

Name/Date:

Geography 12

1C: Earth, Our Planet and Home



Mars Space Rover. Source: NASA Planetary Photojournal:
<http://photojournal.jpl.nasa.gov/catalog/PIA03240>

Summary

Astronomy is important to geography as the position of the earth in space is a factor in determining solar energy input and seasonal variations. This, in turn, affects weather & climate, and productivity in the biosphere. The origins of the earth are also important as they relate to geology and the lithosphere (earth history), and of course the connection to the questions we ask about human history and our purpose on earth. "Origins" to science, belief, and human imagination.

References

- Unit 1 Topic 1 and 2 in Vanzant, P. et al (2010). This Earth: Physical Geography and the Environment. Toronto: Emond Montgomery
- Chapter 2-3 in Birchall, G., McCutcheon, J. (1993). Planet Earth: A Physical Geography. Toronto: John Wiley & Sons
- Chapter 1-2 in Smythe, J., Brown, C., Fors, E., Lord, R. (1980). Physical Geography. Toronto: Gage
- Various vocab in Whittow, J. (1984). Dictionary of physical geography. London: Penguin Books

Weblinks

Oh boy... search anywhere for good stuff on the solar system, planet, meteors, etc. Good starting points are the Nasa group of sites starting at <http://www.nasa.gov/home/> or Nova's Space site at http://www.pbs.org/wgbh/nova/archive/int_spac.html

Thinking about our Origins - Activity

Read or listen to the Ojibway creation story on p. 12 of This Earth. Compare this to your own understanding of how the universe, our planet, and our species came into being. In a few words, what is your understanding of how it all came to be?

Here are some interactive websites that get into the "Origin" stories of other cultures:

Source: http://www.mythicjourneys.org/bigmyth/myths/english/2_chinese_full.htm

Source: http://www.mythicjourneys.org/bigmyth/myths/english/2_norse_full.htm

Questions from This Earth p. 13-20

Vocabulary

1. Big Bang Theory

2. (planetary) accretion

Concepts

3. Provide a brief definition or explanation of the Nebular Hypothesis

Reflect

4. What two possibilities does the big Bang Theory suggest for the future of the universe? What limits the ability of scientists to be certain about the future of the universe?

5. Identify two ways that the Moon influences Earth.

Planetary Motion

Planetary Motion is important to Geographers as it sets up seasonal variations in solar energy, climate, and daily changes. The ultimate effects of the earth's motion cascades down to travel routes, architecture, and fashion trends (think about the influence of climate on vacations spots, building styles, and clothing). The terms used here will help us put climate maps and energy budgets into perspective. The cycles of the earth have also been at the heart of ancient cultures.



Tourists and "druids" at Stonehenge for Winter Solstice
Source: <http://www.greydragon.org/trips/Solstice2004-2/>

Vocabulary (use a simple diagram if it helps — a teacher presentation goes long with this)

6. revolution (of the earth)

7. equinox

8. solstice

9. precession (of the equinox)

10. eccentricity (of orbit)

11. axis (of the earth)

12. rotation (of the earth)

13. time zone

14. Coriolis Effect (or force)

Questions on the vocab:

15. Which three factors do you think determine the amount of solar energy received by the earth?

16. Which do you think has the greatest impact on seasonal variations?

17. Which of these factors experiences “wobble?”

Read This Earth p. 22-24 and answer the following question

18. Why does Earth’s moon lack an atmosphere?

Read This Earth p. 25-26 and answer the following question

19. Which piece of evidence to support the Asteroid-Impact Hypothesis do you find most convincing? Justify your choice.

Cage Match: Earth vs Mars

Earth	Characteristic	Mars
149 597 870 km	Distance from the Sun	227 940 000 km
-88 °C	Minimum surface temperature	-87 °C
58 °C	Maximum surface temperature	-5 °C
12 756 km	Diameter at Equator	6794 km
23 h 56 min	Time for full rotation per day	24 h 37 min
365.2 Earth days	Period of orbit around the Sun	686.98 Earth days
23.5 degrees	Tilt of axis	25 degrees
9.80 m/s ²	Acceleration due to gravity	3.71 m/s ²
Luna (Moon)	Satellites	Phobos, Deimos
11.19 km/s	Escape velocity	5.03 km/s
78% nitrogen 21% oxygen	Composition of atmosphere	96% carbon dioxide 2.7% nitrogen 1.6% argon
Yes	Presence of liquid water	No
H ₂ O ice	Composition of polar caps	CO ₂ ice
Land: blue and green Sky: blue	Physical appearance	Land: orange/red Sky: pink/orange
Basalt and granite	Surface materials	Silicon and iron
148 000 000 km ²	Area of land surface	144 000 000 km ²
Mt. Everest (8848 m)	Highest elevation	Olympus Mons (27 000 m)
Mariana Trench 11 km below sea level	Lowest elevation	Hellas basin 4 km below surface
Yes	Presence of life	Unknown

20. Which planet:
- a) is larger?
 - b) is colder?
 - c) has the most moons?
 - d) has seasons?
 - e) has ice?

21. Compare and contrast the climate, atmosphere, and calendar of the two planets.

Planet	Climate	Atmosphere	Calendar
Earth			
Mars			

22 Why is human life possible on Earth but not on Mars? Describe two specific characteristics to explain your response.

23. In note form, describe what you would see and experience if you were an astronaut standing on the surface of Mars.

24. Class Discussion: think about these items before we talk about it.

Many scientists believe that of all the planets in the solar system, Mars is the best candidate for colonization. Based on what you have learned about the extreme environment on Mars, think about the costs and benefits related to the issue of colonizing Mars. Consider the following questions in formulating your ideas:

- What basic data would be needed to plan a mission to Mars?
- What might be the consequences for Earth if a colony existed on Mars?
- What would need to be done to turn Mars into a habitable planet?
- Should we send people to establish a colony on Mars? Why or why not?

Space for diagrams, doodles, and diversions.