

Assignment example

[Science](#), [Physics](#)



GO 130 Unit HW: Seasons - Chapter 2 A common misconception is that Earth's seasons are caused because Earth's orbit is an ellipse: when our orbit takes us close to the sun, we experience summer; when our orbit takes us far from the sun, we experience winter. The questions below show why this can't possibly be the case. (Our orbit is an ellipse, but its eccentricity is so slight it doesn't cause our seasons.)

a. [5 pts] In December, when it's cold here, what is it like in Australia?

Hot

b. [5 pts] On what date is the Earth closest to the sun (also known as perihelion)?

January 3rd every year

c. [5 pts] On what date is the Earth farthest from the sun (also known as aphelion)?

July 4th every year

2. Earth's seasons are actually a result of its axial tilt.

a. [5 pts] Does the sun reach an altitude of 90° every day for people who live on the equator?

Yes

b. [5 pts] What is the sun's maximum possible altitude for people that live in the tropics, i. e. that live between the Tropic of Cancer and Tropic of Capricorn?

23. 5°

c. [5 pts] What is the sun's maximum possible altitude for people that live at the Poles?

90 $^\circ$

[10 pts] Why is the sun never directly overhead (at zenith, 90° altitude) in Parkville, Missouri?

Parkville is at latitude 39°N , which means that it lies between the Arctic Circle 66.5°N and the Tropic of Cancer at 23.5°N . Scientifically, the sun directly overheads at zenith 90° the regions along the Tropic of Cancer, the Equator and the Tropic of Capricorn. The location of Parkville avoids it from direct sun's overhead.

d. [10 pts] On the back of this sheet, draw a diagram showing the titled Earth during the winter solstice. Mark the Equator, Tropic of Cancer, Tropic of Capricorn, and Parkville which is at 39°N latitude; then add the sun's incoming parallel rays. Show where on Earth the sun reaches zenith during the winter solstice.

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3. [30 pts] In the table below, fill in the altitude (i. e. the angle above the horizon) of the sun when it crossed the meridian (maximum altitude, around noon) for the different times of the year. (An altitude of 0° means on the horizon. An altitude of 90° means straight overhead, i. e. at zenith. Altitudes 90° are not possible.) Use a value of 23.5° for the axial tilt of the Earth.

Meridian Altitude of the Sun at Different Latitudes at Different Times

North Pole 90°N

Arctic Circle 66.5°N

Park U. 39°N

Tropic of Cancer 23. 5°N

Equator 0

Tropic of Capricorn 23. 5°S

Antarctic Circle 66. 5°S

South Pole 90°S

Vernal equinox (20 March)

-90°

-66. 5°

-39°

-23. 5°

90°

23. 5°

66. 5°

0°

Summer solstice (21 June)

23. 5°

90°

39°

90°

0°

-90°

-66. 5°

-23. 5°

Autumnal equinox (23 Sept.)

0°

66.5°

39°

23.5°

90°

-23.5°

-66.5

-90°

Winter solstice (21 Dec.)

23.5°

-66.5°

-39°

-90°

0°

90°

66.5°

23.5°

4. So, why do we have seasons?

a. [5 pts] In Parkville, MO, how many daylight hours will we get on June 21st, 2015?

17HRS

b. [5 pts] In Parkville, MO, how many daylight hours will we get on December 21st, 2015? 7HRs

c. [5 pts] How high will the sun get in the sky on June 21st, 2015?

39°

d. [5 pts] How high will the sun get in the sky on December 21st, 2015?

-39°

GO 130 Units 1 HW: Earth Sun Moon - Chapter 3

1. [20 pts] In the table below, fill in the approximate time when the different moon phases are seen at the various locations. Choose from the following four answer choices: 12 PM (noon), 6PM (sunset), 12AM (midnight), 6 AM (sunrise). (Hint: Check out Figure 3. 2 of your textbook.)

Times the Moon is in a Particular Phase at a Particular Location

Eastern Horizon

(The moon is rising)

On the Meridian

(Highest in the sky)

Western Horizon

(The moon is setting)

New Moon

6AM (sunrise)

12PM (noon)

6PM (sunset)

First Quarter

12PM (noon)

6PM (sunset)

12AM (midnight)

Full Moon

6PM (sunset)

12AM (midnight)

6AM (sunrise)

Third quarter

12AM (midnight)

6AM (sunrise)

12PM (noon)

a. [5 pts] At approximately what time (12 PM (noon), 6 PM (sunset), 12 AM (midnight), or 6 AM (sunrise)) does the third quarter moon set?

12PM (noon)

b. [5 pts] what phase is the moon in if it sets at 9 PM?

Evening crescent

c. [5 pts] approximately what time is it (12 PM (noon), 6 PM (sunset), 12 AM (midnight), or 6 AM

(Sunrise)) if the new moon is rising?

6AM (sunrise)

2. In the 22nd century, you move to Lunar One Colony and notice you can see the Earth out of your bedroom window as you go to bed your first night there.

a. [5 pts] is the Earth in the sky as seen from the Moon larger, smaller or the same size as the Moon in the sky, as seen from the Earth?

Larger

b. [10 pts] over the course of the next 29 days, how will the altitude of the Earth (its angle above the horizon) change?

The altitude of the Earth above the horizon will reduce.

c. [10 pts] over the course of the next 29 days, how will the appearance of the Earth change?

The Earth will appear closer to the moon.

d. [5 pts] Compared to the sun in the sky when you lived on Earth, is the sun in the sky that you see from the moon larger smaller or the same size?

Larger

e. [5 pts] While living in your new lunar home, you enjoy your first sunrise.

How long must you wait to see your first sunset?

After 2 weeks

f. [15 pts] After living on the moon a few months, the Sun, Earth, and Moon are in alignment for what Earthlings call a lunar eclipse. When you look up at the Earth, what do you see? On the back, draw a diagram of this alignment.

One will see the Earth blocks some parts of the sun. In fact the visible part of the Earth will be dark.

Sun Earth Moon

g. [15 pts] several more months later, the Sun, Earth, and Moon are in alignment for what Earthlings call a solar eclipse. When you look up at the Earth, what do you see? On the back, draw a diagram of this alignment.

One will see both North and South Poles of the Earth. Only areas near the poles will be bright as the intermediate part remains darker due to moon's shade.

Sun Moon Earth (Noon