

MATERIALS (included in kit)

1 star chart sheet
 2 plastic hemispheres
 1 erasable marking pen
 1 wooden dowel
 1 small Earth globe
 1 plastic drinking straw

4 adhesive disks
 1 foam block
 1 horizon sheet
 1 box (in which kit was packed)
 1 map pin
 1 small protractor (to be cut out)

other materials (not in kit):

1 pair of scissors

PROCEDURE

1. Prepare the two star charts by cutting along the outside lines with the scissors. The star chart will look like a black flower with eight petals. The white line that crosses four of the petals is the ECLIPTIC. This line represents the apparent path of the Sun against the stars due to the motion of the Earth along its orbit around the Sun. The constellations found along the ecliptic are the signs of the Zodiac.

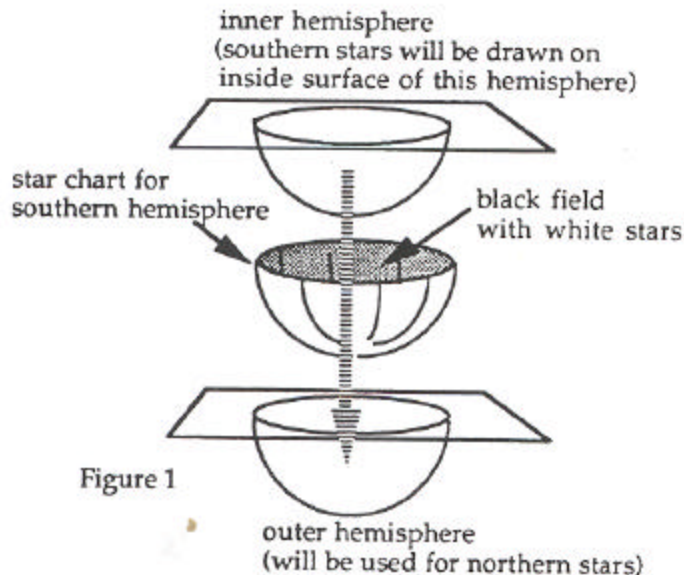


Figure 1

2. Place the chart of the southern sky inside one of the plastic hemispheres with the printed side facing up. CAREFULLY align the chart so the ends of the ecliptic (the line that crosses four of the chart's "petals") touch the base of the hemisphere at two OPPOSITE RIDGES. Secure the chart by placing the other hemisphere over the star chart and pushing it against the first hemisphere. Make sure that the ridges of both hemispheres match. Tape the edges of the two hemispheres together. (Figure 1)

3. Mark the stars on the inside of the inner hemisphere with the erasable marking pen. Also, draw the lines that mark the ecliptic and some brighter constellations. The brighter stars are indicated by bigger symbols. (The "magnitude" of a star is an indication of its apparent brightness. On this chart, a zero magnitude star is the brightest and the fourth magnitude star is the dimmest. The unaided human eye can see stars as dim as +6.5 magnitude.) (Figure 2)

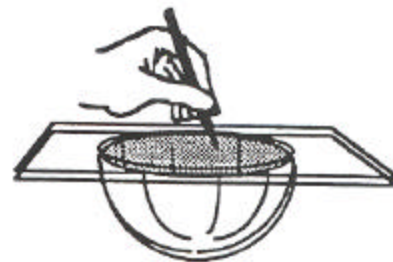
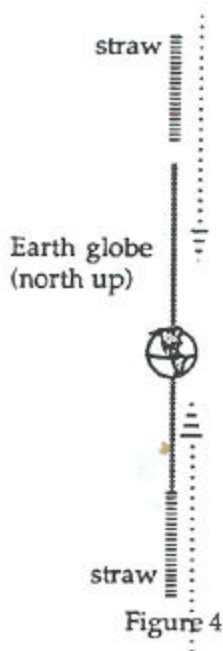
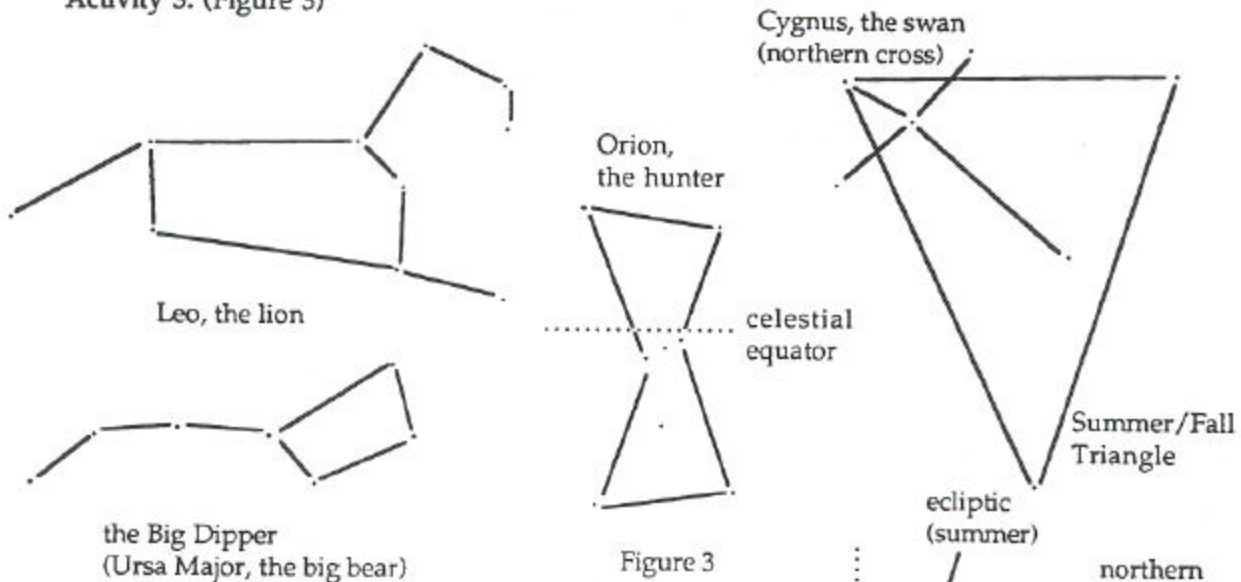


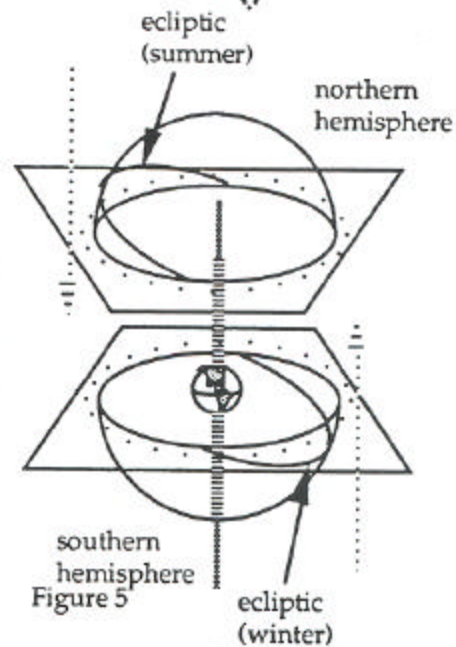
Figure 2

4. When you have marked all the stars, separate the hemispheres and remove the star chart. Repeat steps 2 and 3 with the northern star chart and the other, unmarked hemisphere (the "outer" hemisphere in Figure 1). Confirm that the ecliptic lines touch the base at opposite ridges. (Use the hemisphere you have already marked to secure the chart in place.)

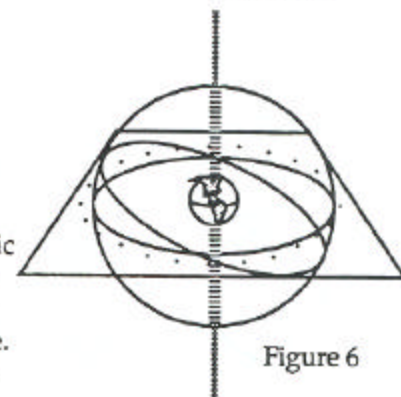
5. Look into the northern hemisphere. Stars in some of the constellations are connected with lines. Pay particular attention to four of them: LEO, CYGNUS with the Summer/Fall Triangle, and the BIG DIPPER (an easily recognized pattern, not a true constellation), and the northern half of ORION (the bottom of ORION is in the southern hemisphere). You will be referring to them in Activity 3. (Figure 3)



6. Slide the Earth globe to the center of the wooden dowel. Cut the drinking straw into two pieces, each 7.5-cm long. Slide these two pieces of straw over each end of the dowel. (Figure 4)
7. Place four of the adhesive disks on the bottom of ONE hemisphere under the dimple at each ridge. (Figure 4)
8. With the thumb tack, make a small hole through the center of both hemispheres (where the ridges cross). Slide the two star hemispheres onto the dowel with the southern hemisphere of the small Earth globe facing into the southern bowl of stars and the northern Earth globe hemisphere facing into the northern bowl of stars. (Figure 5)



9. Rotate the hemispheres until the points where the ecliptic touches the equator match on both hemispheres. (The ecliptic should completely encircle the sphere and should pass both above and below the equator.) The dimples on the northern hemisphere should match those on the southern hemisphere. Evenly space the four adhesive disks around the base of one hemisphere under a dimple. Press the hemisphere together, sticking with the adhesive disks. (Figure 6)



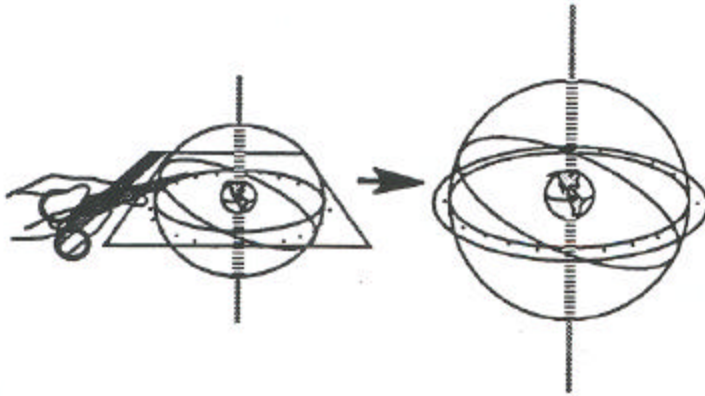


Figure 7

10. Trim the rim of the plastic sphere leaving the dimples. The clear plastic sphere should rotate freely on the dowel. The entire celestial sphere assembly (hemispheres and globe) should slide tightly up and down the dowel. (Figure 7)

11. Cut out the small Latitude Protractor on the last page. Match the dowel with the line for 40° marked on the protractor. Push the dowel into the foam block at this angle. Be careful to place the sphere in the block such that the center of mass of the sphere is over the block. This should insure that the sphere will stand freely on the block. (Figure 8)

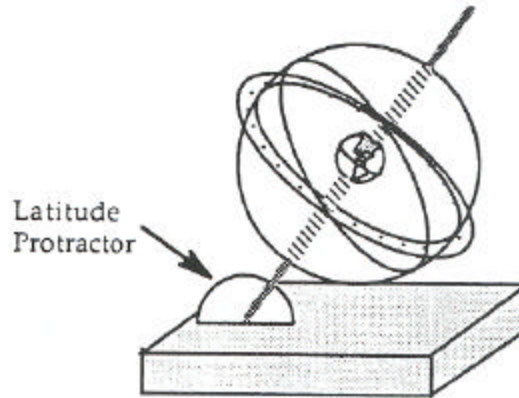


Figure 8

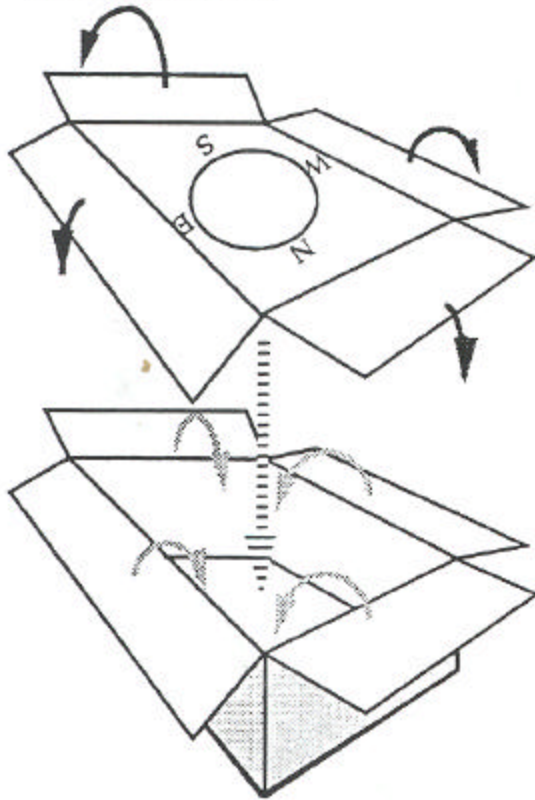


Figure 9

12. Fold the lapels of the box in which the kit arrived into the box, pushing them as tightly to the sides of the box as possible. Cut out the circle on the horizon sheet. Fold the edges of the horizon sheet down and place the sheet in the box. The top of the sheet labeled with the directions, N, S, E, and W, should form a horizontal surface even with the top of the box. (Figure 9)

13. Set the celestial sphere in the box through the hole in the horizon sheet. Adjust the position of the sphere on the dowel until the center of the Earth globe is level with the horizon sheet. Align North on the celestial sphere with North on the horizon sheet. (Figure 10)

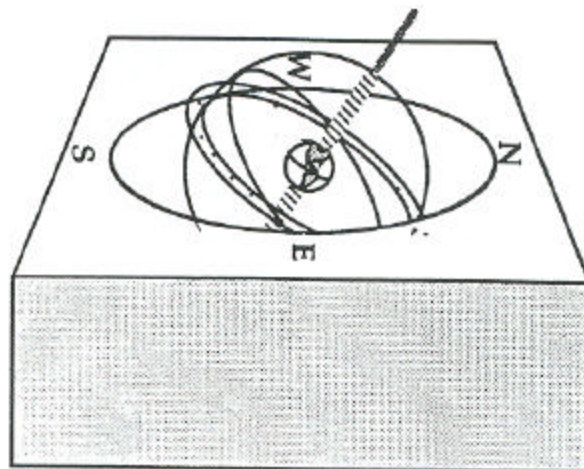
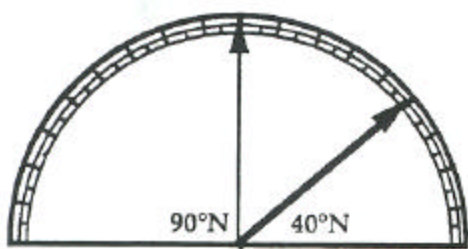


Figure 10



Latitude Protractor