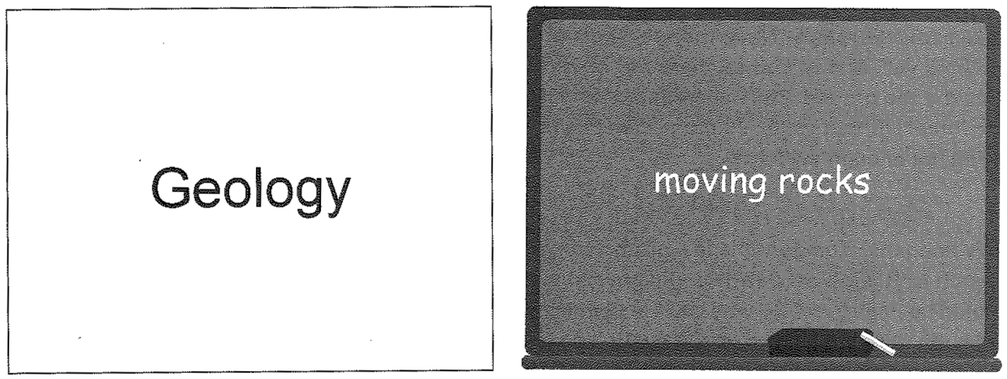
TRANSCRIPT



Narrator
Listen to part of a lecture in a geology class.

Professor
Now, we've got a few minutes before we leave for today. So I'll just touch on an interesting subject that I think makes an important point. We've been covering rocks, and different types of rocks, for the last several weeks, but next week we're going to do something a little bit different. And to get started I thought I'd mention something that shows how, uh, as a geologist, you need to know about *more* than just rocks and the structure of solid matter. Moving rocks. You may have heard about them.

It's quite a mystery. Death Valley is this desert plain . . . a dry lakebed in California, surrounded by mountains, and on the desert floor are these huge rocks . . . some of them hundreds of pounds . . . and they move! They leave long trails behind them—tracks you might say—as they move from one point to another. But nobody has been able to figure out *how* they're moving because no one has ever *seen* it happen. Now there are a lot of theories, but all we know for sure is that people aren't moving the rocks. There're no footprints, no tire tracks, and no heavy machinery—like a bulldozer, uh, nothing was ever brought in to move these heavy rocks.

So what's going on? Theory number one: *wind*. Some researchers think powerful, uh, windstorms might move the rocks. *Most* of the rocks move in the same direction as the dominant wind pattern, from southwest to northeast. But some, and this is interesting, move straight west, while some zigzag . . . or even move in large circles. Hmmm . . . how can that be? How 'bout *wind combined with rain*? The ground of this desert is made of clay. It's a desert, so it's dry. But when there is the occasional rain, the clay ground becomes extremely slippery. It's hard for anyone to stand on, walk on.

So, one theory was that perhaps when the ground is slippery, high winds can *then* move the rocks. But five or ten years ago a team of scientists tested that theory. They experimented by flooding an area of the desert with water, and then trying to establish how much wind force would be necessary to move the rocks. They calculated that it would take winds of at least 500 miles an hour to move the rocks. And since winds that strong don't occur anywhere on Earth, they concluded that the wind wasn't the cause, even with slippery ground. Now, more recent research suggests that it would take winds of only *150* miles an hour, not 500, but even winds *that* strong don't occur in Death Valley. So the original experiment's conclusion that wind is not the culprit seems right.

Here's another possibility: *ice*. It's possible that rain on the desert floor could turn to thin sheets of ice when temperatures drop at night. So, if rocks, uh, become embedded in ice, um, OK, could a piece of *ice* with rocks in it be pushed around by the wind? Makes sense, but there's a problem with *this* theory *too*. Rocks *trapped in ice together* would have *moved together* when the ice moved. But that doesn't always happen. The rocks seem to take separate routes. Nevertheless, ice is probably involved, we just don't quite know how yet. And of course there are other theories. Maybe the ground vibrates, or maybe the ground *itself* is shifting, tilting. Maybe the rocks are moved by a magnetic force. Uh, but sadly, all these ideas have been eliminated as possibilities. There's just not enough evidence.

I bet you're saying to yourself, well, why don't scientists just set up video cameras to record what actually happens? Thing is, this is a protected wilderness area, so by law, that type of research isn't allowed. Besides, in powerful windstorms, sensitive camera equipment would be destroyed. So why can't researchers just live there for a while until they observe the rocks moving? Same reason.

So where are we now? Well, despite some recent progress, we still don't have definite answers. So all this leads back to my main point. You need to know about more than just rocks as geologists. The researchers studying moving rocks, well, they combined their knowledge of rocks with knowledge of wind, ice, and such, uh, not successfully, not yet, but y'know . . . they wouldn't even have been able to get started without, uh . . . *earth science* understanding. Knowledge about wind . . . storms . . . you know, *meteorology*. You need to understand *physics*. So for several weeks, like I said, we'll be addressing geology from a *wider* perspective. I guess that's all for today. See you next time.

Narrator
Listen again to part of the lecture. Then answer the question.

Professor
Most of the rocks move in the same direction as the dominant wind pattern, from southwest to northeast. But some, and this is interesting, move straight west, while some zigzag . . . or even move in large circles. Hmmm . . . how can that be?

Narrator
What does the professor imply when he says this:

Professor
But some, and this is interesting, move straight west, while some zigzag . . . or even move in large circles. Hmmm . . . how can that be?