

## Changing Seasons

For each of the positions below, label the name, date, season in the northern hemisphere, hours of sunlight a certain place receives, where the direct rays of the sun hit the earth, and whether the hours of sunlight in the northern hemisphere will get longer or shorter as the Earth moves to the next position. Shade in the shadow of the earth for positions B, C and D.

The main factor that influences seasons is the changing \_\_\_\_\_ a place receives because the earth is \_\_\_\_\_ at a \_\_\_\_\_ degree angle compared to the sun.

### Earth Movement

R\_\_\_\_\_ is the spinning of the Earth on its \_\_\_\_\_ once every \_\_\_\_\_.

R\_\_\_\_\_ is the movement of the Earth around the \_\_\_\_\_ once every \_\_\_\_\_.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Season (N): \_\_\_\_\_

Hours of Sunlight: \_\_\_\_\_

Direct Rays: \_\_\_\_\_

Name: \_\_\_\_\_

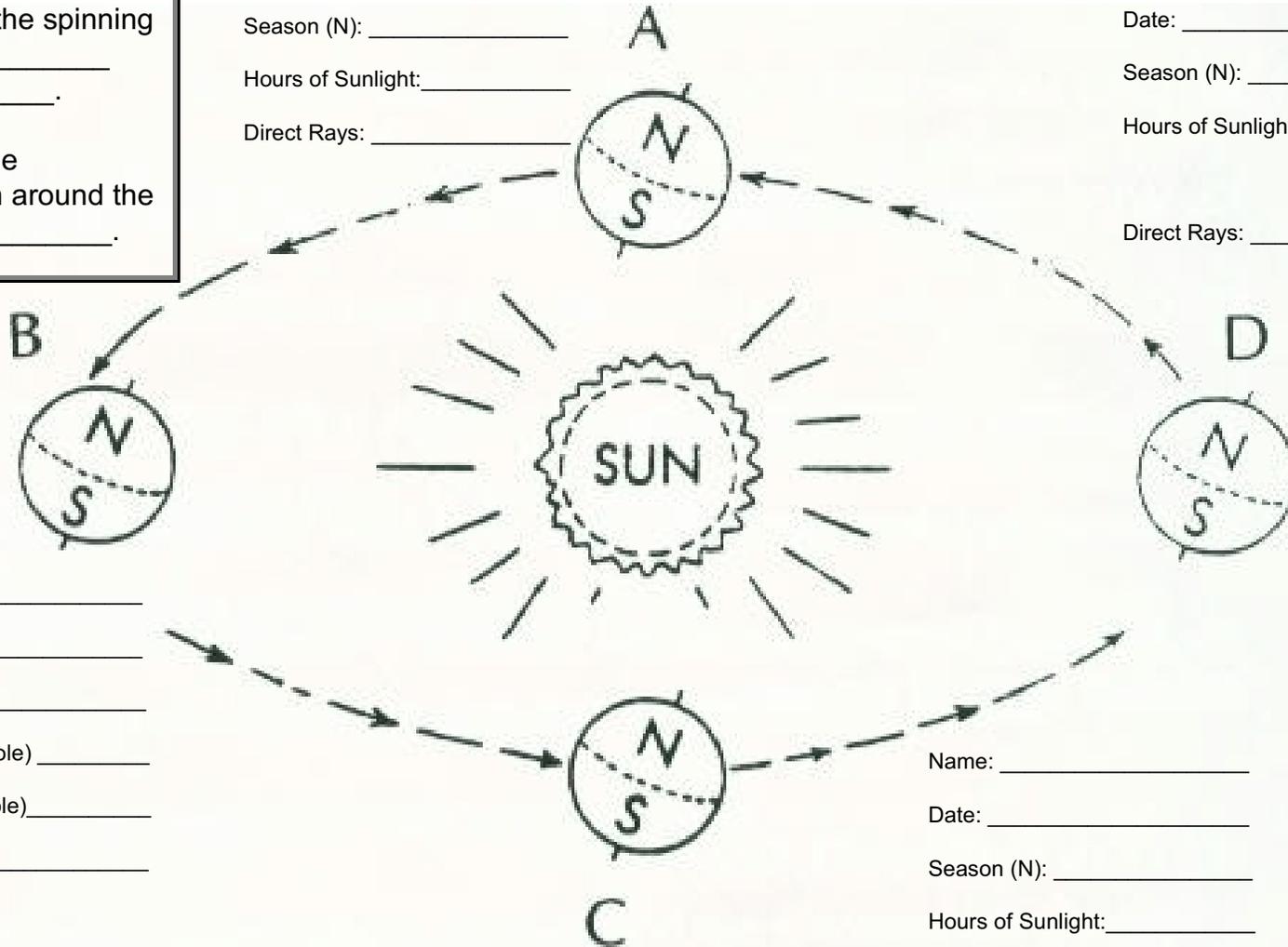
Date: \_\_\_\_\_

Season (N): \_\_\_\_\_

Hours of Sunlight: (N. Pole) \_\_\_\_\_

(S. Pole) \_\_\_\_\_

Direct Rays: \_\_\_\_\_



Name: \_\_\_\_\_

Date: \_\_\_\_\_

Season (N): \_\_\_\_\_

Hours of Sunlight: (N. Pole) \_\_\_\_\_

(S. Pole) \_\_\_\_\_

Direct Rays: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Season (N): \_\_\_\_\_

Hours of Sunlight: \_\_\_\_\_

Direct Rays: \_\_\_\_\_

## Geoclock Simulation

Name \_\_\_\_\_

Geoclock is a computer simulation to show the sunlight and shadow on the earth throughout the year. One half of the earth is always in sunlight and one half in shadow, but because the earth is tilted, the hours of sunlight and angle of sunlight a place receives is not the same. You may download a shareware version of the program to complete the activity by going to <http://home.att.net/~geoclock/>

### DIRECTIONS:

**Step 1:** Double click of the Geoclock icon. What you now see is a Mercator Projection of the earth with light and shadow.

**Step 2:** On the top of the screen, click on the “controls” menu. Select “time control.” Type in “.01” under **hours/cycle**. Next put in the date 9/21/08. Click ok.

**Step 3:** Click on Greenland to change the map to a polar projection.

**#1 Question:** On 9/21/08 about how much of the Arctic Circle was in light and dark? \_\_\_\_\_

**Step 4:** On the top of the screen, click on “maps.” Select “map list.” Click on map of the South Pole.

**#2 Question:** On 9/21/08 approximately how much of the Antarctic Circle was light and dark? \_\_\_\_\_

**Step 5:** Click “maps” at the top of the screen. Select “world.” Locate the small sun icon moving across the screen (make sure that the computer is still within a day or two of 9/21/08).

**#3 Question:** On 9/21/08 over what line did the sun icon appear to travel? \_\_\_\_\_

**Step 6:** Click on Greenland. Click on the “controls” menu at the top of the screen. Select “time control.” Now enter the 12/21/08. Click ok.

**#4 Question:** On 12/21/08 how much of the Arctic Circle will be in light? \_\_\_\_\_

**Step 7:** Repeat Steps 4 and 5 replace the date with 12/21/08.

**#5 Question:** On 12/21/08 approximately how much of the Antarctic Circle will be light? \_\_\_\_\_

**#6 Question:** On 12/21/08 over what line will the sun icon appear to travel? \_\_\_\_\_

**Step 8:** Click on Greenland. Click on the “controls” menu at the top of the screen. Select “time control.” Now enter the 03/21/09. Click ok.

**#7 Question:** On 03/21/09 how much of the Arctic Circle will be in light and dark? \_\_\_\_\_

**Step 9:** Repeat Steps 4 and 5 replace the date with 03/21/09.

**#8 Question:** On 03/21/09 how much of the Antarctic Circle will be in light and dark? \_\_\_\_\_

**#9 Question:** On 03/21/09 over what line will the sun icon appear to travel? \_\_\_\_\_

**Step 10:** Click on Greenland. Click on the “controls” menu at the top of the screen. Select “time control.” Now enter the 06/21/09. Click ok.

**#10 Question:** On 06/21/09 how much of the Arctic Circle will be in light? \_\_\_\_\_

**Step 11:** Repeat Steps 4 and 5 replace the date with 06/21/09.

**#11 Question:** On 06/21/09 how much of the Antarctic Circle will be in light? \_\_\_\_\_

**#12 Question:** On 06/21/09 over what line will the sun icon appear to travel? \_\_\_\_\_

**Step 12:** Click on “maps” at the top of the screen. Select “map list” and click on map “N America.” Watch the darkness and light sweep across the area.

**Step 13:** Change the time control under “controls” to 24 hours/cycle.

**#13 Question:** Why do the hours of sunlight and angle of shadow change throughout the year? (Hint: answer is in the opening paragraph of this assignment) \_\_\_\_\_

**#14 Question:** The Geoclock simulation shows the shadow moving across the earth. What is really moving? \_\_\_\_\_

**Step 14:** If time allows, you may experiment by looking at different settings.