LIVE INTRODUCTION

The show presenter introduces him/herself, the theater, and the star projector; explains that with the Planetarium we can make you feel as if you’re traveling to many different places; explains that “a friend of ours, Kate” is going to talk to us for a while and help us learn about things we can see in the sky.

THE ASTRONOMY ROOM

KATE (on tape): Good morning, boys and girls, and welcome to the Astronomy Room. We’re here today to learn about some things you can see in the sky.

Our program is called "Sun, Moon and Stars."

THE SUN

First, let's find out about the sun.
The sun is a bright hot ball of fiery gases. It’s so bright that we don’t need any other lights when we’re outside on a sunny day. The sun is so hot that whenever it's in the sky it makes everything warmer. The sun is very important to us.

[pause]

THE SUN IN DIFFERENT PLACES IN THE SKY

Have you ever noticed that the sun is in different places in the sky at different times?

"East" on blackboard

In the morning, we see the sun in the direction we call east. It’s morning right now, and that’s why you can see the sun’s light shining in the east window of the Astronomy Room.

"South"

At about noontime, when many people eat lunch, we see the sun in the direction we call south.

"West"

And late in the afternoon, after you’re done with school for the day, we see the sun in the direction we call west.

So the sun is in different places in the sky at different times: east in the morning, south about noontime, west in the afternoon.

Now let’s go outside and look for the sun.

Music bridge.

sun in morning sky

THE MORNING SKY

What a beautiful morning!

Take a moment to look around this pretty blue sky, and see if you can find the sun. When you've found it, please quietly point to it.

[pause]
Now, if you're having trouble finding the sun, follow the pointing fingers. And if you still can't find the sun, the star projector may be in your way. If it is, don't worry -- in just a minute the sun will be where you can see it. [pause]

In the morning we see the sun in the direction we call east. Here in the Planetarium, we have a letter "E" to tell us which way is east. Can you find it and quietly point to it? [pause]

In the Planetarium, if you look toward the "E," you're looking east. And, as you can probably see, the sun is not far from that letter "E." In the morning the sun is in the east.

Now we're going to do something very special that only a planetarium can do: we're going to show you what would happen in the sky if we could make the day go by much faster than it really does. Watch the sun carefully. [pause]

**THE NOONTIME SKY**

Well, morning is over! It's already noontime. Look at where the sun is now. It's not in the east any more; it's in the direction we call south. Look below the sun for the letter "S," for south. [pause]

Now let's make time go fast once again. We'll zoom ahead to afternoon. Maybe you can guess where the sun will be when we stop. Maybe you can even guess what letter to look for.

**THE AFTERNOON SKY**

Here we are in the afternoon. That's probably when you get finished with school for the day. In the afternoon, the sun is in the...[pause] ...in the west. Have you found the letter that tells you which way is west? [pause] It's the letter "W."
The sun was in the east in the morning, in the south around noontime, and now it’s in the west in the afternoon. What will the sun do next?

Every afternoon, the sun goes down in the west. We say that the sun is setting. After a while, the sun won’t even be in the sky any more. Then daytime will be over. Nighttime will begin. And when nighttime begins, we’ll have a chance to see the stars.

INTERRUPTED BY WEATHER

Uh-oh. [pause] The sky isn’t blue any more. [pause] Somewhere up above those clouds the sun is still shining, but not down here on the ground. I think we’d better go back inside the Astronomy Room for a while. [pause]

While we’re waiting for the sky outside to clear, let’s find out about the stars.

INTRODUCTION TO THE STARS

The stars look like tiny lights in the night sky. Now, when you first look at a sky full of stars, it’s very beautiful. But if all you do is say, "Oh, look -- there are the stars; they look like tiny lights in the sky," pretty soon the stars can get boring. If you want to have fun looking at the stars, it helps to know what to look for.

Add arrow (on overlay slide) pointing to a bright star

Here’s one thing to look for. The stars do not all look the same. Some stars are bright. Bright stars make lots of light, so they’re easy to see.
Other stars are faint. Faint stars don't make very much light, so they're hard to see.

Here's another thing to look for. Some stars seem to belong together. They seem to be in groups.

[Beginning of seasonal section for spring]

LEO

Let's look at some star groups you can see during the spring.

Our first star group is called Leo, the lion. Leo has stars that make a backward question mark in the sky.

Now how do you make a backward question mark out of this? Well, you have to use a little imagination. Did you ever play with one of those coloring books where you connect the dots? You draw a line from dot number one, to dot number two, to dot number three, and so on, to make a picture. Well, with star groups, you do the same thing: in your imagination, draw lines from one star to another. [pause]

The backward question mark is just one part of Leo. The other part is a triangle. [pause] When people imagined a lion among these stars long ago, they imagined that the backward question mark was the back of the lion’s head. The tip of the triangle was supposed to be the lion’s tail. [pause]

BIG DIPPER

Here's another star group to look for -- a very famous star group. [pause]
It’s the Big Dipper. You hold the dipper by its handle, which is made of three stars... [pause] ...and you drink water from the bowl, which has four stars. [pause]

If you know the Big Dipper, you can use it to find two other bright springtime stars. Start with the curved handle of the dipper. In your imagination, draw a curved line that comes out the end of the handle and just keeps going. Soon you’ll come to a bright star called Arcturus. There’s a way to remember what we just did. We drew a curved line from the Big Dipper. One kind of curve is an arc. So just remember: follow the arc to Arcturus.

Arcturus is bright and easy to find.

SPICA

Once you’ve followed the arc to Arcturus, you can speed on to Spica, another bright springtime star.

Remember: start with the handle of the Big Dipper. Then follow the arc to Arcturus and speed on to Spica.

A PRACTICAL TIP

Now you know how to find the Big Dipper, plus Arcturus and Spica...

And Leo, the lion.
Big Dipper w/handle up & Leo standing on nose, with connecting lines, no titles

But watch out! These star groups don't always look quite like this. They may be turned in different ways. You might see the Big Dipper hanging from its handle and Leo standing on his nose... [pause]

Big Dipper w/handle down & Leo standing on tail, with connecting lines, no titles

Or the Big Dipper standing on its handle and Leo standing on his tail! [pause]

Big Dipper & Leo, south up, with connecting lines, no titles

Or both of them upside down! [pause]

Music. Sunlight appears in west window of Astronomy Room.

Look! The sun is shining in the west window. The weather must be clearing. Let's go back outside.

Clouds fading, sun setting.

NIGHTFALL

Here we are back outside. The clouds are breaking up, so we can see the sun setting in the west.

When the sun sets, look for beautiful colors in the sky. If we're lucky we'll see blue, and maybe purple and orange and...well, you never know how many other colors. [getting quieter] Now, nighttime is almost here. [pause] Let's watch as the sun sets and the stars begin to appear.

Stars seem to emerge from the darkening colors. Very slow daily motion continues to 10h00m.
The sun has set, the sky is dark, the clouds have cleared away, and now we can see the stars. They look like a lot of beautiful tiny lights in the sky. Maybe you’ve already found some of the star groups we talked about.

**LEO IN THE ‘REAL’ SKY**

If you can find Leo the lion, go ahead and quietly point to him now. If you’re sitting in the very front of the Planetarium, you’ll probably have to turn around in your chair. [pause]

Now, to help everyone find Leo and other star groups, we’re going to use something special that you’ll see only in the Planetarium. And it is -- the green arrow! [pause] We can use the green arrow to point to a star that’s bright, like this one. [pause] Or a star that’s faint, like this one. [pause] Or we can let it run wild like this! [laughs]

But that’s silly. Let’s get back to Leo. I hope you’ve found him. [pause] Look for a backward question mark and a triangle. [pause] And here they are: the backward question mark [pause] ...and the triangle. [pause] That’s the springtime star group Leo, the lion.

Can you imagine a lion in these stars? [pause]

**THE BIG DIPPER IN THE ‘REAL’ SKY**

Now, can you find the Big Dipper? When you have, quietly point to it. If you’re in the front, you’ll have to turn around. [pause]

And here’s the Big Dipper, with three stars in its handle: one... two... three... and four stars in its bowl: one... two... three... four. [pause]
A long time ago, many people imagined a great bear in these stars, so this part of the sky is still called Ursa Major, which means the Great Bear. Can you imagine any kind of bear up there? [pause]

**SPICA AND ARCTURUS IN THE ‘REAL’ SKY**

Next: follow the arc to Arcturus. When you’ve found Arcturus, quietly point to it. [pause] If the star projector is in your way, don’t worry -- in a few minutes Arcturus will be where you can see it. [pause] After you follow the arc to Arcturus, what do you do next? [pause] Speed on to Spica! Quietly point to it when you see it. [pause]

All together, let’s find those stars again, starting with the Big Dipper. [pause] Go out the end of the handle of the Dipper... follow the arc to Arcturus... and speed on to Spica.

Here’s another nice thing to know. If the Big Dipper were full of water... and you punched a hole in the bottom... the water would drip right down onto Leo’s head! [pause]

Now you’ve found Leo the lion, the Big Dipper, Arcturus, and Spica. Those are some of the brightest stars and star groups of springtime. The spring sky has many other star groups. Let’s take a quick look at at some of them.

**OTHER SPRING STAR GROUPS**

If you start at Leo and go west, you’ll come to two fairly bright stars, not far apart, that look almost the same. Long ago, people named those stars after a pair of twin boys, the Gemini twins.[pause]
Orion outline

Even farther west, some of you can see Orion, the mighty hunter. There are two stars for his shoulders...three stars for his belt...and two stars for his knees.

And if you draw an imaginary line from Orion’s belt to the left, you’ll come to the brightest star in the entire night sky, a star called Sirius.

FANTASTIC FIGURES IN THE SKY

Now let’s take a quiet moment to look at some of the other fantastic animals and monsters and heroes and heroines people used to imagine in the sky. It takes a pretty wild imagination to see some of these characters!

About 25 sec. of quiet mysterious music.
Several other constellation outlines

Live point-out of current planets

[end of spring section]
SEEING THE STARS MOVE ACROSS THE NIGHT SKY

A while ago, when we were looking at the sun, we saw how it moves across the sky every day.

Do the stars move across the sky at night? [pause] Let’s find out! Pick out one of the star groups you already know. Now see if anything happens to it as we zoom ahead in time from early evening to very late at night. [long pause]

“Daily motion” music.

Well, it’s certainly late at night. It’s probably way past your bedtime. The star groups you found earlier this evening have all traveled to the west. New star groups are rising in the east. The stars do move across the sky at night. The stars move across the sky every night while you’re asleep! [pause]

THE NORTH STAR

Now, I’d like to show you a very important star. Here’s how to see it. First of all, quietly scoot forward in your seat and turn toward the center of the Planetarium. [pause]

Now look at the stars in the northern sky. They’re all moving -- all except one. The stars in the northern sky seem to go in circles during the night, but one star always stays in the same place. Can you find it? If you can, quietly point to it. [pause]
That’s the North Star. It isn’t really very bright, but it’s important. No matter what time of night you look, no matter what season of the year, the North Star is always in the same place. If you face the North Star, you know you’re facing north.

Remember, The Big Dipper has three stars in its handle: one... two... three... and four stars in its bowl: one... two... three... four.

Now, if you take the last two stars in the Bowl of the Dipper (those are called the Pointer Stars) and connect them with a line, and keep going, you come to the North Star, the one star in the sky that always stays in the same place.

**WHY DO THE STARS SEEM TO MOVE?**

Now here’s a question we haven’t talked about yet: *why* do the stars move in the night sky? And *why* does the sun move in the daytime sky? The answer is: the stars and the sun aren’t really moving! *We’re* moving. Our Earth is turning, and it carries us with it. Let’s go back into the Astronomy Room and see how the Earth turns.
BACK IN THE ASTRONOMY ROOM:  
THE TURNING EARTH

We live on planet Earth. If we could look at the Earth from somewhere far out in space, we would see that the Earth is shaped like a giant ball. It turns very slowly and carries us with it. But we don’t feel the Earth turning. So when we look up at the stars from our homes on Earth, it looks as if the stars are moving. [pause]

Sometimes people ask: where does the sun go at night? The answer is, the sun doesn’t go anywhere! The sun is very far away, and it shines on the Earth all the time.

As the Earth turns, sometimes it turns us away from the sun. Then we have nighttime. After a while, the Earth turns us toward the sun, and we have daytime. We have day and night because the Earth is always turning.

THE MOON

So far, we’ve looked at the sun and the stars. Now, let’s look at the moon.

Everybody knows that the moon sometimes looks like a bright round light in the sky. But look more carefully. The moon isn’t the same color all over. There are dark spots on the moon. Some people think the dark patches look a bit like a face, “The Man in the Moon.”

Of course there isn’t really a man’s face up there. But it’s fun to imagine pictures in the dark shapes on the moon. [pause]

The moon is really a big ball of rock out in space. It doesn’t make its own light, as the sun does. Instead, we see the moon because the sun shines on it out in space. The moon isn’t as big as our Earth, but it’s still pretty big.
The moon doesn’t look the same every night. When the moon looks like a whole circle, we say the moon is *full*.

Sometimes the moon looks like a skinny banana in the sky. We call that a *crescent* moon.

Sometimes the moon looks like a half-circle. We call that a *quarter* moon.

Sometimes the moon has a shape that’s almost like a circle, but not quite. We call that a *gibbous* moon.

Let’s go back outside and see what the sky looks like when the moon is up.

**THE MOON IN THE SKY**

Have you found the moon yet? [pause]

Well that’s not a crescent moon, not a quarter moon, and not quite a full moon either. Tonight the moon has that almost-a-circle shape we call a gibbous moon.

The moon is very bright tonight. If you’re ever in a safe place where there aren’t many electric lights around, on a night when the moon is very bright, look at how the moon’s light shines on things around you. Moonlight makes everything look quiet and peaceful. [pause]

Well, moonlight is lovely to see, but nights when the moon is bright are usually not the best nights to look at stars. In our sky right now, the faint stars are hard to see because the moon’s light is so bright.
But I want to show you what the sky looks like with a lot of stars in it. So once again we’re going to do something we can do only in the Planetarium: we’re going to make the moon fade away. I want to show you how a nighttime sky looks with no moon, no clouds, and no city lights.

Music. Moon fades off or slides away

**STARRY NIGHT**

There it is -- an unbelievably gorgeous, clear, dark, starry sky! If you have a chance to see a sky like this, don’t miss it. It’s an experience you’ll never forget.

Take a quiet moment to find a star group you know. [pause] I’ll bet you can see a lot more faint stars around your star group than you did before. Faint stars are easy to see in a sky with no moon, no clouds, and no city lights. Also, if you want to see a lot of stars, it helps to keep looking at the sky for a few minutes to let your eyes get used to the dark.

**THE TWINKLING STARS**

Can you see any stars twinkling? When a star twinkles, it seems to get brighter and fainter very quickly, almost as if it were winking at us.

The stars look like tiny lights in the sky. But the stars really are not tiny at all. Every star is a big hot ball of fiery gases, like our sun. All the stars in the night sky are other suns! But the stars we see at night are so far away in space that they just look like tiny lights in our sky.

Sometimes looking at a starry sky makes you think about traveling in space. Let’s use our imaginations to travel out into space now -- all the way to the moon.
Here we are on the moon. It’s very different from Earth. On the moon there are rocks [pause] and mountains [pause] and round holes called craters. But there are no trees, no flowers, no animals, no people, no clouds, no water, and no air! The moon is just a big rock in space.

Take a look at the sky. Can you find the sun and quietly point to it? If the sun is in the sky, that means it’s daytime on this part of the moon. Can you see any stars? On the moon, you can see stars even in the daytime. And maybe you can guess what that blue ball in the sky is. [pause] That’s the Earth, our home in space.

The moon is a strange and interesting place, but it gets lonely after a while. So let’s have our imaginations take us back home, to Earth.

Here we are back on Earth. The stars are twinkling again. But the star groups up there right now are not the same ones we learned about earlier. That’s because the Earth has been turning. The Earth has turned us to face different star groups. [pause]

Can you see the sky getting lighter in the east? [pause] Something very bright must be about to come up in the eastern sky. I’m sure you know what it is [pause]: the sun. Let’s watch as the stars fade away, the sky brightens, and the sun rises to begin a brand-new day.