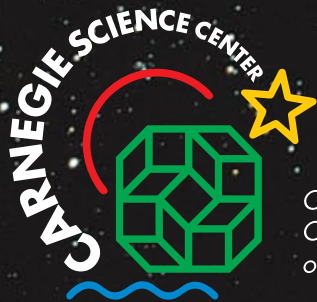


THE SKY ABOVE  
MISTER ROGERS' NEIGHBORHOOD®  
Teacher's Guide



Henry Buhl, Jr.  
Planetarium & Observatory



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## **Introduction**

We live in a magnificent universe! We are surrounded by its wonders. They are beneath our feet, in the air we breathe and, of course, in the sky above our heads. There is so much to explore and to enjoy!

Those of us at Carnegie Science Center believe that our lives are enriched when we take the time to learn about all of these things that make up our “neighborhood”. And when we introduce young minds to the exploration of the universe around them, we set them on a lifelong path of learning and growing.

This is our primary goal in creating *The Sky Above Mister Rogers’ Neighborhood*. We want our youngest visitors to have a fun and understandable first experience of the science of the sky and all it holds. We want children, and the adults who care for them, to see that science is not a pile of facts found in a book. It is an adventure that includes wonder, exploration and discovery.

Toward that end, the sky show and these accompanying materials address some of the most basic questions that children — and adults — have about the sky, Sun, Moon and stars. We hope that this experience will help to dispel some of the misconceptions about the sky that are so common. More than that, our greatest hope is that you will find that the show and accompanying materials will stimulate the children you work with to want to explore the real sky.

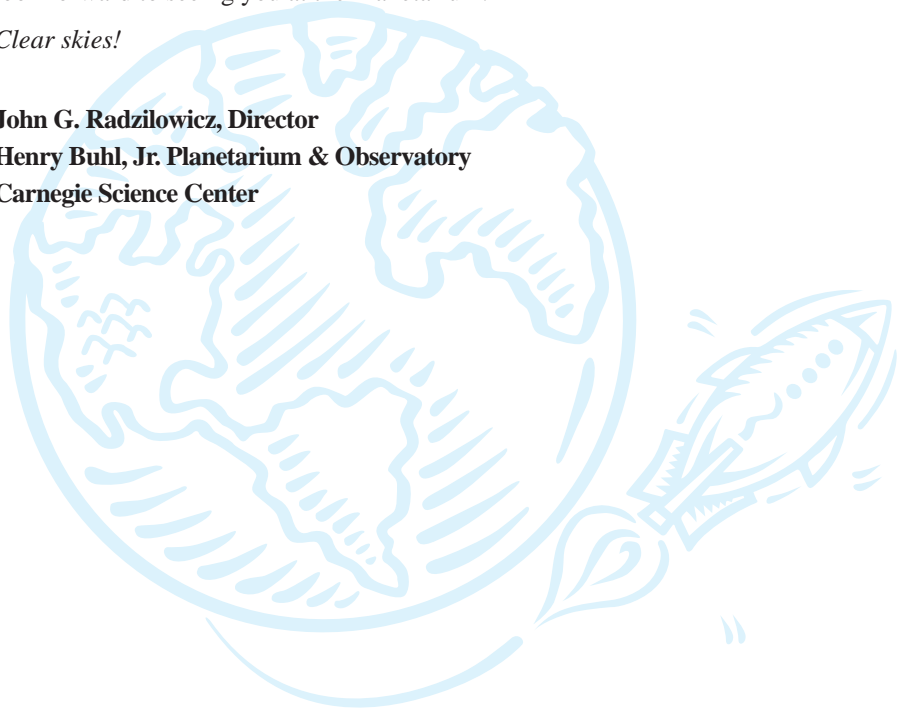
We invite your comments and suggestions as you use these materials, and we look forward to seeing you at the Planetarium.

*Clear skies!*

**John G. Radzilowicz, Director**

**Henry Buhl, Jr. Planetarium & Observatory**

**Carnegie Science Center**



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## *Dear Neighbor,*

Wondering about the Moon...imagining shapes in the clouds...looking for the Big Dipper — those are some of the ways we encourage children’s curiosity and imagination in our sky show. While we’re using sophisticated technology for this planetarium show, there are many basic and simple ways to help the children in your care develop curiosity and imagination.

In fact, it’s what *you* bring to the children everyday — your listening, your caring, your enthusiasm and your responding to their ideas, thoughts, and feelings — that encourages and inspires children to ask questions and to be imaginative. It’s through such relationships that children grow best and learn best.

It’s how you, in your own unique way, build on what the children see and hear at the planetarium that will help them get the most out of this experience. For one thing, you know the children best. You know what kinds of discussions or activities stimulate them, individually and as a group. And by responding thoughtfully to children’s questions — about the sky show or anything else — you’re encouraging their curiosity. Even when you don’t know the answer, you’re letting them know it’s good to wonder and ask. And you help children develop their imagination when you offer open-ended art materials or applaud their creative ideas.

Can you remember some of your childhood feelings about the Sun or Moon or stars or nighttime? Those memories can help you have empathy for the children’s thoughts and feelings about the sky in the day or night...and when the day turns into night.

As an adult, have you ever been fascinated by something in the nighttime sky, like the shape of the Moon on a particular night? Do you remember being awed by a sunset or sunrise? All of that contributes to your feelings and becomes part of what you communicate to the children. “Attitudes are caught, not taught.” When you, in your own honest way, convey marvel — in your voice and in your facial expressions — you’re helping children appreciate the sky as a wondrous thing.

A handwritten signature in black ink that reads "Fred Rogers". The signature is written in a cursive, flowing style.

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**I Wonder** can help children:

- develop healthy curiosity
- feel comfortable asking about things



**Rehearsing the Visit to the Sky Show** can help children:

- feel comfortable with new experiences
- encourage dramatic play



## Before the Sky Show

**Note to Teachers:** Try to find time to prepare the children for your planetarium visit. Thinking about new experiences and imagining about things is one important tool in helping children to be ready to learn.

### I Wonder

**Materials:** paper, pencil or marker

Let the children know that the planetarium show is about the sky. It's called a "planetarium" because it's a place where people can understand more about the sky and the planets and stars.

Ask what the children *already know* about the sky. What do they know about the Sun? About the Moon? About the stars? About clouds? Write their thoughts on a list. What have they seen in the daytime sky? What have they seen in the nighttime sky? Even if some of their knowledge isn't correct, encourage the children to express themselves and share their ideas.

Now encourage the children to tell you what they *want to know* about the sky. What are they wondering about? You could write the words "I wonder..." and ask for their ideas.

Tell them they may learn the answers to some of their questions in the sky show.

Follow up your visit to the sky show by asking the children *what they learned* about the sky, the Sun, the Moon, the stars. Take out the list of what the children already know, and ask if they learned something different from what they thought. Look at the list of "I wonder..." Were any of their questions answered in the sky show? How could they find out answers to their other questions?

### Rehearsing the Visit to the Sky Show

**Materials:** chairs, flashlight (optional)

Ask if any of the children have been to a planetarium? Have any of them sat in an audience at a movie or theater? Talk about the difference between a movie screen and the planetarium show which is on the ceiling (with special chairs that allow them to comfortably look up at the ceiling). Tell them that a planetarium is a place that helps them understand more about the sky.

You could practice by asking the children to help you line up their chairs like a theater audience. Then have the children walk into the room and sit in the chairs. Let them know the chairs at the sky show will be even bigger than regular grownup chairs, so they're bigger than the chairs they're sitting in now.

In the planetarium, the room will get dark so they can see what the sky looks like at night. But it won't get completely dark. If you can make it dim in your room, you can let them practice the feeling of being in the dim planetarium by turning off the light and then turning it on again.

It would also help to tell the children that Mister Rogers won't be there, but he will be on a big video screen. The sky show will be like a big movie all around the ceiling. If the room is somewhat dark, you may want to use a flashlight and shine it on the ceiling of the room — in patterns or in motion.



## What Do You See Up in the Sky?

Materials: none

If you can, take the children outside for a walk. Pause from time to time to look up in the sky. If you aren't going out for a walk, you can look out the window with them and look up at the sky. What can the children see? Birds, airplanes, clouds, tree branches? Ask them what they remember of what they saw? What would it be like to ride in an airplane, looking down at the sky. Have any of them been in an airplane?

## On the Way To and From the Sky Show

**Note to Teachers:** If your group is traveling on a bus or in a van to the Planetarium, you might want to use the travel time beforehand to help the children think about what they will be seeing — and to use the trip home to talk about what they've seen at the planetarium.

On the trip, you could ask the children to look out the window at the sky. What do they see in the sky?

You could lead the children in songs about the weather, the Sun, the Moon, and the sky. Here are some songs that you could suggest:

1. *You Are My Sunshine*
2. *Oh, Mister Sun (Moon)*
3. *Twinkle, Twinkle, Little Star*
4. *Teensy, Weensy Spider*
5. *Rain, Rain Go Away...Come Again Another Day...*
6. *It's Raining, It's Pouring...*
7. *Let the Sun Shine In (from the Broadway musical HAIR)*



**What Do You See Up in the Sky** can help children:

- develop observational skills
- develop their imaginations





### Science Notes:

Clouds form when warm, wet air is cooled down. As the air cools, the moisture in the air forms water drops and ice crystals. Dark clouds have lots of water drops in them – that’s where rain comes from.



**Cloud pictures** can help the children:

- learn more about their world
- recognize likeness and difference
- encourage imagination and creativity

### Book Suggestions:

- *Little Cloud*, by Eric Carle
- *It Looked Like Spilt Milk*, by Charles Shaw



### Science Notes:

Although the Sun seems to move across the sky, coming up in the East and going down in the West, it doesn’t move. It is actually the Earth spinning that gives us that perception.

The Sun is actually a star. Stars are giant balls of very hot gas. Stars give off lots of light and heat. The Sun is much, much closer to us than all the other stars. That’s why the Sun seems so bright and warm.

## After the Sky Show

**Note to Teachers:** The scientific principles underlying the following activities are abstract and sometimes difficult for children and adults to understand. Children know best what they can see and touch. But we can give children experiences to help them begin to process this information.

The **Science Notes** that we are offering are to give you a better understanding of some of the scientific principles behind the activities. You know your group of children best, so you can decide if some of these facts can be understood and appreciated by the children.

### Clouds

#### Cloud Pictures

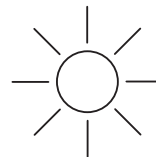
Materials: blanket, construction paper, cotton balls, glue

If it’s a day with interesting cloud formations, go outside with the children and ask them to look up in the sky. You may want to spread a big blanket on the ground and let the children lie on their backs looking up to the sky. What do they think the cloud formations look like? You may want to suggest they watch just one cloud and see how it moves across the sky.

When you come back inside, let the children use cotton balls for clouds. They may want to pull the cotton out of a ball shape and into whatever shape they want it to be. Let them glue the shapes onto the construction paper sky.

### The Sun

**Note to Teachers:** The children may be confused when they hear (from King Friday in the sky show or from you) “The Sun is a star.” They think of the Sun as a big round object and a star having a very different shape (usually with five or six points). You may want to show them that people draw light coming out of something with lines around that object...since the Sun is closer to us and very bright, we make lines coming out of it all around.



People often draw a star shape like the art here— making the star a small circle with lines coming out of it this way.



The star is farther away from us, so the inside circle is small, or not drawn at all.





## The Light of the Sun

Materials: spinning globe, flashlight

To help children understand how the light of the Sun effects us, shine a flashlight on an area of the globe. Explain that the globe is a model of the Earth. Put a bit of clay on the globe to show where your part of the world is. Turn the globe. The light from the flashlight is like the Sun. Have the children watch the light as you turn the globe the way the Earth always slowly turns. Is the clay in the light now? Tell them the Sun stays in one place, and the Earth spins. Slowly turn the globe, letting them see that the Sun is now shining on a different place. When the Sun shines on one side of the Earth, it's daytime there. But they can also see that it's dark (nighttime) on the other side.

## Shadow Play

Materials: large white sheet, flashlight or high intensity lamp, lullaby music, familiar toys, camera with film (optional)

Begin by asking children what they know about shadows. Tell them that the Sun makes shadows. If it's a sunny day, you might take them outside to see shadows of familiar objects. You may want to take photos of their shadows at different times of the day. You could also trace the outline of their shadows with chalk on the sidewalk. If you do that at different times of the day, they can see that the Sun is lower in the sky in the morning, which makes for very long shadows, but high in the sky at noon - so their shadow is smaller then.

The children can make their own shadows indoors. A sheet suspended from a doorway makes a good screen for the shadows. Put a bright light (that is like the bright Sun) behind the sheet with enough room for one or two children to dance between the sheet and the light. The other children could watch the shadows from the other side of the screen, while waiting for their turn to dance.

If you shine a bright light on a wall, you can let the children take turns using their hands, fingers, or bodies to make shadows. This might be a chance to remind the children that some things can seem frightening when we don't understand what they are - like shadows at night. You can let them know they can talk with you and the people in their family about things that frighten them.



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**The Light of the Sun** can help children:

- learn more about the Sun
- learn about day and night
- understand cause and effect



**Science Notes:**

The light of the Sun makes shadows. Because the Earth is spinning, the Sun appears low in the morning sky, appears high in the sky at noon, and low in the evening sky.

The altitude of the Sun changes the length of the shadows that are cast. When the Sun is high in the sky – the shadows are short. When the Sun is low shadows are long.



**Shadow Play** can help children:

- develop healthy curiosity and observation skills
- express feelings through movement and dance
- understand shadows

**Book Suggestions:**

- *Come Out Shadow, Wherever You Are*, by Bernice Myers
- *Guess Whose Shadow?* by Stephen Swinburne

**Poem:**

- *I Have a Little Shadow* by Robert Louis Stevenson



### The Warmth of the Sun can help children:

- understand more about their world
- understand that besides giving light, the Sun also warms the Earth.
- understand cause and effect



### Apple Rings Dried by the Warmth of the Sun can help children:

- understand that the Sun is a source of heat
- develop the ability to wait



### Science Notes:

The Earth spins and revolves. It spins completely around every 24 hours — each day. The Earth also revolves around the Sun. It takes a full year for the Earth to go all the way around the Sun.



### The Earth Spins and Revolves Around the Sun can help children:

- learn more about their world

## The Warmth of the Sun

Materials: none

Take a walk around your child care center, school, or home. Let the children touch the building and sidewalks on the sunniest side. Repeat on the shadiest side. Which side feels warmer? Feel the top of a rock on the ground. Turn the rock over to feel the underside. The Sun gives the Earth warmth. In places where the Sun's warmth and light are blocked, it is cooler and darker. Even thick clouds can block the Sun's light and warmth.

## Apple Rings Dried by the Warmth of the Sun

Materials: apples, lemon juice, dowel rods or string

Let the children wash several apples. Core the apples and slice them crosswise into 1/4" rings. Let the children drop the apple rings into a bowl of water to which two tablespoons of lemon juice have been added. Pat the rings dry. String them on a long, clean dowel or on a heavy cord. Tie the cord or place the dowel across a sunny, warm corner of the classroom to dry for several days. The apples will be dry to the touch, darker in color, and slightly rubbery. Rinse the slices, dry, and eat.

## The Earth Spins and Revolves Around the Sun

Materials: tape or yarn

You can help children understand the difference between spinning (the Earth is spinning) and revolving (the Earth revolves around the Sun) by putting a circle of tape or yarn on the floor — big enough for each child to stand behind. You can pretend to be the Sun — you might want to hold a big round yellow Sun that you've cut from construction paper and stand inside their circle.

Then have the children spin slowly in place noting when it is day... and night. When they face the Sun, it's daytime. When they face away from the Sun, it's nighttime.

Then have them spin as they're walking very slowly around the circle. Explain to them that it takes a full year for the earth to go around the Sun — so that's what they are pretending — to take a whole year to walk all the way around the circle!

## The Nighttime

**Note to Teachers:** Children can have lots of feelings about stopping their evening activities and leaving the people they love to go off to bed. By giving them the opportunity to play about bedtime and the feelings of separation, they can be in charge and rehearse some of their feelings. Then they may feel more in control and more able to manage when it's their bedtime.

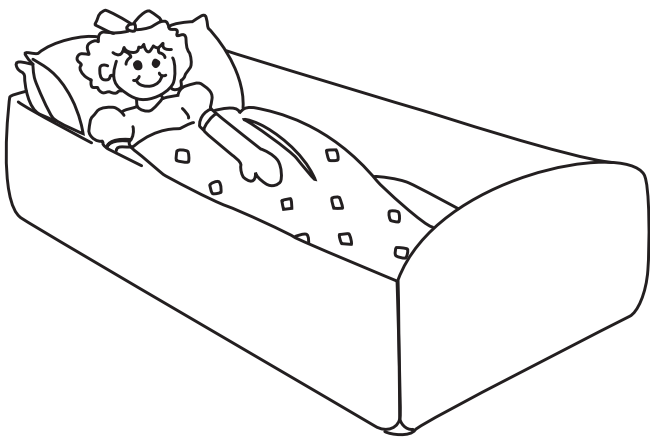
### When the Day Turns Into Night

**Materials:** empty boxes of different sizes, blankets or fabrics to use as blankets, dolls or stuffed animals, pieces of material or old baby blankets

You may want to have a nighttime party when the children wear their pajamas and bring a stuffed animal. Ask what they do each night at home before they go to bed. Different families do different things for their bedtime routine. The children might want to take turns pretending to be the children, and then the grownups who help them get ready for bed and tuck them in.

If you would prefer not to have the children in pajamas, you can play about going to bed with dolls or stuffed animals. The children might make beds, mattresses, and pillows for their dolls out of folded up pieces of material.

While the children are making the beds, some might want to talk about what they do to get ready for bed at home. Do any of them have special blankets or toys that they use at bedtime? Is there a bedtime song or story they like? Can the children tell you the things they do before going to bed (take a bath, brush their teeth, listen to a story, get a drink of water, listen to music? The children can play "bedtime" with their dolls and toy animals. If you have any toy baby bottles, they might like to use them for pretend, too.



**When the Day Turns Into Night** can help children:

- use play to work on feelings
- develop caring attitudes towards others

### Book Suggestions:

- *Jumbo's Lullaby*, by Laura Cross Melmed
- *Goodnight Moon*, by Margaret Wise Brown
- *Time For Bed*, by Mem Fox





### Science Notes:

The **stars** are like our Sun, but they are very, very far away. The stars are always there, but we can't see them in the daytime because the sky is so bright. We can see them at night because the sky is dark. The lights from the buildings and houses in the city makes the sky less dark, so we can't see the stars as well as we can in the country, away from the city lights, or in the planetarium. There are trillions of stars in the universe.

The **Moon** has no light of its own. It looks bright because the Sun shines on it. You can sometimes see the Moon in the daytime. It's always in the sky, revolving around the Earth, but we can't always see it.

The Moon doesn't change its shape, but it looks different on different nights. Sometimes it's a full Moon — big and round like a circle. Sometimes it's just like a half a Moon. And sometimes just a crescent. But the Moon itself isn't changing shape — it just looks like it does.



**Moon Music** can help children:

- express feeling through music
- practice gross motor skills

### Book Suggestions:

- *How Many Stars in the Sky?*, by Lenny Hart
- *Owl Moon*, by Jane Yolen

## The Nighttime Sky

### Twinkle, Twinkle, Little Star

Materials: none

Ask the children if they have seen the stars at night. They sometimes look like twinkling lights. Do the children know the classic fingerplay, "Twinkle, Twinkle, Little Star"? If not, you can teach it to them:

*Twinkle, Twinkle Little Star (open and close your hands)*

*How I wonder what you are (finger taps cheek)*

*Up above the world so high (open/close your hands up high)*

*Like a diamond in the sky (diamond with fingers)*

Repeat, and each time do it softer and softer until the children are whispering.

You might want to remind the children, that just as it says in the song, people have always wondered about the stars. Science has helped us know about stars and understand that they are like our Sun, only much farther away.

### Moon Music

Materials: audio cassette player or CD, recording of "Claire de Lune" by Debussy or "The Moonlight Sonata" by Beethoven

This activity will work well with either recording.

Explain to the children that "Claire de Lune," is French for the "light of the Moon." You might want to remind the children that, in fact, the Moon has no light of its own. It just reflects the Sun's light. It is something like the reflectors children sometimes have on their shoes or back packs. Maybe the children have seen those. The first time the children hear the music, let them lie on their backs on the floor and think about the nighttime and the Moon. It might be interesting to ask them why they think the composer named it "Claire de Lune" — light of the Moon?

Play the music again and ask if any children want to dance to it. If you have scarves or paper streamers, they may feel like they're "flying" through the nighttime sky. They may want to pretend to be "falling stars" and think about how to "fall" in a way that doesn't hurt them or anyone else. Do they remember the part about the "falling stars" in the planetarium show? Do they remember that it is not stars falling, but dust and rock falling very, very quickly though the air.

Children may also want to paint to the music.

## Nighttime Pictures

Materials: dark construction paper for the nighttime sky, star shapes cut from construction paper, Moon shapes cut from white paper, glue or paste

You may want to start by asking children if they have seen the real sky at night. What have they seen at night in the sky? Does it look like the sky in the planetarium show? How is it different? How is it the same? (Remind the children that the lights from the buildings and houses makes the sky lighter so we can't see the stars as well as we can in the country, away from the city lights, or in the planetarium.)

Give each child a sheet of dark paper for the nighttime. Encourage the children to paste one Moon and many star shapes anywhere on the paper. Some children may want to put more than one Moon on their picture, and that's okay.

Can the children tell you anything about the pictures? You can tell them that it's surprising to think that the stars are always in the sky, but we don't see their light until the sky is dark at night.



**Nighttime Pictures** can help children:

- develop their imagination
- use art to express feelings and ideas
- reinforce their own experience of the night sky





### Science Notes:

“Constellations” are groups of stars that, long ago, people gave names to — because they look somewhat like pictures of things or people. The “pictures” of the constellations are very abstract and are often hard to see.



**The Big Dipper** can help children:

- recognize and use a symbol
- practice working together

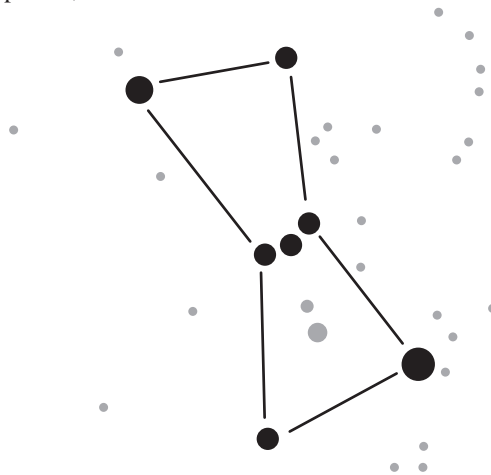
## Constellations

Materials: paper, crayons, star stickers

Some children may want to make dot-to-dot designs, connecting the stars like constellations.

A variation is to have the children glue stars on the paper, then pass it to the next person to connect the dots for a picture, like a constellation. It could be a picture of something they know or just patterns. They can create whatever pictures they like.

Some children may want to make three stars in a row, like Orion’s belt, and make a picture of a person, like Orion.

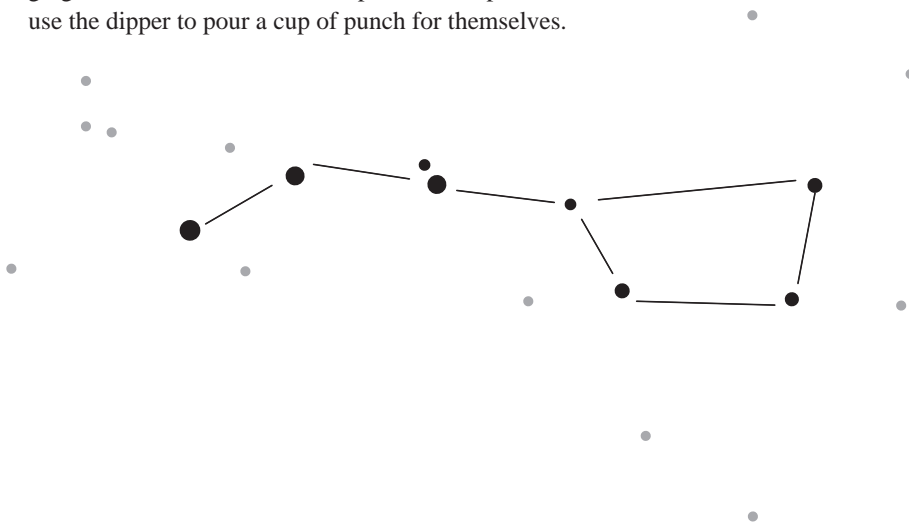


## The Big Dipper

Materials: punch bowl, dipper (or ladle) for serving punch, pineapple juice, ginger ale, vanilla ice cream, ice cream scooper, paper cups

Show the children the dipper or ladle. Remind them of the constellation of stars that looks like a “big dipper.” Do they think the ladle looks like the Big Dipper? You might want to draw it for them.

Ask the children to help you pour into the big punch bowl the pineapple juice and ginger ale. Then let the children put in a scoop of vanilla ice cream. Let the children use the dipper to pour a cup of punch for themselves.







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