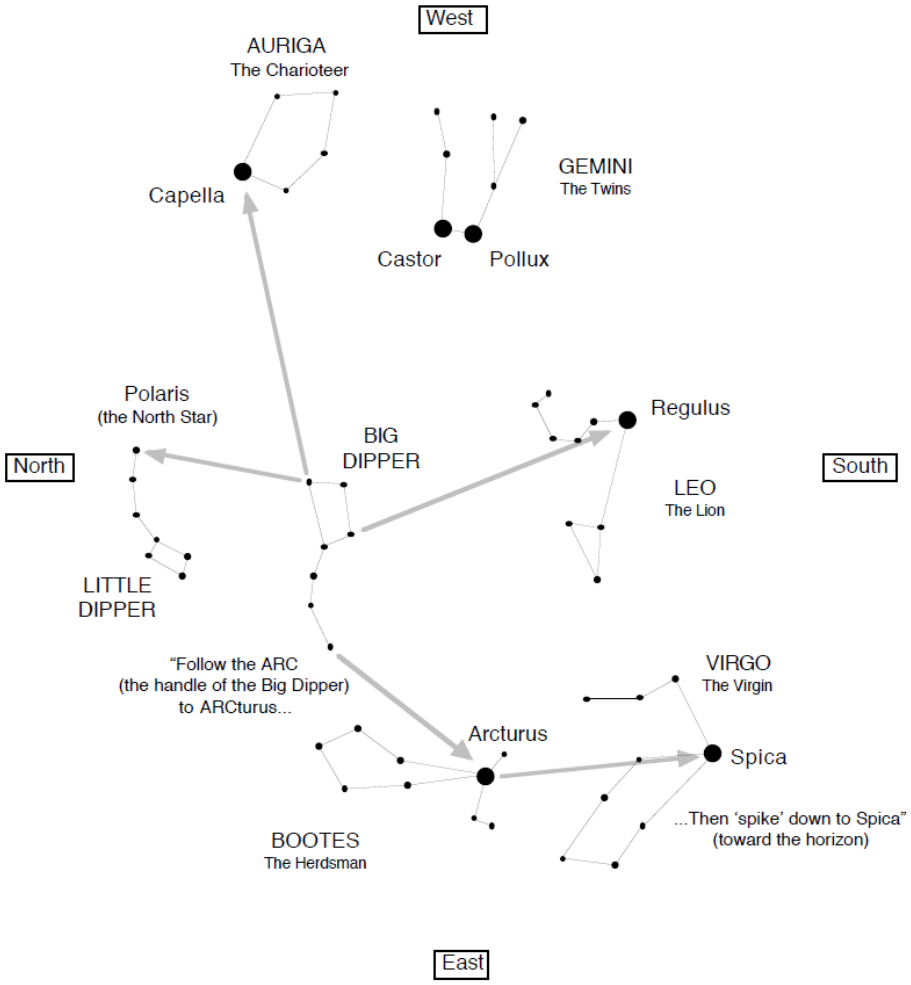
Name _____

Constellations Workbook

THE STARS OF SPRING

Follow the Arc



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About Constellations

(modified from a NASA/Amazing Space Student Background Reading)

Look up at the sky on a clear night. You will see vast patterns of bright stars. Close your eyes and think about the shapes of these patterns. Do they remind you of people, or animals, or mythological beings? Ancient astronomers imagined they saw people, animals, and mythological beings in the sky. They called them ***constellations***.

Constellation Myths

Constellation myths are ancient stories about the gods, heroes, and mythological creatures (serpents, dragons, and flying horses) featured in the constellations. The Greeks and Romans created the stories for their constellations.

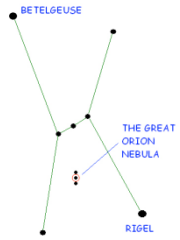
Other societies had their own myths for the stars. The stories were part of their religions, helping them to explain everyday events, such as the seasons. These stories usually have a hero, who was given an honorary place in the sky, as either a reward or a tribute.

Most of the constellations in the Southern Hemisphere are more modern. European explorers identified and named these constellations. They are not usually associated with myths

.

Constellations and the Star Patterns They're Based On

Currently, the entire sky has been divided into 88 constellations. A simple star pattern lies at the heart of each constellation. The stars in these patterns may appear to be close to each other, but they are often very far apart.



Often, there is little resemblance between the constellation and what it represents. For example, consider the Northern Hemisphere's winter constellation, Orion, the Hunter. The star pattern — four bright stars at the corners of a trapezoid and three stars in a row near the center — doesn't look much like a person. The ancients used a lot of imagination when they created the constellations.

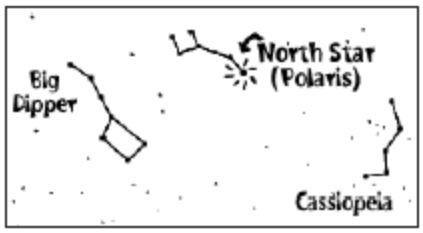
The History of Constellations

Many of our modern constellations come from the ancient Greeks, but they were not the first to "see" patterns among the stars. Historians believe that the ancient Babylonians and Sumerians invented many of the constellations. They passed the tradition on to the ancient Egyptians and Greeks.
Arabs learned of the Greeks' writings on astronomy and translated them into Arabic. Greeks had named their stars based on the star's position in a constellation, but Arabs began naming individual stars for people. Later, the Romans translated

the Arabic writings into Latin. We now have Arabic names (Zubenelgenubi) for stars in Greek constellations that bear Latin (Ursa Major) names!

Original Uses for the Constellations

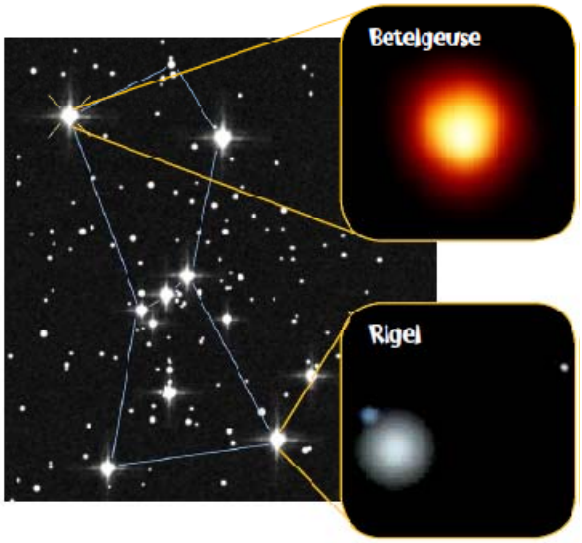
Ancient farmers may have used the stars to tell them when to plant and harvest their crops. Since some constellations are only visible at certain times of the year, their appearance can reveal the month. Some historians think the constellation myths were invented to help the farmers remember the constellations.



Throughout history, the stars have also been used for navigation. Travelers have historically relied on the North Star, Polaris, to mark their way. Polaris is the last star at the end of the handle of the asterism[1] of the Little Dipper, in the constellation of the Little Bear. Due to Earth's rotation, the stars appear to move across the night sky. But, Polaris is located above Earth's North Pole, so it doesn't appear to change position through the night.

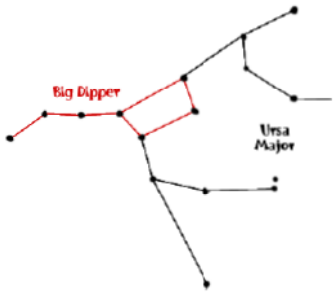
Modern Uses for the Constellations

Constellations give modern-day sky watchers a means of keeping track of the many bright stars in the sky. By looking for groups of stars in a particular pattern, professional and amateur astronomers can locate specific stars within the group. For example, many people can pick out the trapezoidal winter star pattern known as Orion. Once they have found Orion, they can find Betelgeuse (Orion's left shoulder) and Rigel (Orion's right foot), two of the brightest stars in this region of the sky. Constellations are also used to locate other objects, such as galaxies and nebulae (areas where gas and dust are clustered).



[1] The term "asterism" is used here to indicate a subset of the stars in a constellation that make a separate, recognized pattern of their own. The Little Dipper is such a group of stars, found within the Little Bear, one of the 88 constellations. The stars making up the Big Dipper are another "asterism," falling within the constellation of the Great Bear.

Constellations and the World's Cultures



Many cultures have identified star patterns, but rarely do these patterns correspond to those of other cultures. One of the patterns in the northern sky that many cultures have recognized is the asterism[1] called, in the U.S., the Big Dipper. In southern France, it is called a "saucepan." In Britain, it's the "plough." The Mayans called it Seven Macaw, a parrot. The Hindus saw seven wise men. The Micmac Indians of Maritime Canada, and other North American Indians saw a bear (the part we see as the bowl of the dipper), with hunters tracking it (the handle). The runaway slaves called it the "drinking gourd" and followed it north to freedom. The Big Dipper became a symbol of freedom. It is unusual for so many cultures to pick out the same set of stars. Perhaps it is because all seven stars are very bright.

About Constellations Student Reading Worksheet

1. What do we ***CALL*** patterns in the sky?

_____

2. What ***ARE*** constellation myths?

_____

_____

3. Which constellations ***ARE NOT*** usually associated with myths?

_____

4. There are ***HOW MANY*** constellations?

_____

5. Describe the ***LOCATION*** of the stars in a constellation *(near to each other, far away, in different parts of the sky, etc.).*

_____

_____

6. Who ***INVENTED*** many of our constellations?

_____

7. How did farmers ***USE*** constellations?

_____

_____

8. Travelers have historically relied on the _____ to mark their way.

9. How do modern sky watchers ***USE*** the stars?

_____

_____

_____

10. Constellations are also ***USED*** to find …

a.

b.

11. In the United States, this asterism is called the Big Dipper. List ***OTHER*** names of this constellation.

a.

b.

c.

d.

e.

f.

12. What was the ***SIGNIFICANCE*** of the "drinking gourd"?

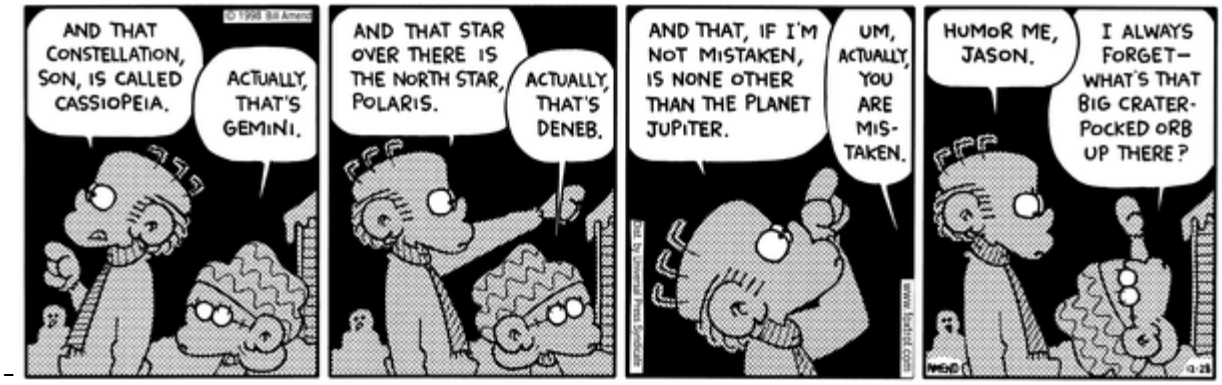
_____

_____

13. Describe the various ***USES*** of constellations.

14. Why did most societies ***DEVELOP*** myths surrounding the constellations?

15. How could ***YOU USE*** constellations today?

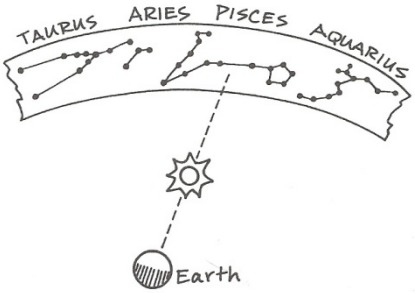


Why Do We See Different Constellations During the Year?

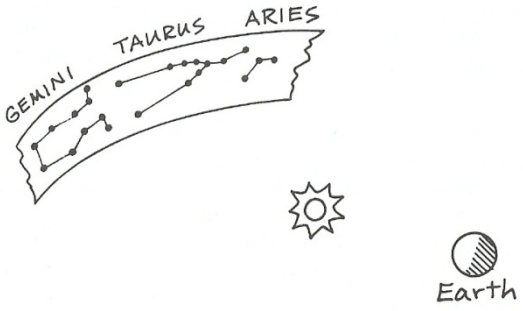
If observed through the year, the constellations shift gradually to the west. This is caused by Earth's orbit around our Sun. In the summer, viewers are looking in a different direction in space at night than they are during the winter.

Constellation "Think" Questions

(from *Constellations for Every Kid* by Janice VanCleave)

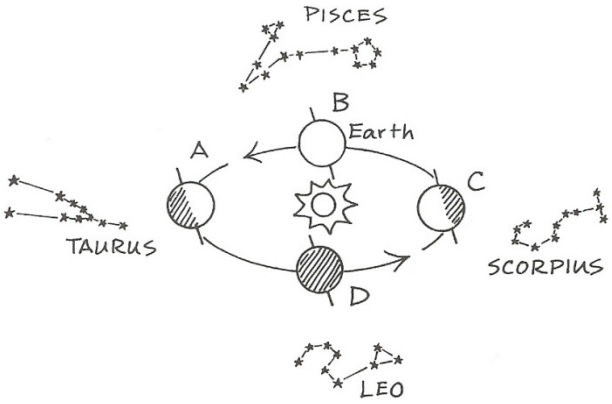


1. Look at the picture. In what constellation would you see the Sun?



2. Look at the picture. In what constellation would you see the Sun?

3. Look carefully at the picture.



a. In what constellation would you see the Sun if it were in Position D?

b. In what constellation would you see the Sun if it were in Position A?

c. In what constellation would you see the Sun if it were in Position B?

d. In what constellation would you see the Sun if it were in Position C?

Making a Star Finder

Step 1: Cut along the black outer circle of the Star Wheel and along the solid lines on the Star Wheel Holder. Remove the interior oval shape on the Star Wheel Holder.

Step 2: On the Star Wheel Holder, fold the cardboard along the dashed lines.

Step 3: Tape or staple along the edges of the Star Wheel Holder forming a pocket.

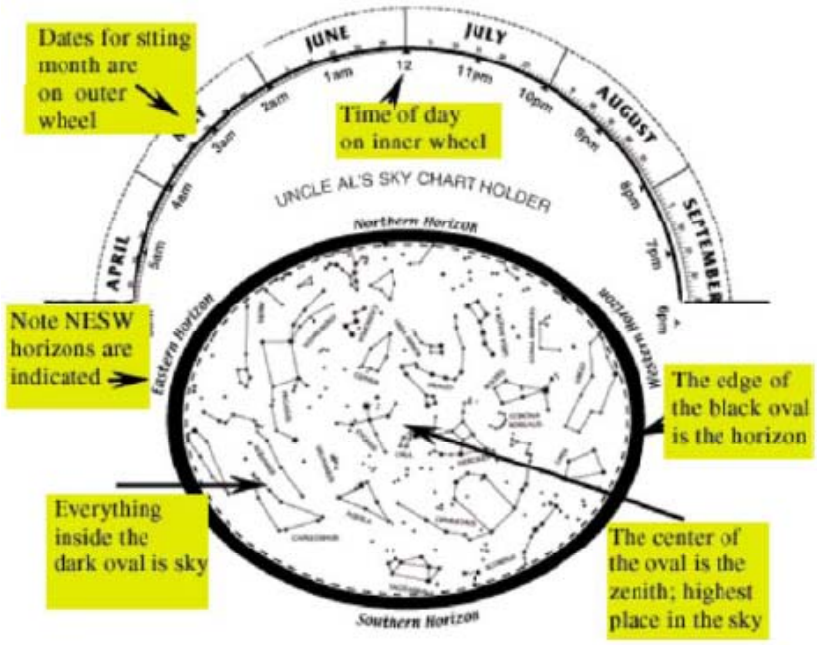
Step 4: Place the Star Wheel in the Star Wheel Holder.

How to Use the Sky Wheel

To find a constellation in the sky using the Star Wheel, follow these steps:

1. Set date and time of night: Rotate the Star Wheel in the Star Holder until your desired time of night lines up with the desired date.

2. View it right-side up. For the constellation, you want to find, note which horizon to which it is closest. Orient the Star Wheel Holder so that horizon is at the bottom. Then that part of the sky will look right-side up to you. For example, if your constellation is closest to the northern horizon, flip the Star Holder upside down so that you are reading northern horizon at the bottom of the oval.



3. Note how high the constellation is in the sky: Is the constellation closer to the zenith (center of the map) or closer to the horizon?

4. Memorize the shape of the constellation.

5. Then look for the constellation in the sky and find it!

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

Use your Star Finder. List four constellations that can be seen during a season.

Winter

a.

b.

c.

d.

Spring

a.

b.

c.

d.

Summer

a.

b.

c.

d.


WHY DO WE PAY ATHLETES BIG BUCKS AND OUR SCIENTISTS PEANUTS?
WOULD YOU BUY A TICKET TO SEE A SCIENTIST?

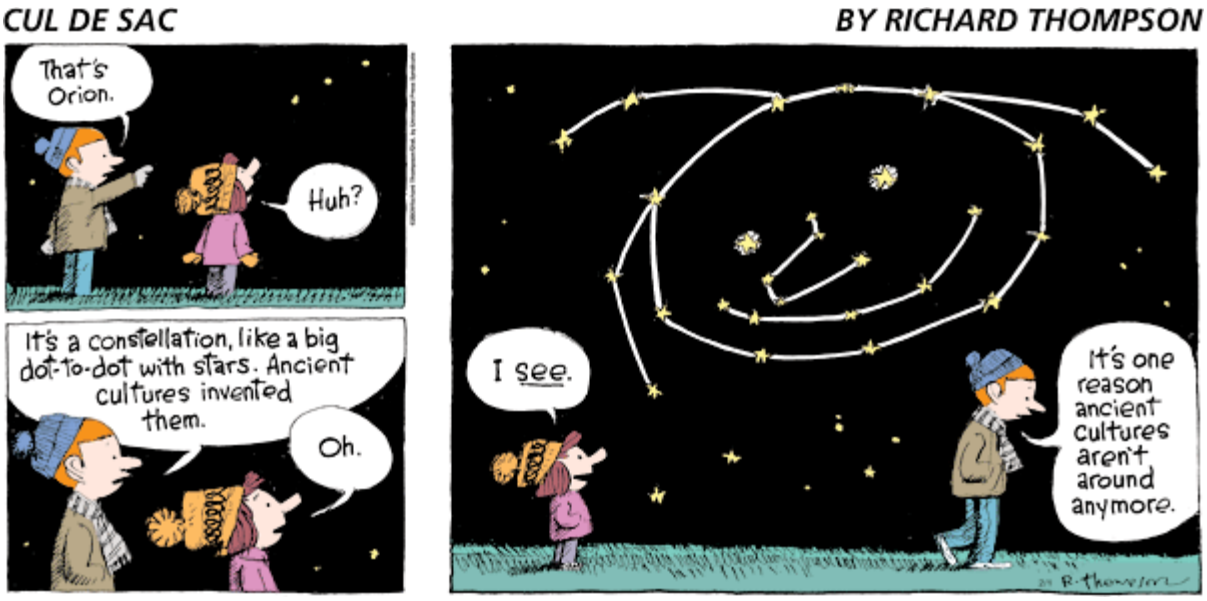
Autumn

a.

b.

c.

d.

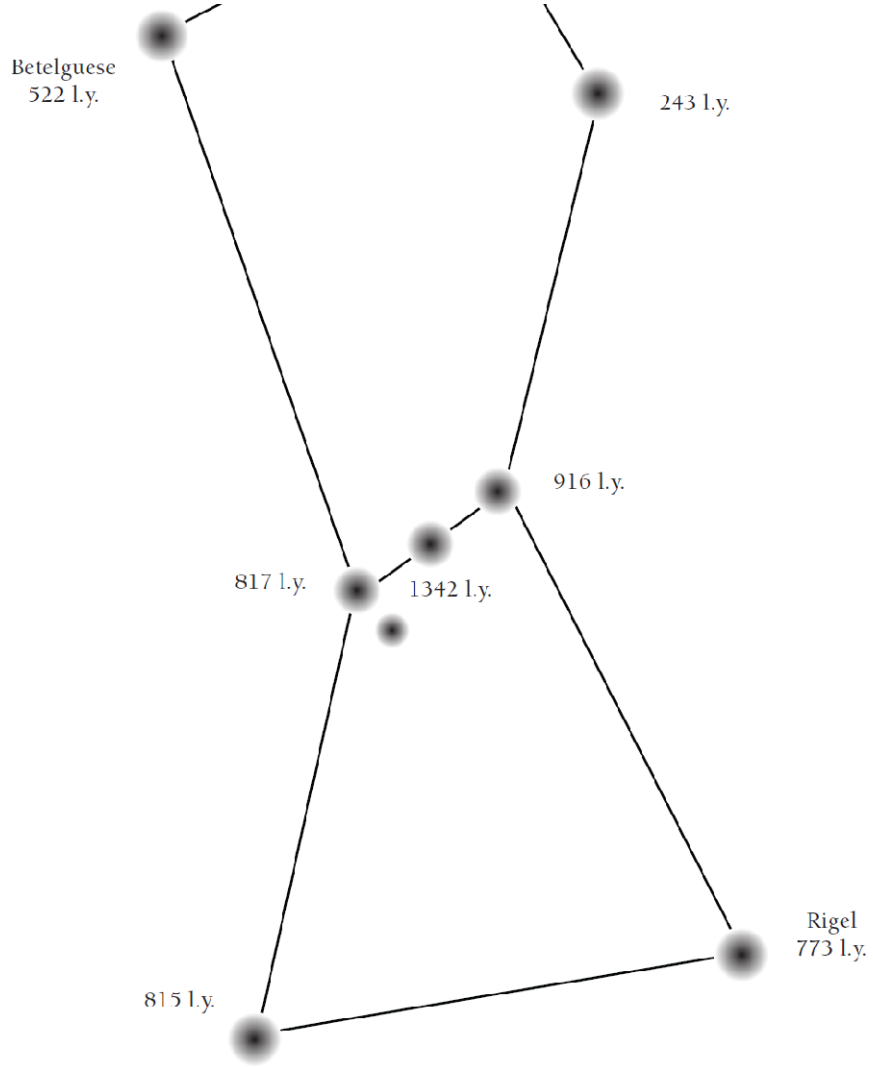

CUL DE SAC
BY RICHARD THOMPSON
That's Orion.
Huh?
It's a constellation, like a big dot-to-dot with stars. Ancient cultures invented them.
Oh.
I see.
It's one reason ancient cultures aren't around anymore.

Star Distances

When you look at constellations, they all appear as if they are the same distance from Earth. That is because stars are so far away, we can't tell which stars are close and are far away. We will use the constellation of Orion as our example.

Below is a picture of Orion that shows the distance (light years – Ly.) to some major stars in the constellation. One the diagram on the next page, place a dot that shows how far away that star is from Earth.

When you are done, you will see that, even though the stars appear to be the same distance, they are different distances away from Earth.



We know that light travels 186,000 miles per second. Let's say that a 1 cm string equals the distance light travels in one second. If it takes about 8 minutes for light from the sun to reach us, how long would the string be? (480 cm) The light from the

next nearest star takes 4½ years to reach us. How long would that string be? (141,912,000 cm)

Materials

- 7 Beads
- 150 cm of Thread
- Cardstock
- Ruler
- Scissors
- Pushpin
- Tape

Procedure

1. Get a copy of *Orion* on cardstock.

2. Get your string and beads. Tie a bead on the end of the string.

3. Using a pushpin, make a hole big enough for the thread at the location of the seven-labeled stars.

4. From the bead on the thread measure 15 cm long and cut the thread. Thread the end through the star labeled 522 light years (ly) until 1 cm is on the backside of the cardstock. Tape the 1 cm piece of string securely on the back.

5. Use the measurements below to cut the remaining threads to the appropriate lengths and attach them to the cardstock using 1 cm of string on the back.

- 243 light years (ly) – 18 cm
- 817 light years (ly) – 12 cm
- 1,342 light years (ly) – 7 m
- 916 light years (ly) – 11 cm
- 815 light years – 12 cm
- 773 light years – 13 cm

6. Hold the model above your head to see the relative distance from the earth of each star.

Straw Stars

(Modified from a lesson plan from *Sky Tellers – Star Darts,* Lunar and Planetary Institute)

Materials

- Paint
- Non-bendable straws
- Star template
- Q-tip™
- Scissors
- A pencil
- Glue
- Double-sided tape
- Butcher paper for drawings
- Colored markers or paints
- Images of constellations

Safety Concerns: Scissors. Discuss safe and proper use of scissors.

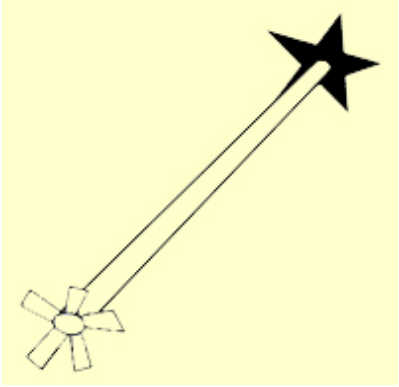
Procedures

1. Cut out seven cardstock stars from the template. Paint your seven stars.

2. Cut the straws into the following lengths:

9”
3.7”
5”
3.4”
4”
4.4”
4.4”

Make five ½” cuts in both ends of each straw. Bend the sections back until all the sections are splayed to form bases at either end.



3. Tape a star to the splays on one end of the straw.

4. Using the table below, glue your “straw stars” to the Big Dipper template.

Star	Length	Light Years
Alkaid	9”	210
Alioth	3.7”	70

Dubhe	5”	105
Megrez	3.4”	65
Merak	4”	80
Mizar	4.4”	88
Phecda (Phad)	4.4”	90

5. Explain how this activity demonstrates that the stars we see in a constellation are at different distances from Earth.