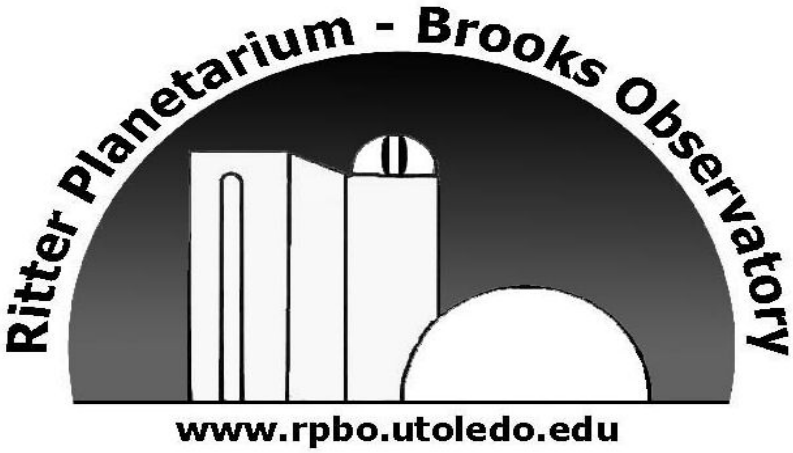

Amazing Stargazing

Post-visit Packet

Ritter Planetarium-Brooks Observatory
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Name _____ Date _____

Summary

Now that you've seen the program you may be wondering what to do next. We're here to help. In the following pages we've provided some samples of vocabulary, possible questions and discussion topics as well as some activities that could be done in the classroom or at home. These are simply suggestions and we encourage you to modify this packet to suit your particular needs.

Concepts covered in show:

1. **Constellations**
   Constellations are defined and several examples are discussed throughout the year. Also covered are the reasons for changes in the sky throughout the year (i.e. the reason we see different constellations in different seasons.)

2. **Planets**
   The five planets that are visible at some point to the naked eye are discussed and brief descriptions are given. Included are tips about planet watching.

3. **Meteors and Comets**
   Here the students learn that things such as 'falling stars' and 'hairy stars' are really just meteors and comets. The history and composition of these phenomena are outlined and the origins of and times of meteor showers are discussed.

4. **Moons and Satellites**
   This is a discussion of the Earth's moon, how it moves during the night and throughout the month. A brief mention of the moons phases is made. Artificial satellites are introduced and students are given tips on how to spot one.

Name _____ Date _____

Vocabulary

1. **Polaris**

2. **Constellation**

3. **Ecliptic**

4. **Planet**

5. **Moon**

6. **Moon Phases**

7. **Comet**

8. **Meteor**

9. **Meteor shower**

10. **Satellite**

Name _____ Date _____

Vocabulary-Key

1. **Polaris**- sometimes called the North Star; marks the direction of North and lies directly over the North Pole.

2. **Constellation-** group of stars that seem to form a shape; sometimes human shapes or animals. 88 official constellations make up a map of the night sky.

3. **Ecliptic**- The apparent path of the sun through our sky. Constellations found on the ecliptic are called zodiac constellations.

4. **Planet**- A celestial body larger than an asteroid or comet, light is provided entirely from a star, like our sun, around which it revolves.

5. **Moon-**A natural satellite revolving around a planet**.**

6. **Moon Phases-** The change in the moons appearance as seen from here on earth.

7. **Comet-**a relatively small celestial body consisting of a frozen mass that travels around the sun in a highly elliptical orbit.

8. **Meteor-** a meteoroid that has entered the earth's atmosphere. Commonly called a shooting star.

9. **Meteor shower**- Occurs when a large number of meteors appear together and seem to come from the same area of the sky.

10. **Satellite-** a body that revolves around a planet, sometimes called a moon.

Name _____ Date _____

Short Answer and Discussion Questions

1. Can you see more stars out in the country or in the city? Why?

2. What are the five planets that can be seen with the unaided eye?

3. Where do meteor showers come from?

4. What is a constellation?

5. Why does the moon go through phases? Name the moon's phases.

Name _____ Date _____

Short Answer and Discussion Questions – Key

1. Can you see more stars out in the country or in the city? Why?

   You can see more stars in the country. That is because the extra lights of the city make it hard to see the dimmer stars. This effect is called light pollution.

2. What are the nine planets? Give a brief description of each.

   The nine planets are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. Descriptions will vary.

3. Where do meteor showers come from?

   Meteor shows occur when the Earth passes through a stream of space-bourn dust. The source of this dust is a comet that leaves a trail of debris as it orbits the Sun.

4. What is a constellation?

   A constellation is a group of stars that together form a picture. There are 88 official constellations that make up a map of the sky.

5. Why does the moon go through phases? Name the moon's phases.

   The apparent change in the moon's shape throughout the month is the result of the differing angle between the sun, earth, and moon. For example, a new moon occurs when the sun, moon, and earth are in a direct line with the sunlit side of the moon facing away from the earth. The moons phases are: new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, third quarter, waning crescent, new moon. Simpler version is: new, crescent, half, gibbous, full.

Name _____ Date _____

Classroom Activity

Mrs. Witherspoon's Constellations Crawl

We see different constellations during the year because the Earth orbits the Sun, pointing us toward different directions in space.

To see how this works, simply imagine the four walls in a room as four different directions in space. Next, mark these walls with four different constellation signs. Make signs for:

Wall #1: Orion the Hunter
Wall #2: Leo the Lion
Wall #3: Scorpius the Scorpion
Wall #4: Pegasus the Flying Horse

You can write the constellation names, draw pictures of the characters or make a chart of the stars in that constellation. Be creative!

Now, make the Earth and the Sun. Find a lamp and place it in the center of the room. Make sure it shines in all four directions, and you have your very own Sun. For the Earth, that's easy – let your head be the Earth.

To start your constellation crawl, stand between the sun and wall #1 and face the stars of Orion. This is where the Earth is during winter. Notice, the Earth's night side (your face) points to Orion and we see it best in our night sky. Next, make your Earth orbit so it's between the Sun and wall #2 and you're facing the stars of Leo. Now it's Spring! And that is the best time to catch Leo the Lion in the night sky. Now, orbit to wall #3 and face the stars of Scorpius. When we see the Scorpion, it means summer has arrived. And finally, fall returns when you move to wall #4 and face the stars of Pegasus the Flying Horse.

Special thanks to the following resource:
Minneapolis Planetarium Amazing Stargazing Activity Book

Name _____ Date _____

Classroom Activity

Build a Comet

In this activity students will better understand the composition of a comet by visually seeing a comet model.

You will need:

- Large bowl
- Wooden spoon
- Garbage bag
- 1 cup dirt
- 2 cups dry ice as fine as can be crushed
- 2 cups of water
- Eyedropper
- Can of coke
- Ammonia

What to do:

1. Explain that all the ingredients are actual composition and appearance of a comet and scaled down in proportion
2. Begin by placing the garbage bag into the bowl so that it acts as a liner.
3. Pour two cups of water in the bag.
4. Next pour in one cup of dirt and begin stirring.
5. Add a dash of ammonia (eyedropper).
6. Add a splash of coca cola (organic material)
7. Now for the fun part: pour in the 2 cups dry ice and stir until it gets the consistency of pudding. Timing is very important here. If you wait too long the mass will get lumpy.
8. Wrap the edges of the bag up around the mixture and squeeze into a nice ball.
9. When you unwrap this, you will have an excellent model of a comet.

Developed by: Dennis Shatz
Written by: Chuck Matlock, Jr.
UT-SPICA 1993

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Classroom Display

Planet Pop Cans on Display

This display demonstrates the effects of a planet's size (mass) by showing how much a can of pop would weigh on each of the nine planets and the moon. A further explanation of the concept of gravity can be made using the pop cans as well. For example, the can of pop on Jupiter weighs the most because Jupiter has the strongest pull of gravity because Jupiter is the most massive planet.

You will need:

- 10 pop cans
- 5 pounds of paraffin wax
- 4 pounds of lead BBs (or something similar)
- Small sheet of poster board
- Contact paper and/or spray paint
- Scale

In order to make a set of display quality planet pop cans, the cans have to be relatively indestructible. We recommend BB's for weight and paraffin wax, which can be found in most craft stores, as a filler to make the cans squeeze proof. Please observe all safety precautions when dealing with hot wax and do not allow children to participate in the melting of the wax.

Here are the specifics of the cans for each planet:

Planet	Surface Gravity	Weight of Can (grams)
Mercury	0.38	148
Venus	0.91	354
Earth	1.00	390
Moon	0.16	62
Mars	0.39	152
Jupiter	2.74	1069
Saturn	1.17	456
Uranus	0.94	367
Neptune	1.15	449
Pluto	0.003	1

Decorating Tips: After filling the cans be sure to cover the tops with circular pieces of poster board. The display pop cans can be decorated in various ways. Contact Paper seems to work the best, as it does not chip like paint may. Label each of the pop cans with stick-on letters. Feel free to experiment with decorating methods.

Name _____ Date _____

Take-Home Activity

When you wish upon a falling Star…

Stars don't actually fall or shoot through the sky, as people once believed, it only looks that way. In fact, falling stars are actually meteors, tiny pieces of rock about the size of a pea or grain of sand. Meteors look like stars that fall from the sky because they burn and glow as they plunge into the earth's atmosphere. To see why meteors get hot, try rubbing your hands together very fast. What happens? Right, they get hot! Now imagine that you could rub your hands together as fast as a meteor moves, up to 150,000 miles per hour, and you'll understand why these space pebbles look like falling stars!

The best place to see meteors is out in the country on a dark moonless night. There you might expect to see six to ten meteors per hour. There are times when it's much easier to see meteors, when the earth plows through the debris left by certain comets. When the earth runs into these tiny rocks, dozens and sometimes hundreds of meteors are seen. We call these events meteor showers. Because the paths of these comets are well know we can predict these times.

Some of the year's best meteor showers are shown below:

Name	**Date**	**Meteors/Hour**
Quadrantids	Jan. 3	40
Perseids	Aug. 12	50
Orionids	Oct. 21	25
Geminids	Dec. 13	50

To see a meteor shower, plan to get away from city lights. You may see more bright meteors before midnight when a meteor shower is happening, but if you want to see lots of meteors, plan to do your observing during the hours after midnight. Be sure to give your eyes ten minutes to adjust to darkness, and then let nature's fireworks dazzle you!

Special thanks to the following resource:
Minneapolis Planetarium Amazing Stargazing Activity Book

Name _____ Date _____

Recommended Astronomy Web Sites

After seeing a program you may be interested in finding out more about a particular subject. These are some of our favorite websites.

Misc

Ritter Planetarium-Brooks Observatory	**www.rpbo.utoledo.edu**
Search for Extra-Terrestrial Intelligence Inst.	www.seti.org
SETI@home	setiathome.ssl.berkeley.edu
Space.com	www.space.com
Space Ref	www.spaceref.com
Heavens Above (Satellite Tracking)	www.heavens-above.com

Education

Windows to the Universe	windows.arc.nasa.gov
Bad Astronomy	www.badastronomy.com
The Nine Planets	seds.lpl.arizona.edu/nineplanets/nineplanets

NASA

NASA Homepage	www.nasa.gov
NASA Human Space Flight	www.spaceflight.nasa.gov
NASA Jet Propulsion Laboratory	www.jpl.nasa.gov
Space Telescope Science Institute (Hubble)	www.stsci.edu

Telescopes

Meade	www.meade.com
Celestron	www.celestron.com
Orion	www.telescope.com
Astromart	www.astromart.com

Magazines

Sky and Telescope	www.skyandtelescope.com
Astronomy Magazine	www.astronomy.com

Societies and Organizations

International Dark-Sky Association	www.darksky.org
The Astronomical Society of the Pacific	www.aspsky.org
International Astronomical Union	www.iau.org
The Planetary society	planetarysociety.org