



## RESOURCE GUIDE

[www.spacedoutshow.com](http://www.spacedoutshow.com)

Dear Educator:

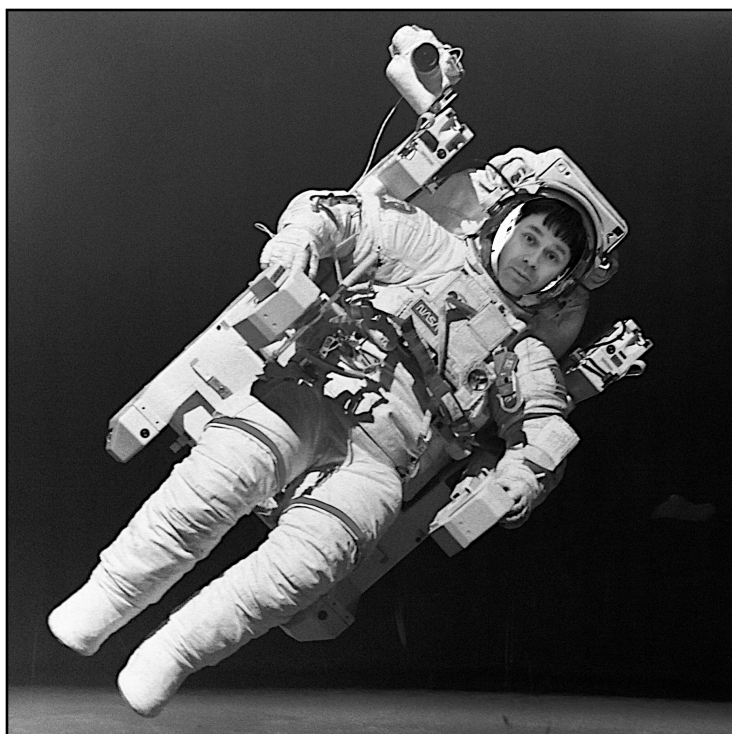
Welcome to the wonderful world of space. We hope your students will enjoy attending the Spaced Out! performance. We've created this resource kit to provide some basic vocabulary, background information and a few ideas we hope will be useful to you. The topic of space is as big as space itself, so we'd love to hear about any activities that you've been doing with your students that you think would be a good addition to this guide. Our email address is: [info@spacedoutshow.com](mailto:info@spacedoutshow.com). Our goal with the Spaced Out! show is to instill in the students an amazement at the vast universe around us. Thank you for being willing to help us nurture the wonder that lies in children's minds!

Greg and Kristi  
Spaced Out!

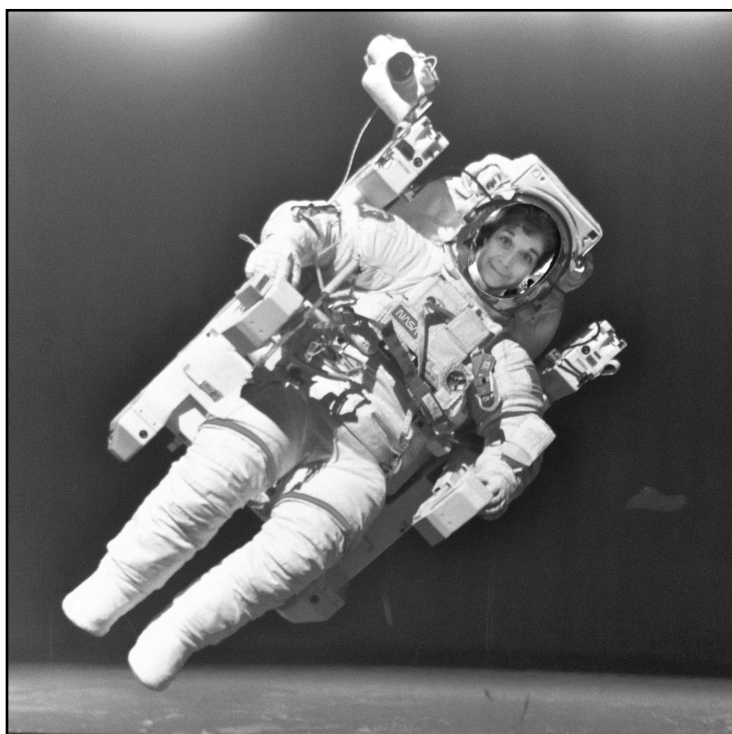




# Performer Bios



Greg Tarlin's remarkable skills earned him the title of Canadian juggling champion at the age of 20 and since then he has performed in Japan, Korea, at the North Pole for Canada's military, coast to coast in Canada, the USA and aboard cruise ships. His vast repertoire of skills includes 7 ball and 5 club juggling, ball spinning, unicycling, stilt walking, rola bola, yo-yo and plate spinning. Despite all that performing he still has time to enjoy his hobbies: building electronics projects and learning about science!



Kristi Heath has been a professional performer since the age of eighteen, beginning her career with the Second City comedy revue company. Once she figured out how to combine her background in comedy and theatre with goofy circus tricks, she became a very happy person. She has been performing her own unique style of physical comedy around the world ever since, including engagements with Cirque du Soleil and performances in Japan, Korea, Europe, New Zealand, Singapore and coast to coast in Canada and the US.



# Vocabulary

**Astronomer** - a scientist who studies objects in space

**Dwarf planet** - An object in the solar system that orbits the Sun, is big enough to have a constant (nearly round) shape but not big enough to have cleared its neighbourhood of other objects. Pluto is a dwarf planet as is Ceres (in the asteroid belt between Mars and Jupiter), Eris (beyond Pluto), and more are being discovered all the time.

**Gas Giant** - One of a class of large planets composed mostly of frozen hydrogen, helium and ices. The gas giant planets in our solar system are Jupiter, Saturn, Uranus and Neptune. There is no surface or ground on a gas giant, so they would be impossible to walk on.

**Gravity** - a force that pulls objects together

**Moon** - a body that orbits a planet

**My Very Excited Mother Just Served Us Noodles** - a mnemonic device to remember the order of the planets starting from closest to the Sun to furthest away (**M**ercury, **V**enus, **E**arth, **M**ars, **J**upiter, **S**aturn, **U**ranus and **N**eptune)

**Orbit** - the path taken by one body circling another body

**Planet** - a large round body that orbits a star

**Rocky Planet** - Mercury, Venus, Earth and Mars are the four rocky planets in our solar system. They are the four smallest planets, and have a surface solid enough to stand on. They are sometimes called 'terrestrial' planets.

**Rotate** - to turn about an axis or centre

**Solar System** - the collection of planets and their moons in orbit around a sun, together with smaller bodies such as asteroids, meteoroids, and comets



# Writing activities

## 1. Spaced Out! Newspaper

Discuss with your students news stories about space exploration or discoveries. These could be events like the first person to walk on the moon; the decision of scientists to change Pluto's status from planet to dwarf planet; the discussion of the robotic vehicles exploring the surface of Mars or any other stories the students might be familiar with. Have the students read the news stories and then write a fictional news story of their own about a scientific finding. Compile the stories into a fictional newspaper. Have the students create illustrations or stage photographs to accompany their stories. Distribute copies of the completed student paper to other members of the school community.

## 2. Comparison Writing

How do comparisons help writers describe places and things to readers? Select an object in the room and have the students write two descriptions of it, both assuming that the audience has never seen such an object before. The first description must be objective - the students must describe the object as accurately as possible without using comparisons. In the second description, the students may use comparisons (it's the colour of \_\_\_\_\_, it's as big as a \_\_\_\_\_, it has a nozzle like a \_\_\_\_\_). How do comparisons help them get the point across? In science, what is the danger of using comparisons? For help answering that question, see below. Discussion with your students about objectivity and subjectivity can lead in all kinds of directions including how we view people, events, news etc.

**Objective** is a statement that can be verified by looking up facts or performing mathematical calculations. (eg. the box is 12 cm by 14 cm by 15 cm). It is not touched by experiences or tastes. Scientific facts are objective as are mathematical proofs; essentially anything that can be backed up with solid data.

**Subjective** is a statement that has been determined by the writer's experience. It often has some truth to it, but reflects the perspective through which the writer sees reality. It cannot be verified **using concrete facts and figures**. (eg. the box is the colour of an elephant's skin). Subjective : opinions, interpretations, and any type of marketing presentation are all subjective.

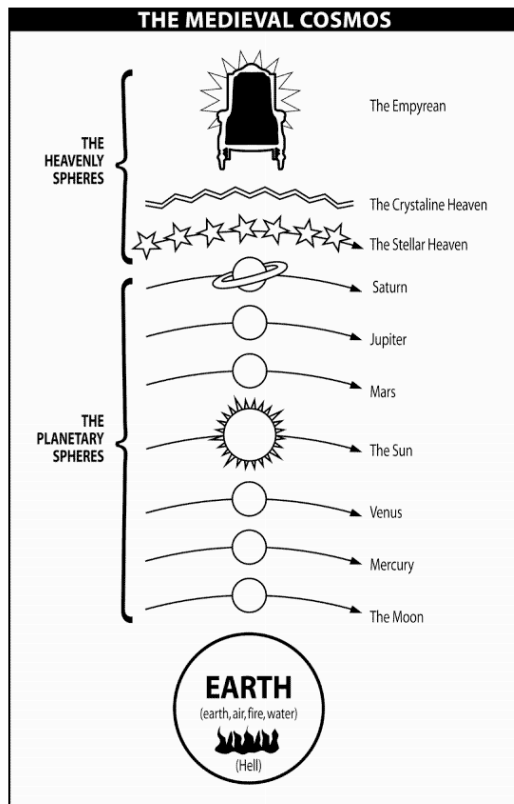
## 3. Mythology

The names of our planets and constellations come from Greek and Roman mythology. Have students pick a planet and write and illustrate a short version of the related myth. Compile students' myths into a class anthology, pairing each myth with a drawing or photo of the related planet or constellation.

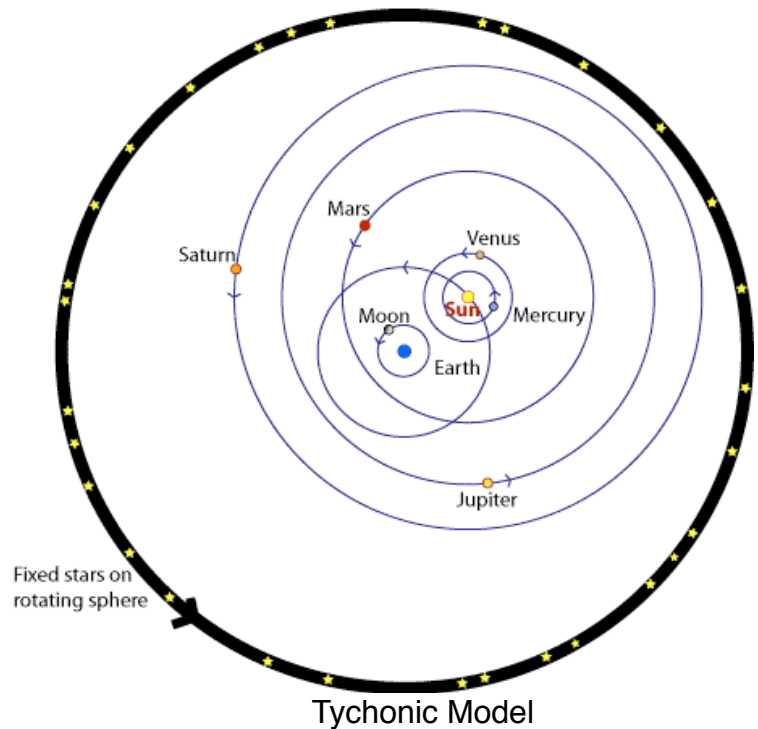
# Science



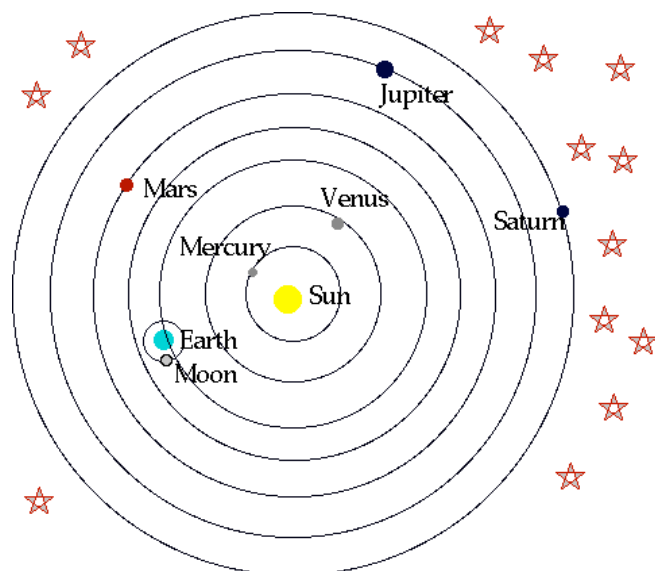
Have the students research ancient models of the solar system (three are below). Have them draw each model on a large sheet of paper. Display their drawings side by side to compare and contrast. Ask: Do you think today's model of the solar system is accurate? Why or why not?



Medieval Model



Tychoonic Model



Copernican Model



# Art Activities

## 1. Phase of the Moon Flip book

Each night, the Moon looks a little different. Unlike the Sun, the Moon doesn't make any light of its own, it's just reflecting light from the Sun. Only the side of the moon which is facing the sun is bright, the other side is dark. As the Moon moves around Earth, different amounts of the sunlit half come into view. We call these changing views the phases of the Moon. Appendix A in the back of this guide is a three page section which can be cut out and assembled into a flipbook showing the phases of the moon. Cut along the dashed lines, make sure the pages are in the right order, staple the booklets together on the left hand side. Then you have your Flip Book!

Tip: Make sure that the sides with the picture of the moon are all even by tapping them on a desk, then bend the cards backward to stagger them apart a little bit before stapling them. This makes it easier to flip through the pages.

## 2. Build a Big Dipper mobile (and see what it looks like from space!)

When we see the stars at night, we can't tell how far away each of them are just by looking. Two stars that are right beside each other look close together, but one of them may be millions of kilometers farther away than the other. This activity helps demonstrate that effect.

Each student will require a copy of the Big Dipper Map (Appendix B at the end of this guide). In addition, the students will need:

- a black crayon or marker
- an 8 1/2" X 11" piece of rigid cardboard
- black string (3 meters long)
- aluminum foil cut into seven 30 cm squares
- a pen to poke a hole in the cardboard
- tape
- a ruler

Glue or tape the Big Dipper map page to the cardboard. If you want, you can colour or decorate the Big Dipper map to look like the night sky as long as you can still see where the holes are and read the star names.

Use a pen to poke holes through the cardboard where the "stars" appear on the paper

Cut the string into 5 pieces 35 cm long and two pieces 10 cm long.

Tape the end of one piece of string to the middle of a square of foil. Crumple the foil into a ball around the string. Make the foil ball as tight as you can. Repeat until you have seven foil ball stars on strings.

Poke the free end of one of the long strings through the hole for Star #1 (the first star on the end of the handle). Now find Star #1 on the following chart (*figure 1*). This star is named Alkiad. In the right-hand column of the chart, you'll see that Alkiad gets a string 18 cm. long. The length of the string represents the distance to the star from the earth. Pull the string through the hole until the foil ball is 18 cm from the board. Once you have the right length of string, tape the string in place on the back of the board and trim off the excess.

Repeat for all seven strings. Be careful not to let the strings get tangled together as you work. For stars #3 and #4, use the short strings and pull the string up until the ball hits the board and tape the string down in back.

To hang your mobile, poke four new holes through the cardboard, each about 3 cm from the four corners. Now cut two more pieces of string, each about 50 cm long. Pull one piece of thread down through one corner hole and then pull it up through the nearest corner hole. Tie the two ends together, then repeat for the other two holes. Tie the two loops together so the board hangs flat.

Hang your mobile from a nail in a doorway, or tape it to the ceiling. Now stand or lie down **under** your mobile and look up. It should look like the constellation in the sky!

Now look at your mobile from the side. That's what the Big Dipper looks like from space - and you didn't have to spend a billion dollars on a spaceship! No need to thank us....

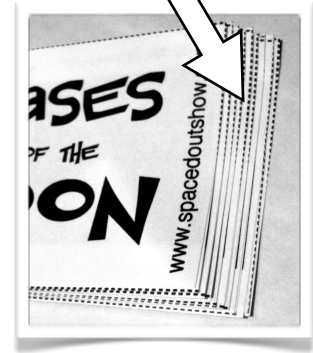
#	Star Name	String Length
1	Alkiad	18 cm
2	Mizar	28 cm
3	Alioth	0 cm
4	Mergez	0 cm
5	Phecda	27 cm
6	Merak	28 cm
7	Duhbe	26 cm

*figure 1*

## Instructions

1. Cut out the pages along the dashed lines
2. Arrange the pages in order
3. Staple the pages together to create a flipbook

Tip: it is easier to flip through the book if you stagger the pages like this before you staple them!



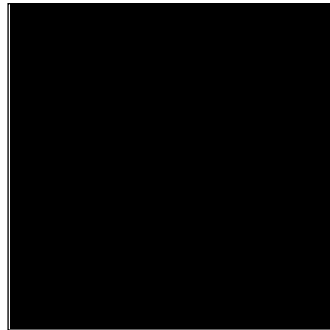
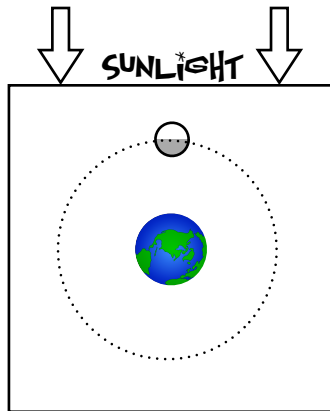
# PHASES OF THE MOON

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1

When the moon is here

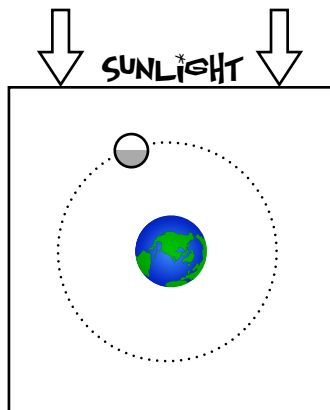
This is what we see



2

When the moon is here

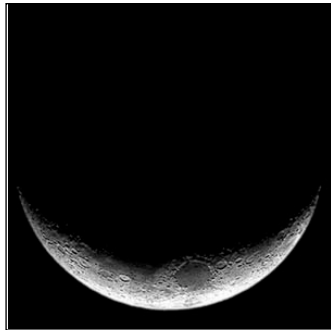
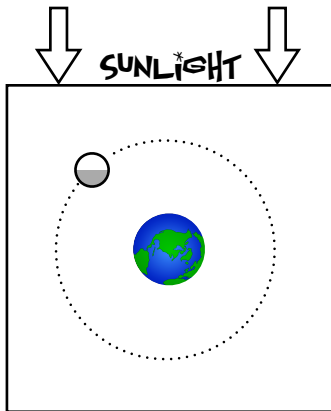
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3

When the moon is here

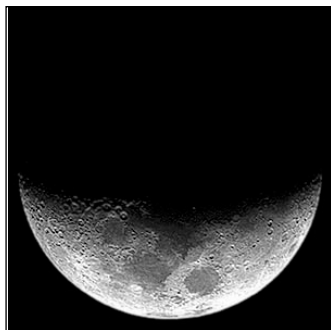
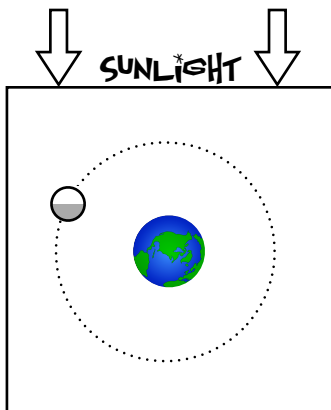
This is what we see



4

When the moon is here

This is what we see

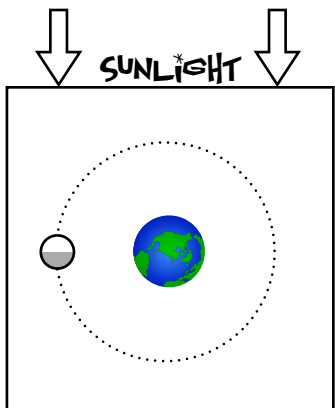




5

When the moon is here

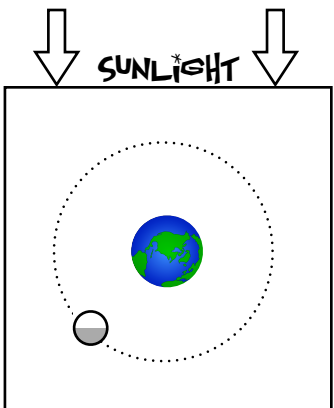
This is what we see



7

When the moon is here

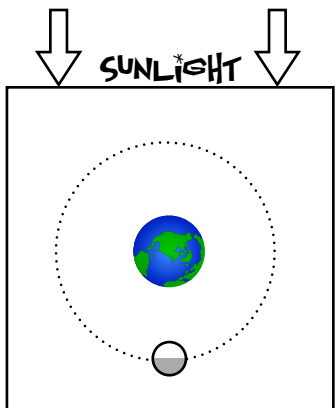
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9

When the moon is here

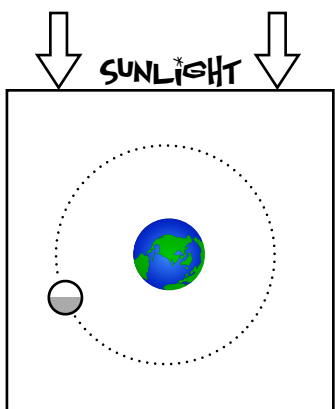
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6

When the moon is here

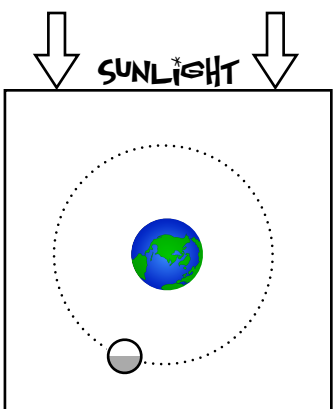
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8

When the moon is here

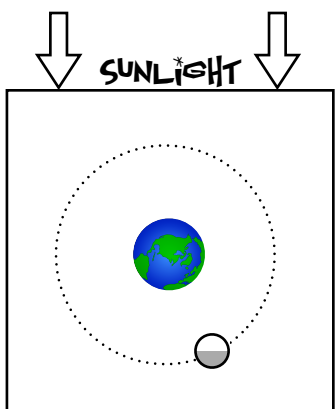
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10

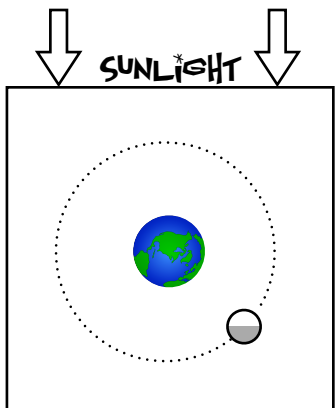
When the moon is here

This is what we see



11

When the moon is here

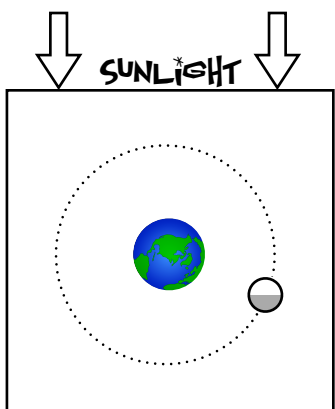


This is what we see



12

When the moon is here

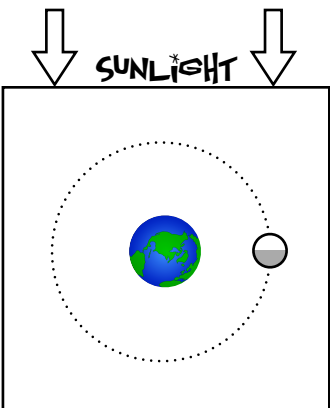


This is what we see



13

When the moon is here

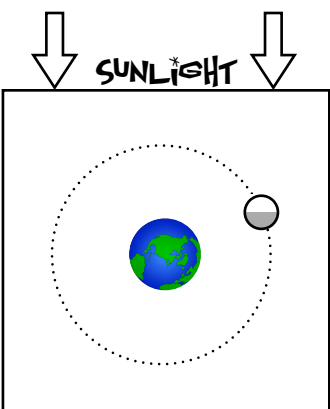


This is what we see



14

When the moon is here

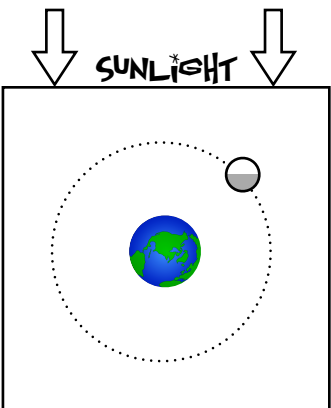


This is what we see

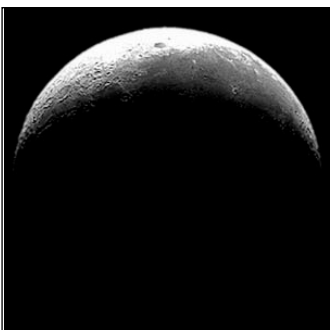


15

When the moon is here

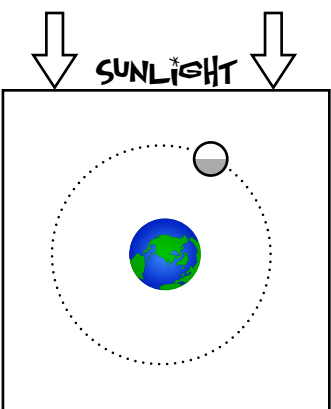


This is what we see

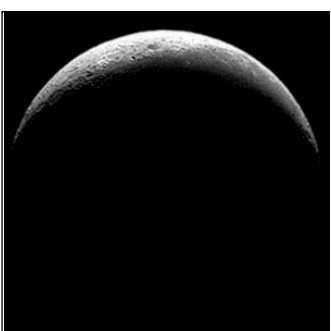


16

When the moon is here



This is what we see



● Duhbe

● Merak

● Mergez

● Alioth

● Mizar

● Phecda

● Alkiad