Name _____ Homeroom _____

Science Quiz

Day/Night, Sun's Energy, Seasons

September 24, 2012

1. The winter solstice occurs on either December 21 or 22, depending on the year. Which of the following statements **best** explains why the time of the year the winter solstice occurs has the least amount of daylight in Massachusetts?
   a. Earth is farthest away from the Sun on the winter solstice.
   b. Earth's rotational speed on its axis is greatest on the winter solstice.
   c. Earth is traveling around the Sun with the greatest speed on the winter solstice.
   d. Earth's Northern Hemisphere is tilted away from the Sun on the winter solstice.

2. The diagram below shows the relative positions of Earth and the Sun at a certain time of the year.

Based on the diagram, which season is occurring in the Southern Hemisphere of Earth?

Summer is occurring in the Southern Hemisphere. Because the South Pole is tilted towards the sun, more of the Southern Hemisphere is receiving the sun's energy, making it summer.

3. Which of the following statements **best** explains why it is warmer at the equator than at the North Pole?
    a. The equator has a larger area than the North Pole.
    b. The equator is closer to the Sun than the North Pole.
    c. The equator receives more direct sunlight than the North Pole.
    d. The equator has more hours of daylight per year than the North Pole.

4. Which of the following statements **best** explains why the tilt of Earth on its axis causes summer to be warmer than winter in the Northern Hemisphere?
    a. The warm ocean currents flow from the tropics to the Northern Hemisphere in the summer.
    b. The rays of the Sun strike the Northern Hemisphere more directly.
    c. The greenhouse effect increase in the Northern Hemisphere in the summer.
    d. The Northern Hemisphere is closer to the Sun in the summer.

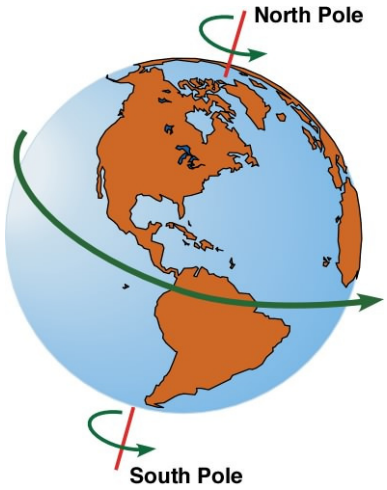
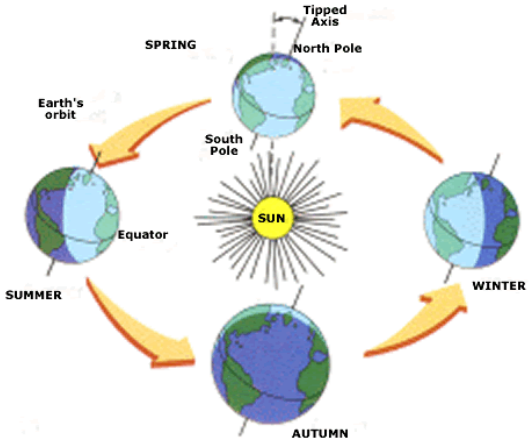
5. When the Sun is directly overhead at the equator, both hemispheres receive the same amount of the Sun's energy. Tell the name we give to this day.

    Equinox

6. Tell how solstices are related to the seasons.

    The solstices mark the beginnings of two of the seasons (winter & summer) and the end of two others (spring & fall).

7. Fact: Earth moves through space in two major ways.
   In the boxes below, create a drawing that illustrates <u>each</u> of the <u>two ways</u> Earth moves through space. Be sure to label the pictures.

Drawing:	Drawing:
	
Label: Rotation	Label: Revolution

8. When a hemisphere experiences winter, tell what happens to the Sun's energy hitting the surface of the hemisphere.

   During the winter, the Sun's energy hits the surface at a low angle. This causes the energy to be less direct & spread out over a larger area, resulting in less heating.

9. When a hemisphere experiences winter, tell about the Sun's position in the sky, particularly at local noon (local noon is the time when the Sun stops rising and begins to set; it is NOT 12:00pm)

   In the winter, at local noon, the sun's position is low in the sky.

10. When a hemisphere experiences winter, which way is that hemisphere's pole pointing – towards the Sun, away from the Sun, or neither towards nor away from the Sun?

The hemisphere's pole is pointing away from the sun during the winter. For example, the Northern Hemisphere's pole (the North Pole) points away from the sun when it's winter in the Northern Hemisphere.

11. Tell how equinoxes are related to the seasons.

Equinoxes mark the beginning of two seasons (spring & fall) and the conclusion of two seasons (winter & summer).

12. Facts: Mars rotates on its axis.
Mars's axis is currently tilted at about 25°, very close to Earth's 23.5° tilt.
Mars revolves around the Sun.
Mars takes twice as long as Earth to orbit the Sun.
Mars is further away from the Sun than the Earth is.

Question: Based on these facts, does Mars have seasons? Support your answer with reasons.

Yes. Seasons are caused by uneven heating of a planet's surface due to a tilted axis as it revolves around the Sun. Mars' axis is tilted (like Earth) and it does revolve around the Sun (like Earth), so it must have seasons.

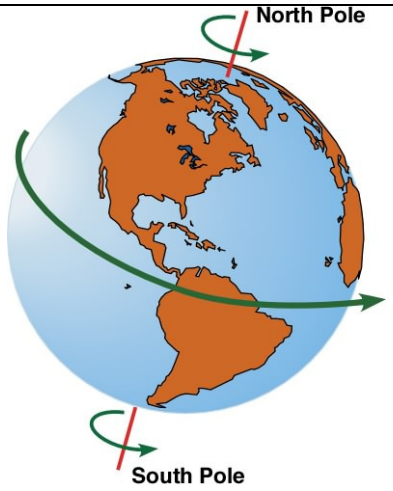
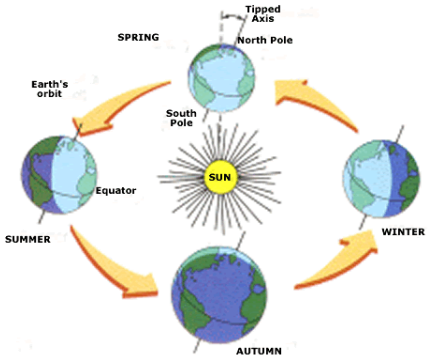
Name _____ September 21, 2010

Science Quiz – Day/Night, Seasons, Solstice, Equinox

Fact: Earth moves through space in two major ways.

1. Identify the two ways in the boxes below.

2. Make a drawing that illustrates each of the two ways Earth moves through space.

Identify Here ⇒	Rotation	Revolution
Draw Here ⇒		

3. Explain what it means for a hemisphere to experience "winter".

For a hemisphere to experience "winter", that hemisphere's pole has to point away from the Sun. The Sun's energy is less direct on the hemisphere – it will be spread out over a larger area, resulting in less heating. The noon Sun will be low in the sky, not very far off the horizon, which creates long nights and short days.

4. In which direction was the Earth's axis pointed at the time of this photograph in Lowell, MA (a lot of snow had just fallen):

The North Pole is facing away from the Sun (MA is in the N. Hemisphere, and this picture is taken in the winter).

For numbers 5 – 10, use the word bank to fill in the blanks

Word Bank

axis	rotation	revolution	orbit	day	night

5. The path that the Earth (and other planets) take when moving around the sun is called a/an _____orbit_____.

6. ___Rotation_____ is the spinning of the Earth on its axis.

7. __Night_____ is when your part of the Earth faces away from the Sun.

8. The imaginary line that passes through the Earth's center and the North & South Poles is the Earth's ___axis_____.

9. __Revolution_____ is the movement of one object around another.

10. __Day_____ is what you call the period of time when your part of the Earth faces the Sun.

11. Which direction does the Earth rotate? Circle one:

East to West West to East

12. How are solstices and equinoxes related to the seasons?

They mark the beginnings & ends of the seasons. Solstices mark the beginning of winter & summer; equinoxes mark the beginning of spring & fall.

13. How would the seasons be different if Earth were not tilted on its axis?

If there Earth were not tilted on its axis, there would be no change in the seasons.

14. Which of the following statements best explains why it is warmer at the equator than at the North Pole?

A. The equator has a larger area than the North Pole.

B. The equator is closer to the Sun than the North Pole.

C. The equator receives more direct sunlight than the North Pole.

D. The equator has more hours of daylight per year than the North Pole.

A tall man and a short man sat next to a woman at the subway. One man was heading to the town of Liars and the other to Truthsayers. The woman asked them “Where are you from?” The short man mumbled something she couldn’t understand. The tall man said: “He is not from Liars. I am also not from Liars.”

Who is from Liars?

REMEMBER: Anyone from Liars always tells a lie, and anyone from Truthsayers always tells the truth.

A man from either town will say "I am not from Liars"
(either truthfully or as a lie, depending on which town they are from).

But if we know that one man is from each town, they cannot both be
"not from liars", so the man speaking must be lying.

The tall man is the Liar, and the short man spoke the (mumble) truth.

SCORING RUBRIC FOR WRITTTEN RESPONSES

4	The response demonstrates a thorough understanding of the topic. The response provides accurate and specific evidence that supports the answer to the question.
3	The response demonstrates a general understanding of the topic. The response provides accurate and specific evidence that supports the answer to the question.
2	The response demonstrates a limited understanding of the topic. The response does not provide accurate or specific evidence that supports the answer to the question.
1	The response demonstrates a minimal understanding of the topic. The response provides inaccurate and non-specific evidence that supports the answer to the question.