

TUMBLE TRANSCRIPT:

Episode 2 - Starting Your Star Journal



INTRO MUSIC

ME: Hi and welcome to Cataloging the Universe! In this 7 part series, we'll be taking a journey through time and space to try to find our *own* answers to giant questions about the universe. Along the way, we'll have some help from scientists, experts, and our imagination. I'm Marshall, and I'll be your guide on this journey.

This is Lesson 2: Starting Your Star Journal. In this lesson, it's your turn to look up at the night sky. I mean, *really* look—like try to find things you've never seen before. You might be amazed at what you can see—and when you start to see it through the eyes of an astronomer, what's up there is *that much more amazing*.

INTRO MUSIC ENDS

In our last episode, we learned about The Great Debate. You may remember that Shapley and Curtis each had an idea of how big the universe was, and how big our own galaxy was. Do you remember what each of them argued? And do you remember why they each argued what they argued? **<Ding>** Take a minute to write down a brief summary of what the argument was about, and what each of them said.

MUSICAL PAUSE

ME: Ok. Did you write down your answer? As always, you can pause if you need more time. Shapley and Curtis were trying to determine the size of the universe. They each had their ideas. Shapley believed our sun sat on the edge of one huge universe. Curtis believed our sun was the center of a group of stars, or a galaxy that was just one of millions in the universe.

They came up with these theories based off of things they observed in the night sky. As I mentioned before, part of this course is going to be learning the basics of sky-watching and taking your own observations of what you see there. In this lesson, it's your turn to be an astronomer!

And we're going to get some help from our good friend and astronomer, Dhanesh Krishnarao—or DK.

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DK: Hi, I'm Dhanesh Krishnarao, or DK. I am a postdoctoral fellow with the national science foundation at Johns Hopkins University, studying astronomy and physics.

ME: As an astronomer, DK is an expert at sky-watching. He uses extremely powerful telescopes for his job, but mapping stars, even using just your eyes, is an important first step to understanding the universe.

DK: So as far as tricks to identify bright objects, trust your instincts...

ME: We are going to step outside soon, and when we do, don't worry about whether you know what it is you are seeing. Focus on the fact that you see it at all.

DK: So don't think too much about "Is this one really brighter than the other one," but just... The things that stand out the most are probably the brightest objects. So try and concentrate on whatever pops out to you first when you look up at the sky.

ME: Let's take a second to gather together some supplies that you're going to need for this lesson. You will need:

- A flashlight
- A pencil
- Your sky observation notebook
- A pair of binoculars or a telescope, if you have one. But if you don't have either, that's okay.
- Clothes appropriate for going outside—a jacket, good shoes, whatever you need wherever you happen to be
- You'll also want to make sure the sun's down before you go outside. So if it's not night-time yet, pause this podcast! We can pick up where we left off once the sun's gone down.

ME: Let's take a second to gather together your supplies for this episode. I'm gonna wait just a second while you get your things together. If you're already ready, skip ahead a bit.

MUSIC

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ME: You ready? If so, pull out your sky observation notebook. Before we do *anything* else, we need to note the date and time. This is a really important step! To understand why, we're going to get some help from DK.

DK: So the night sky looks like it's always changing. And that probably is due to something you're very familiar with, which is just the fact that the earth is rotating, which is why we have days where the sun rises and sets. The Earth's also moving around the sun. So that's why we have different seasons and different times of years. Over the course of a year, we do one full rotation around the sun. All of these things combined mean that the sky that we are looking at is changing.

ME: And as the Earth goes around the sun over the course of the year, different stars appear and disappear, depending on where we are in the year.

DK: So it's really important to keep track of the day and time of day that you're making all of your observations and looking out at the night sky.

ME: So now that we have that out of the way, take note of the date, and time. <ding> Write today's date and the time at the top of the page in your observation notebook. Once you've got that, let's go on outside, to take a look at the sky.

GOING OUTSIDE MUSIC

ME: The first thing you need to know about sky-watching is how to get your bearings—or how to figure out which way is which, and where you are.

DK: So when you're looking at the night sky, it's really hard to kind of come back to the same place that you were looking at, especially when you are looking all over the sky. If it's your first time going out, it's easy to get lost. So it really helps to identify a large building, a really unique-looking tree nearby - things to anchor directions.

ME: First things first, step out your front door, or out onto your balcony if you have one, or a window, or whatever. Look around you. Do you see any landmarks? You know, buildings, or unique-looking trees, or whatever. Things that aren't going to move.

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<Ding> Write down three landmarks that you see when you look outside - things that aren't going to move.

PAUSE MUSIC

ME: The next thing you want to notice are weather conditions—what the weather is like tonight.

DK: Yeah. So a lot of things you might just overlook as being normal occurrences can be really important. So weather, for example, different weather conditions mean you can see different levels of things in the sky.

ME: Is it clear, is it cloudy? Is it raining or not? How do you think these things might affect what you can see in the sky? Even things that might not seem important at first could turn out to be a big deal! <Ding> Take careful notes about tonight's weather.

PAUSE MUSIC

ME: Got it? As always, you can pause if you need more time. We have identified the section of the sky we are watching. We have logged the weather and viewing conditions. And now we watch. As you watch, the Earth is turning and the stars above will seem to move.

PAUSE

ME: When you look up what do you see? There are several large objects you can use as an anchor to figure out what you're looking at in the sky—things like the moon! Can you see the moon from where you are? If so, draw a picture of what the moon looks like tonight in your star journal. Is it full, half, less-than-half? Or completely invisible? Also, where in the sky is the moon relative to your landmarks? <Ding> Draw a picture of the moon, and put it on the diagram along with the three landmarks you found earlier.

PAUSE MUSIC

ME: Ok! Again, pause if you need some more time to draw. If you've already got your drawing ready, we're going to try one last thing. Have you ever found a constellation? DK is going to describe what they are.

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DK: Constellations are pretty weird. Fundamentally they're essentially just drawings on the sky. You can think of them as kind of connect-the-dot images, where you just have stars that are individual points of light, and you just draw lines between them to form some image. Maybe in those points, you see weird shapes that look like something familiar.

ME: Can you find a group of stars anywhere? Begin to connect the dots into an object or shape that you see in the sky. Maybe you see a boat? Or a cat? **<ding>** Draw the group of stars that you see—and don't worry if it's a "real" constellation or not.

PAUSE

ME: Do you know any "real" constellations—that is, constellations that astronomers and skywatchers everywhere know and can name? If so, **<ding>** Draw that constellation as well, if you can see it! Make sure you include where you saw your constellation on your diagram with your three landmarks.

PAUSE MUSIC

ME: Finding constellations, as weird as they may seem to you, is actually really important.

DK: It's really, a lot of imagination is involved. But the reason it's so useful is because once you get used to that imaginary shape that you're seeing in the sky with those stars connecting, you can come back to the night sky at any point later that night, a different day, a different time of the year, and try and look for that same shape again, because it won't really change the shape.

ME: Just like the landmarks you found earlier, knowing where constellations are in the sky can give you other things to help you get your bearings in the future.

PAUSE

ME: All done? If not, you know what to do: pause if you need more time. Whenever you're ready, it's time to go back inside.

MUSIC FADES

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ME: Now that you're inside, let's take some time to reflect on what we've learned today. We went outside to look at the sky tonight. How did you keep track of what you saw? Did you see many constellations? Or did you see none at all? Why do you think you saw what you saw? What are some factors that make it easy, or hard to see things in the sky at night? **<ding>** Finally, answer the reflection questions that came along with this episode. You can find them in the "extra resources" connected to this episode.

ME: Once again, this has been Cataloging the Universe. Next time, we'll be traveling back in time again to talk to an astronomer in France to learn how taking careful observations ultimately changed everything in astronomy. See you then!