Which Planets Might Support Life? transcript

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The first step to find life in our galaxy is locating exoplanets, planets that orbit other stars. But, once we find them, how can we tell if they can support life? Would we want to go there?

The TRAPPIST-1 system has seven Earth-sized planets, with three of them in the habitable zone. But we know very little about their atmospheres. The Hubble Space Telescope can tell us whether these planets have hydrogen-rich atmospheres, like icy, gaseous Neptune, or atmospheres more like rocky Earth.

To measure the planet’s composition and atmosphere, we need to use a technique called spectroscopy. Astronomers use spectroscopy to sort light into its very specific components, since different chemicals and dust particles give off different telltale fingerprints.

The Webb Telescope has four spectrographs which will be trained on a few lucky exoplanets. We’ll learn about the atmospheres of these planets by seeing their fingerprints as a shadow against their bright host star, in a way similar to the transit technique.

Life changed the atmosphere of our Earth over time, increasing the oxygen and decreasing the methane. By taking a virtual sample of the atmospheres of these exoplanets, we can look for evidence of carbon dioxide, water vapor, and methane—signs of life as we know it. With Webb, we can scan for evidence of biological processes, trillions of miles from Earth.

So, are we alone? Webb and future missions may finally help us answer this question.