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00:00:00,000 --> 00:00:06,000
(Music) It's a whole planet out there with a complicated history.

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It's that history is a story that's stored in the rocks and our job is to figure out that story

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and what that story of that planet tells us about this planet that we live on.

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The recommendations of the Science Definition Team to NASA are to fly a rover with similar capability to the

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Curiosity rover that' s still on Mars that would land in the same way and have about the same size.

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And we are recommending that they equip that rover with instrumentation that allows it to explore

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the surface of Mars at one site, which will have relevance or importance to understanding past habitability,

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did it have the conditions necessary to sustain life, and to look for signatures or rocks

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that may hold signatures of biological significance.

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So where Curiosity takes rocks and grinds them up into powder and looks at their bulk constituents.

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What this mission would need to do is be able to look at a microscopic level and examine the rocks for these

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very tiny and detailed messages that they would be sending us about the past life that could've lived there.

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The sorts of evidence we're looking for, sorts of the signatures of past life

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that we would be looking for would be signatures of microbial life.

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So not realistically looking for dinosaur bones and that kind of thing.

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If life ever existed on Mars, we expect it to have been microbial microorganisms.

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This that I'm holding up here is a classic biosignature from the Earth. It's a fossil.

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We're not actually expecting to see a fossil of shells or other components, but what we want to be able

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to see with this instrumentation, are the fine scale layering that one might see in a

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rock, in which we can see dark and light tone layers and those dark and light tone layers are telling a story.

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We wanted to do something that would make technical progress and that thing was going and

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coring rock samples, putting them into a little container, a cache,

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and storing them for bringing back later.

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Because no matter how well instrumented a rover is we can't look with the kind of detailed understanding

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that we would have in laboratories back here on Earth.

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We can do so much more in a laboratory on the Earth with equipment that exists now

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and who knows what's getting invented in the decades ahead that can still analyze those rocks.

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The human flight component would like to see an experiment where resources on the surface of Mars,

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from the rocks or the atmosphere could be used to generate fuel or other parts that

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would enable future exploration in cutting the ties, so to speak, to Earth.

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So you wouldn't necessary have to bring everything with you.