**Materials: Pen & Stickies**

G is for Galaxy - Script & audience interaction guide

Time: 30-45 min

A is for astronomy – as we go along, please recite with me, the text on the screen. Let’s practice, all together now, A is for Astronomy… this is a picture of our galaxy, the way it would look if you were actually inside the sphere looking out and Alpha Centauri is the closest star and solar system to us.

B is for Big Bang…. – **Can you name some things in our universe?** Now close your eyes and imagine none of those things exist, only dark space. Then one day, everything formed from nothing in a giant explosion. Slowly little tiny particles joined together and made bigger bodies like our Sun and planets. This happened over 13 billion years ago. It may have looked something like this!

C is for Craters. … Do you recognize this?

Without making a sound, walk around there sphere and when you find a crater, point to it. Sit down now. **Why do you think that Earth doesn’t have as many craters as the Moon? Talk with the person next to you and let’s share out.**

D is for Dinosaurs… Sixty-five million years ago, more than three-fourths of all plant and animal species living on Earth became extinct. This event is known as the K-T mass extinction. The most famous group of animals who died was the dinosaurs. This is what the Earth looked like when the giant object struck the earth. **Does it look the same as it does now? What do you notice is different?**

E is for Earth… I wonder why the right distance from the sun matters. **Please write down on your sticky note, why you think the “right distance” from the sun is so important for life on Earth**. It’s ok if you don’t know! I’ll give you a hint: (next dataset) We like to refer to Earth as the goldilocks planet. It’s not too hot, not too cold, but just right. Which means, it’s not too close to the sun or too far away, but just right. This also means that water can exist on Earth is liquid form, which seems to be the key to life. How many of you wrote something down like that?

F is for Footprint… The pictures popping up on the sphere are of the U.S. Moon Landings. Notice they are all on the same side of the Moon. **With the person next to you, consider what happens to footprints on the moon. Why won’t they go away anytime soon? What causes footprints on Earth to go away? How is that different from the Moon?**

G is for Galaxy… (next slide) Our SUN is one of over 200 billion STARS in the Milky Way Galaxy, which is actually a small-sized galaxy. The Milky Way is one of the oldest galaxies in the universe. It is approximately 13.2 billion years old. **Wow, is 13.2 billion years hard to imagine?**

H is for Halley… A man who was very good at math and discovered that a comet returns about every 76 years, then he named it after himself. **Will you see one in your lifetime?** 2061 is the next one. So, most likely, yep.

I is for International… Here you can see the satellites that are up in space that are monitoring the Earth. If you look closely for the white one. Oh there it is. It’s the International Space Station, which has been in orbit since 1998 and constructed with the help of 16 different countries. Imagine that you someday got to go to space. I wonder what it might be like. **What do you think it might be like?**

Can anyone guess what J might stand for?!

J is for Jupiter… **What are some things that you know about Jupiter?** It’s 300 times heavier than Earth, has 63 known moons of which 4 are very big: Io, Ganymede, Europa, Callisto. The middle of Jupiter is very hot and the outside and atmosphere are very cold.

K is for Kepler… Kepler is a mission launched by NASA, the National Aeronautics and Space Administration, to go out and look for planets that might be similar to ours. This was made by an artist and was made of a planet that Kepler has spotted from very very far away that might be Earthlike. **Do you think you could draw a planet that looks like but is not the same as Earth? What would be on it?**

L is for Looking Up… There are a couple of recognizable constellations or patterns in the night sky. **Raise your hand if you have ever seen one of those patterns in the sky.** The most common ones are on the wall up there. Big dipper, Cassiopeia…

M is for Mercury… Mercury is the closest to the sun. **Do you think Mercury has a longer or shorter year than the Earth? Let’s take a vote.** A year on Mercury is 88 days compared to 365 on Earth. The temperature on Mercury fluctuates between 800 degrees f during the day and -350 at night.

(next dataset) Mars, is red and is the planet most studied by us. We can learn a lot about the history of the solar system by studying Mars. **Do you see the red pushpin?** That’s where the last Mars lander, a vehicle that drives around Mars, Curiosity, successfully landed almost 2 years ago!

N is for Neptune… Neptune is blue but it isn’t like the Earth. **What makes Earth blue?** That’s right, water! **Do you think Neptune has water?** Neptune might look nice and peaceful but is far from peaceful and its atmosphere is made of three poisonous gases --hydrogen, helium and methane. Methane absorbs red light while it reflects green light, which causes it to be blue.

O is for Orbit… How long does it take the Earth to do one full trip around the sun? This is the sun with all the planets and their comparable sizes. **What’s the largest object in the solar system?** That’s right and it’s the center too. Everything revolves around the sun!

P is for Pluto… Pluto was once considered the 9th planet but has recently been demoted to a dwarf planet. There are some scientists who don’t agree so some NASA people are meeting this summer to discuss the fate of Pluto. **Take a moment to think about why Pluto is so blurry. What do you think?** There's a spacecraft called New Horizons that will be zooming past Pluto soon, to give us some better pictures of this little known planet.

Sshhhh (no dataset) Q is for Quiet…Without air sound cannot travel and there is no air in space so you can’t hear anything in outer space. If you remember from the movie Gravity when all the satellites were crashing into one another it was still silent.

R is for Robots… Robots can go where humans cannot because they don’t need to breathe, eat or even sleep. 13 space probes and landers have been sent to Mars by Russia, England and the US. Only 8 have successfully landed and are still there today.

**How many of you think that robots on Mars are going to come back to Earth?**

S is for Saturn… Sometimes our problems seem big, but when you look at the stars and think about all the billions of other galaxies out there that have billions of stars and planets, maybe even some like ours, it can make our problems seem smaller. This is Saturn. **Does it look different? Why?**

T is for the Telescope… Space Telescopes like Hubble have given us thousands of pictures of other galaxies out in space. Let's watch this little movie that shows some of Hubble's accomplishments.

U is for Uranus… Uranus is turned on its side. We think that it was hit by a large object, which caused it to tip over**.** The reason that Uranus is so faint is because it is also very far away and we don’t have very good pictures of it.

V is for Venus… We cannot actually take pictures of Venus because it is always cloudy, which is why it’s the brightest object in the night sky. A spacecraft has flown around it and bounced radar off of its surface to give us this picture. The colors are based on altitude. This is not a place that we would like to go. It’s always 800 degrees F, day and night and it rains sulfuric acid there!

W is for water… This is what Mars may have looked like when it once had water. **Why do you think water is so important?** **Why don’t you write some things down on your sticky note about what water does for a planet.**

(next dataset – Ocean Drain) Can you imagine Earth with no water?

X is for x-class solar flares. You might have learned about this downstairs today but the sun sometimes has small explosions that sends lots of crazy solar material out into space. Here at NOAA we watch the sun 24 hours a day and 7 days a week in order to warn satellite operators and astronauts for example, of these events.

Y is for year… So, we decided earlier that Mercury has the shortest year because it has the shortest distance to go around the Sun. **If Mercury’s year is just 88 days,**  how many times does Mercury go around the Sun during an Earth year? How would we figure this out? If we divide 365 by 88 we get more than 3.5.

Z is for Zodiac… Forever, as long as people have been on this Earth, they have looked into the sky and seen patterns in the stars. Patterns like the lion, bull and fish have become zodiac signs for birthdays. **Do you know your sign?** Your sign is in the daytime sky during your birthday so in fact in order to see your zodiac constellation in the night sky, you have to wait until your half-birthday!