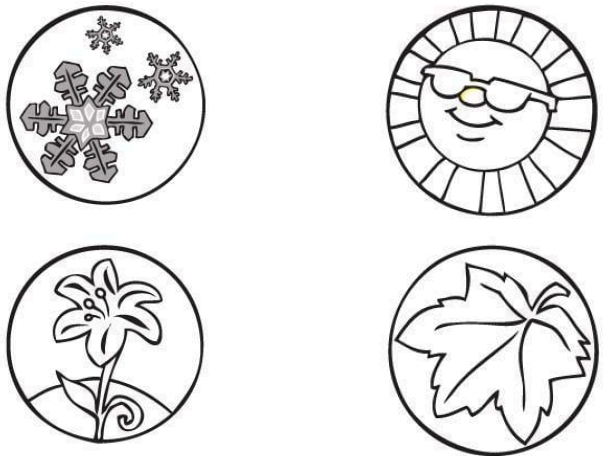
Changes in the Year

Engage
Materials: colored pencils
What To Do:
1. Look at the four pictures below.
2. Determine what they represent.
3. Color the one you like the best.



4. What do the circles represent? _____
5. Which is your favorite? _____
6. Circle the statement below that best explains why the Earth has seasons.

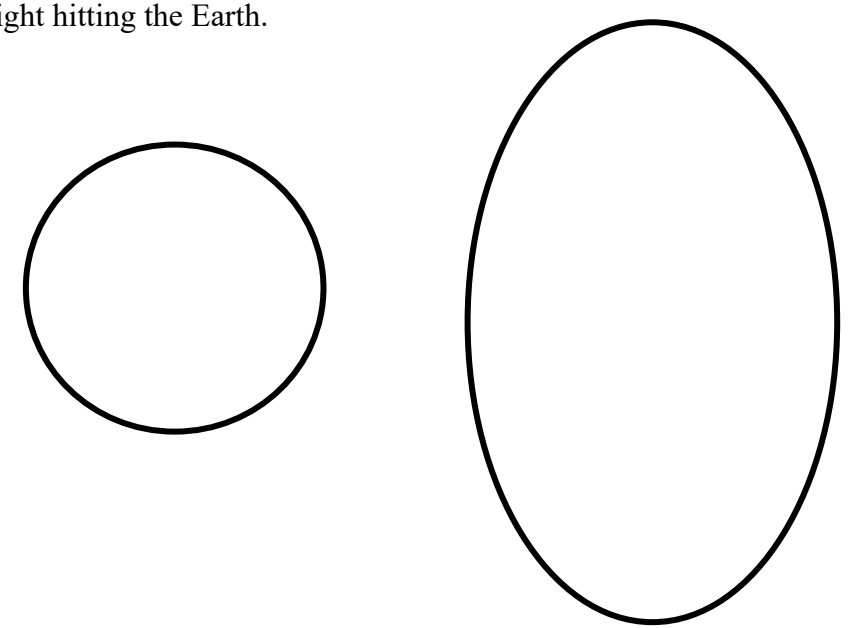
1. The Earth has seasons because during the winter the Earth is very far from the Sun.

OR

2. The Earth has seasons because the Earth's axis is tilted and sometimes one hemisphere leans closer to the Sun.

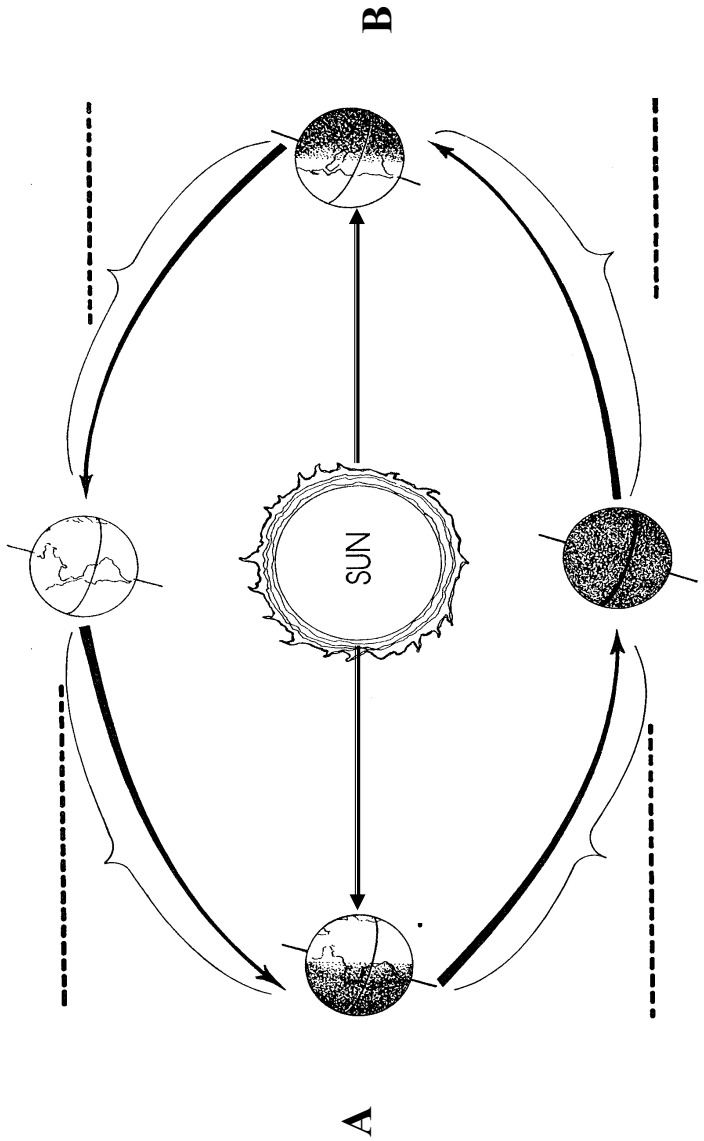
Explore
Materials: Teacher demo - Flashlight, projection screen

What To Do:
1. Observe as your teacher demonstrates perpendicular rays of light using a flashlight on the screen.
2. In the diagram below label the shape that shows direct rays of light hitting the Earth.
3. Observe as your teacher demonstrates slanted rays of light using a flashlight on the screen.
4. In the diagram below label the shape that shows slanted rays of light hitting the Earth.



Questions:
1. If you were standing in the circles with the flashlight as the sun, which do you think would be hotter? _____
2. If you were standing the circles with the flashlight as the sun, which do you think would be cooler? _____
3. Why do you think this might be true? _____
_____

Work with your teacher to label the diagram below following the directions on the next page.



What To Do:

1. The arrows show the direct rays of the sun for figures A and B.
2. On those arrow lines write **DIRECT RAYS**.
3. What hemisphere are the direct rays closest to A pointing to?_____
4. With the direct rays of the sun pointing to that hemisphere, what season would it be? _____
5. What type of rays are falling in the other hemisphere?

_____

6. What season would it be in that hemisphere?

_____(Hint: the opposite)

7.What hemisphere are the direct rays closest to B pointing to?

_____

8. With the direct rays of the sun pointing to that hemisphere, what season would it be? _____
9. What type of rays are falling in the other hemisphere?

_____

10. What season would it be in that hemisphere?

_____(Hint: the opposite)

11. Start at A and follow the curved arrows. Label the first dotted line Summer, then continue with the rest of the dotted lines.
12. Color the Sun and the rest of the pictures.

Don't Glue until your teacher tells you to.

The Reasons for Seasons

Explain

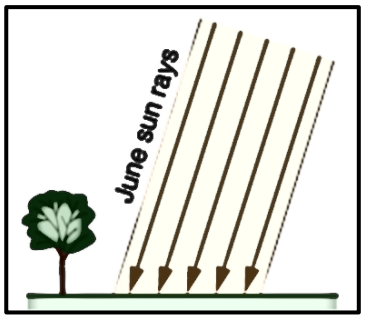
Seasons

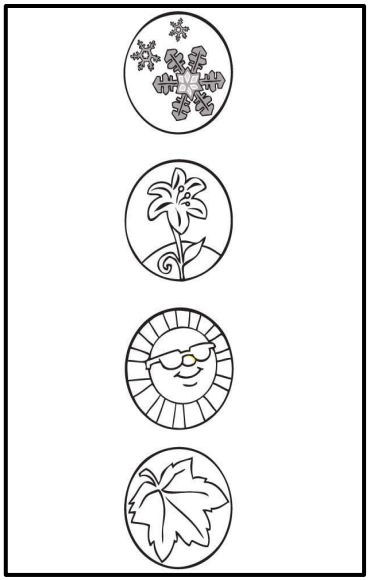
Direct Rays

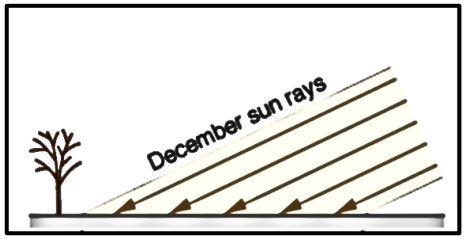
Slanted Rays

Work with your teacher to define the words on the previous page.

Glue the following images to the back of the flap.



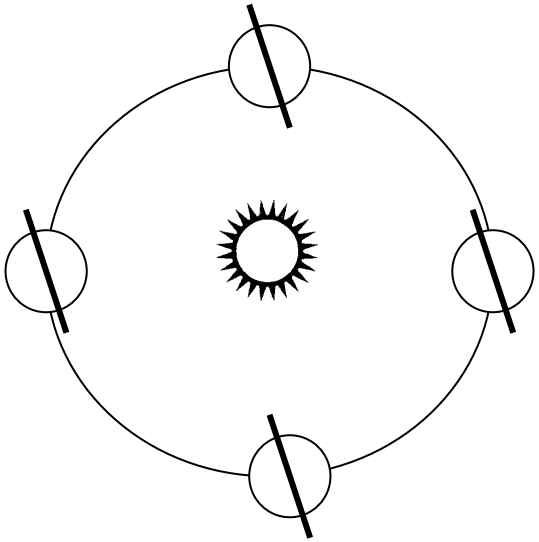




Elaborate

The diagram below is a model of Earth.

1. Draw the equator on each planet in the diagram.
2. Label the Northern and Southern Hemispheres on one planet.
3. Label the axis on one planet.
4. Draw where the direct rays of the sun will hit the earth in each position of the planet.
5. Label the seasons in the northern hemisphere. (spring, summer, fall and winter)



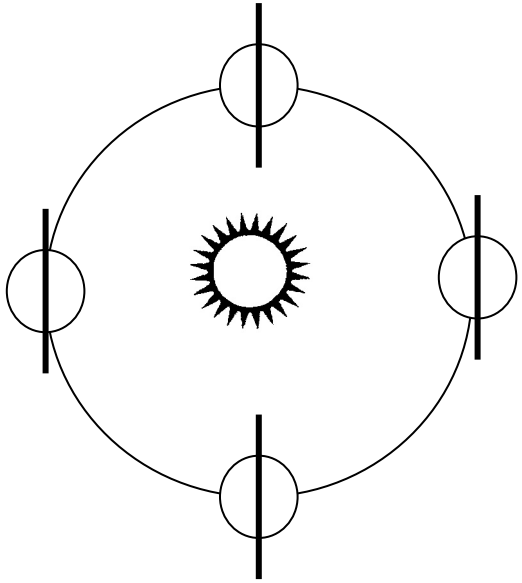
Questions:

1. Where do the direct rays of the sun hit when we are having summer? _____
2. Where do the direct rays of the sun hit when we are having winter? _____
3. When it is summer in the Northern Hemisphere what season is it in the Southern Hemisphere? _____
4. When it is winter in the Northern Hemisphere what season is it in the Southern Hemisphere? _____
5. Why do the Northern and Southern Hemispheres have different seasons at the same time of the year?

_____

The diagram below is a model of Mercury.

1. Draw the equator on each planet in the diagram.
2. Label the Northern and Southern Hemispheres on one planet.
3. Label the axis on one planet.
4. Draw where the direct rays of the sun will hit Mercury in each position of the planet.



Questions:

1. Where do the direct rays of the sun always hit Mercury?

_____

2. Does Mercury have different seasons? _____
3. Why is this so? _____

Watch the video "What if Earth Loses Its Tilt?" at https://www.youtube.com/watch?v=evyPuMRxgyA
Write ways the Earth will change from the video in the space below.

_____

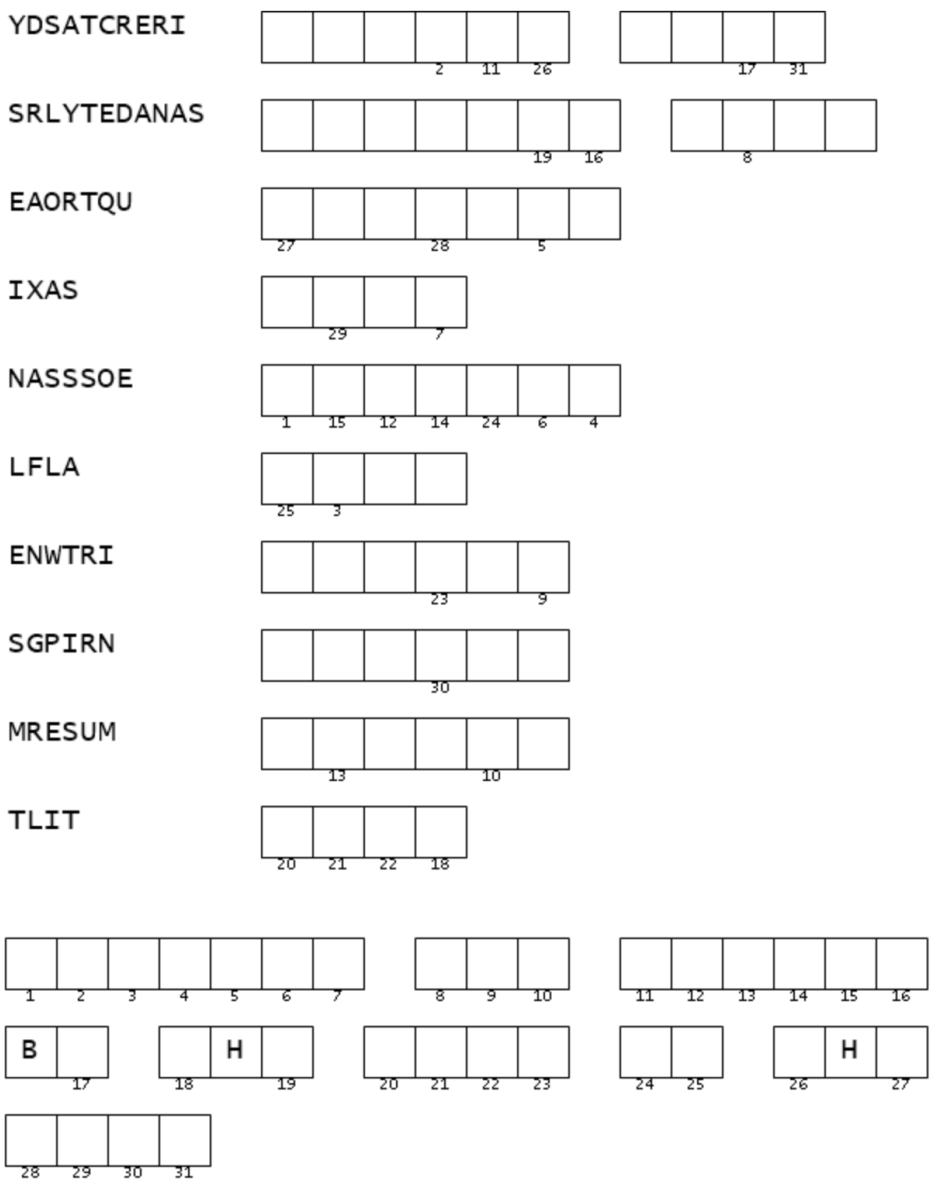
_____

_____

_____

_____

The Reasons for Seasons



Evaluate

Name _____ period _____

EXIT TICKET

Changes in the Year

1. If the Earth lost its tilt –

   A. we would have eight different seasons.
   B. we would have no seasons.
   C. the seasons would stay the same as now.

2. What season happens in the Northern Hemisphere when it has direct rays shining on it?

   A. Winter
   B. Summer
   C. Fall

3. What season happens in the Southern Hemisphere when it has direct rays shining on it?

   A. Winter
   B. Summer
   C. Fall

4. The main cause of the change of the seasons is –

   A. The rotation of the Earth on its axis
   B. The tilt of the Earth's axis
   C. The amount of energy the Sun releases

5. What is the imaginary line that divides the Earth into Northern and Southern Hemispheres called?

   A. axis
   B. Tropic of Cancer
   C. Equator