ACT SCIENCE PRACTICE PAPER

Question: 1

Scientists studied a species of termite and looked at their foraging habitats across the United States. The termite's population in a given tree was measured by the level of decomposition within a tree, due to the termites eating the bark. The experiment also kept track of the level of shade tolerance for each species of tree. For the species of trees in this experiment, shade tolerance fell into two main categorizes- shade tolerant (ST) and intermediate shade (IS). Lastly, they recorded the average amount of rainfall in that given month for the species location being observed. The chart below summarizes the data. Scientists hypothesized that the level of decomposition would be highest in tree species with a higher average rainfall. In addition, they hypothesized that the trees allowing more shade would allow for more termites and, in turn, more decomposition.

	Tsuga canadensis	*Morus rubra*	*Pinus strobus*	*Acer rubrum*	*Arbutus menziesii*	*Quercus lobata*	*Juniperus scopulorum*
Decomposition (*in ccm*)	2.38	3.21	1.01	.970	2.89	1.31	4.03
Shade tolerance	ST	ST	IS	IS	ST	IS	ST
Average rainfall	47.27	50.89	43.26	41.65	46.87	44.98	52.75

1. The relationship between average rainfall and the quantity of termites in a certain tree species is that _____

select

None of the answer choices listed

select

higher rates of rainfall accompany lower quantities of termites.

select

quantities of termites stay the same regardless of rainfall rates.

select

lower rates of rainfall accompany greater quantities of termites.

select

higher rates of rainfall accompany greater quantities of termites.

Question: 2

Scientists studied a species of termite and looked at their foraging habitats across the United States. The termite's population in a given tree was measured by the level of decomposition within a tree, due to the termites eating the bark. The experiment also kept track of the level of shade tolerance for each species of tree. For the species of trees in this experiment, shade tolerance fell into two main categorizes- shade tolerant (ST) and intermediate shade (IS). Lastly, they recorded the average amount of rainfall in that given month for the species location being observed. The chart below summarizes the data. Scientists hypothesized that the level of decomposition would be highest in tree species with a higher average rainfall. In addition, they hypothesized that the trees allowing more shade would allow for more termites and, in turn, more decomposition.

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Decomposition (*in ccm*)	2.38	3.21	1.01	.970	2.89	1.31	4.03
Shade tolerance	ST	ST	IS	IS	ST	IS	ST
Average rainfall	47.27	50.89	43.26	41.65	46.87	44.98	52.75

2. What is the relationship between shade tolerance and the level of decomposition?

select

There is not a consistent relationship between shade tolerance and decomposition levels within the tree species studied.

select

Tree species with higher shade tolerance have lower levels of decomposition.

select

The level of decomposition stays the same regardless of shade tolerance.

select

Tree species with less shade tolerance have higher levels of decomposition.

select

Tree species with higher shade tolerance have higher levels of decomposition.

Question: 3

A scientific experiment is conducted to test if calcium can affect gene regulation. Scientists hypothesize that high levels of calcium would interact with the proteins Cs3 and Gfy, which would increase the transcription of genes F4597 and BC392. The experiment procedure is summarized below.

1. Isolate the genes F4597 and BC392.
2. Create a vector within yeast cells containing the two genes
3. Culture yeast cells
4. Grow yeast cells in different growth mediums—one medium lacking calcium (plate A), and one medium with supplemented calcium (plate B)

3. According to the experiment, what data results would support the hypothesis?

select
Plate B shows increased F4597 and BC392 gene activity.

select
Neither Plate A nor Plate B show F4597 and BC392 gene activity.

select
Both Plate A and Plate B show equal F4597 and BC392 gene activity.

select
Plate A shows increased F4597 and BC392 gene activity.

select
Plate A shows decreased F4597 and BC392 gene activity.

Question: 4

Sleep plays a vital role in defining the daily activities of virtually all animals. During periods of sleep, the parasympathetic nervous system becomes active and induces a relaxed state in response to increased levels of the hormone melatonin. Despite its ubiquity in the animal kingdom, the purpose of sleep and its role in our daily lives has been disputed by scientists. Two scientists discuss their theories about the purpose of sleep.

Scientist 1

During periods of sleep, animals are able to conserve energy that they would otherwise be spending on unnecessary activity. If an animal's primary food source is most abundant during daylight, it is a waste of precious energy to be moving about at night. For example, many herbivores, such as squirrels, are *diurnal* (sleep during the night) because their food source is available during the day, while many insectivores, such as bats, are *nocturnal* (sleep during the day) because their food source is available during the night. Food sources, as an animal's most valuable resource, dictate their sleep cycles. Many animal traits observable today evolved as a result of the supply and demand of food in their natural habitat.

Scientist 2

During waking hours, it is true that the body utilizes large amounts of energy; however, the role of sleep is to restore biological products that were utilized during periods of wakefulness, rather than simply to avoid utilizing energy in the first place. Many types of biological molecules, such as hormones, are released throughout the body while an animal is active. Sleep serves as a period of inactivity, during which the body can manufacture and store a supply of these molecules for future use during the next period of activity. Furthermore, sleep allows the body to repair cellular damages that has accumulated during waking hours. Experimental evidence shows that when animals are deprived of sleep, their immune system quickly weakens and death rates increase. Sleep is necessary for animals to prevent accumulation of damage and to regenerate crucial biomolecules for daily life.

4. Scientist 1's theory would be most weakened if which of the following were true?

select

Some herbivores are diurnal, while others are nocturnal.

select

Bees sleep less during spring, when food is abundant.

select

Sharks continue to move constantly while sleeping.

select

Desert animals often spend long periods sleeping during the day.

select

When deprived of sleep, chimpanzees require more food.

Question: 5

Sleep plays a vital role in defining the daily activities of virtually all animals. During periods of sleep, the parasympathetic nervous system becomes active and induces a relaxed state in response to increased levels of the hormone melatonin. Despite its ubiquity in the animal kingdom, the purpose of sleep and its role in our daily lives has been disputed by scientists. Two scientists discuss their theories about the purpose of sleep.

Scientist 1

During periods of sleep, animals are able to conserve energy that they would otherwise be spending on unnecessary activity. If an animal's primary food source is most abundant during daylight, it is a waste of precious energy to be moving about at night. For example, many herbivores, such as squirrels, are *diurnal* (sleep during the night) because their food source is available during the day, while many insectivores, such as bats, are *nocturnal* (sleep during the day) because their food source is available during the night. Food sources, as an animal's most valuable resource, dictate their sleep cycles. Many animal traits observable today evolved as a result of the supply and demand of food in their natural habitat.

Scientist 2

During waking hours, it is true that the body utilizes large amounts of energy; however, the role of sleep is to restore biological products that were utilized during periods of wakefulness, rather than simply to avoid utilizing energy in the first place. Many types of biological molecules, such as hormones, are released throughout the body while an animal is active. Sleep serves as a period of inactivity, during which the body can manufacture and store a supply of these molecules for future use during the next period of activity. Furthermore, sleep allows the body to repair cellular damages that has accumulated during waking hours. Experimental evidence shows that when animals are deprived of sleep, their immune system quickly weakens and death rates increase. Sleep is necessary for animals to prevent accumulation of damage and to regenerate crucial biomolecules for daily life.

5. Scientist 2's theory would be most weakened if which of the following were true?

select

Cows show decreased melatonin at night.

select

Salmon do not require sleep during the mating season.

select

Snakes are diurnal because they are cold blooded.

select

Nocturnal mice have low hormone levels in the morning.

select

Hibernating hedgehogs often become sick soon after waking.

Question: 6

A group of scientists wanted to test the effects of Nitra-Grow, a chemical additive that can be given to plants to help them grow. 3 test groups of plants were given all the same time of sunlight, the same type of soil, and the same amount of water. Plant A was given no extra chemicals. Plant B was given 5g of Nitra-Grow. Plant C was given 5g of Ammonia to see if Nitra-Grow worked any better than a basic nitrogen-based household product. The plants are then measured on 5 consecutive days to find their average height (in cm).

DAY	Height Plant A (cm)	Height Plant B (cm)	Height Plant C (cm)
1	1.2	1.2	1.2
2	1.4	1.4	1.2
3	1.6	1.8	1.3
4	1.8	2.4	1.3
5	2.0	2.6	1.4

6. Suppose that the scientists repeated the experiment with Plant D. Plant D was given 15g of Nitro-Grow and 15g of Ammonia. What would be the expected results?

select

Plant D would perform the best out of all plants.

select

There is not enough information to determine how well the plant will perform.

select

Plant D would perform better than Plant A, but worse than the other two.

select

Plant D would perform better than Plant C, but worse than the other two.

Question: 7

A group of scientists wanted to test the effects of Nitra-Grow, a chemical additive that can be given to plants to help them grow. 3 test groups of plants were given all the same time of sunlight, the same type of soil, and the same amount of water. Plant A was given no extra chemicals. Plant B was given 5g of Nitra-Grow. Plant C was given 5g of Ammonia to see if Nitra-Grow worked any better than a basic nitrogen-based household product. The plants are then measured on 5 consecutive days to find their average height (in cm).

DAY	Height Plant A (cm)	Height Plant B (cm)	Height Plant C (cm)
1	1.2	1.2	1.2
2	1.4	1.4	1.2
3	1.6	1.8	1.3
4	1.8	2.4	1.3
5	2.0	2.6	1.4

7. What is the general relationship between plant height and the amount of days?

select
There is no relationship between time and height of the plants.

select
As the plant height increases, the time increases.

select
As time increases, the plant height increases, then decreases.

select
As the plant height increases, the time decreases.

select
As time increases, the plant height increases.

Question: 8

A group of scientists wanted to test the effects of Nitra-Grow, a chemical additive that can be given to plants to help them grow. 3 test groups of plants were given all the same time of sunlight, the same type of soil, and the same amount of water. Plant A was given no extra chemicals. Plant B was given 5g of Nitra-Grow. Plant C was given 5g of Ammonia to see if Nitra-Grow worked

any better than a basic nitrogen-based household product. The plants are then measured on 5 consecutive days to find their average height (in cm).

DAY	Height Plant A (cm)	Height Plant B (cm)	Height Plant C (cm)
1	1.2	1.2	1.2
2	1.4	1.4	1.2
3	1.6	1.8	1.3
4	1.8	2.4	1.3
5	2.0	2.6	1.4

8. What is the dependent variable?

select

Day of measurement

select

Type of chemical added

select

Type of soil

select

Height of the plant

Question: 9

A scientific experiment is conducted to test if calcium can affect gene regulation. Scientists hypothesize that high levels of calcium would interact with the proteins Cs3 and Gfy, which in turn would increase the transcription of genes F4597 and BC392. The experiment procedure is summarized below.

1. Isolate the genes F4597 and BC392.
2. Create a vector within yeast cells containing the two genes
3. Culture yeast cells
4. Grow yeast cells in different growth mediums—one medium lacking calcium (plate A), and one medium with supplemented calcium (plate B)

9. What could be changed to strengthen the design of the experiment?

select

Having a control plate

select

Looking at just one protein-gene interaction

select

Use another substance instead of calcium as the independent variable

select

Nothing could be changed to strengthen the design experiment.

select

Take out the step looking at protein interaction and focus just on the effects of calcium on the F4597 and BC392 gene activity

Question: 10

The significant increase in atmospheric carbon dioxide since pre-industrial levels can be seen in the world's oceans which absorb the CO_2 and in turn undergo changes in chemistry. The consequences of increased CO_2 include acidification of seawater and a decrease in carbonate ion (CO_3^{2-}) concentration.

Changes in seawater chemistry affect marine organisms. The early life stages of invertebrates, such as squid, may be particularly vulnerable to changes in carbon dioxide levels. Acting as both predator and prey, squid are a significant component of marine ecosystems. For example, fish and sea birds, such as tuna and albatross, are dependent on squid as a source of prey. Furthermore, the fishing industry is impacted by the health of squid populations. California fisheries produce the majority of market squid.

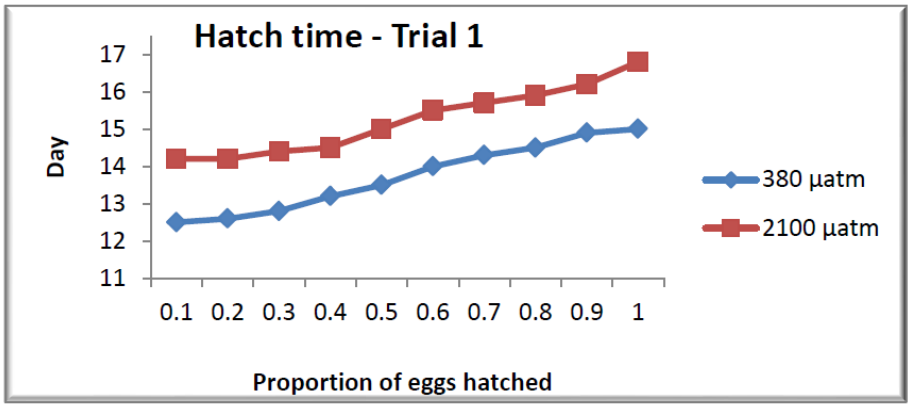
In order to determine how increased levels of carbon dioxide affect the development of squid, eggs were hatched in two different conditions: normal (380 µatm) and elevated (2100 µatm) levels of CO_2. The time to hatch and the size of the larval mantle (the anatomical feature that includes the body wall and fins) were measured and recorded. Two trials were conducted for each carbon dioxide concentration.

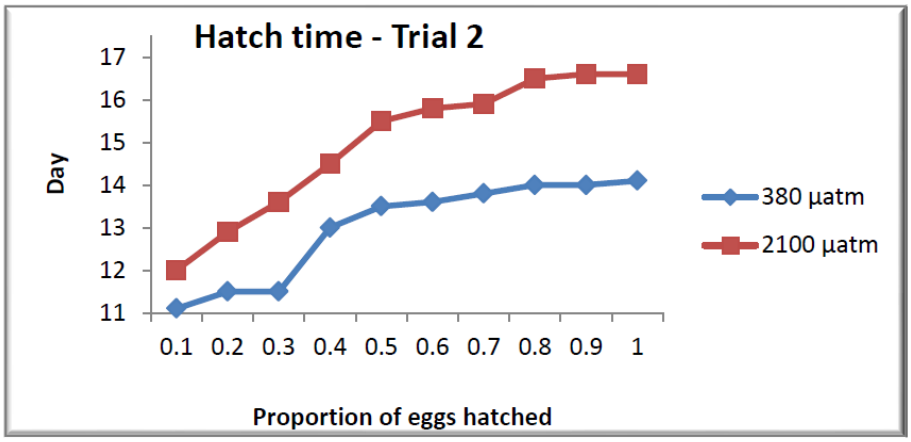
	CO_2 concentration	Temperature	pH	Salinity
Trial 1	380 µatm	20.35	7.89	30.518
Trial 2	380 µatm	20.26	7.84	30.600
Trial 1	2100 µatm	20.28	7.29	30.450
Trial 2	2100 µatm	20.33	7.31	30.724

Water chemistry conditions for each trial

	CO_2 concentration	Length (mm)
Trial 1	380 µatm	1.88
Trial 2	380 µatm	1.91
Trial 1	2100 µatm	1.67
Trial 2	2100 µatm	1.75

Average larval mantle lengths





10. Which of the following can be concluded from the passage?

select

Carbon dioxide concentration correlates with ocean temperatures

select

Carbonate ion concentration correlates with ocean temperatures

select

Atmospheric CO_2 levels correlate with the concentration of CO_2 in the oceans

select

Tuna and albatross populations are directly related

Question: 11

Since the early 1900s, there has been a steady increase in the earth's atmospheric temperature, resulting in a phenomenon called "Global Warming." While the steady temperature change has been well documented, the cause of global warming remains controversial.

Scientist 1

Scientist 1 believes that "external forcings" are the cause of increased temperature over the past century. "External forcings" can direct the change in temperature over thousands of years. One example of an external force is variation in the earth's orbit around the sun. The earth orbital cycle lasts 26,000 years and causes general trends in warming and cooling.

Scientist 2

Scientist 2 believes that global warming is a man-made phenomenon due to an increase in greenhouse gases such as carbon dioxide or methane. Greenhouse gases have a natural warming effect, however, an increase in the amount of atmospheric greenhouse gases many enhance that effect. Since 1750, the concentration of carbon dioxide has increased 36 percent while the amount of atmospheric methane has increased 148 percent.

11. Summarize the differences between the scientists' theories.

select

Scientist 1 does not believe there has been a significant change in global temperatures while scientist 2 does.

select

Scientist 1 thinks global warming is a naturally occurring phenomenon while Scientist 2 believes man is responsible.

select

Scientist 1 believes a global cooling cycle will occur soon while Scientist 2 does not.

select

Scientist 1 believes there is no harm in global warming while Scientist 2 believes global warming will be catastrophic.

Question: 12

Since the early 1900s, there has been a steady increase in the earth's atmospheric temperature, resulting in a phenomenon called "Global Warming." While the steady temperature change has been well documented, the cause of global warming remains controversial.

Scientist 1

Scientist 1 believes that "external forcings" are the cause of increased temperature over the past century. "External forcings" can direct the change in temperature over thousands of years. One example of an external force is variation in the earth's orbit around the sun. The earth orbital cycle lasts 26,000 years and causes general trends in warming and cooling.

Scientist 2

Scientist 2 believes that global warming is a man-made phenomenon due to an increase in greenhouse gases such as carbon dioxide or methane. Greenhouse gases have a natural warming effect, however, an increase in the amount of atmospheric greenhouse gases many enhance that effect. Since 1750, the concentration of carbon dioxide has increased 36 percent while the amount of atmospheric methane has increased 148 percent.

12. What data would support Scientist 1's theory?

select

A chart depicting the average atmospheric temperature each year for the past century

select

A chart depicting the number of minutes of daylight experienced at a particular location on June 21st each year

select

A chart depicting the average atmospheric temperature every 100 years for the past 50,000 years

select

A diagram of the earth's orbital variances

Question: 13

Since the early 1900s, there has been a steady increase in the earth's atmospheric temperature, resulting in a phenomenon called "Global Warming." While the steady temperature change has been well documented, the cause of global warming remains controversial.

Scientist 1

Scientist 1 believes that "external forcings" are the cause of increased temperature over the past century. "External forcings" can direct the change in temperature over thousands of years. One example of an external force is variation in the earth's orbit around the sun. The earth orbital cycle lasts 26,000 years and causes general trends in warming and cooling.

Scientist 2

Scientist 2 believes that global warming is a man-made phenomenon due to an increase in greenhouse gases such as carbon dioxide or methane. Greenhouse gases have a natural warming effect, however, an increase in the amount of atmospheric greenhouse gases many enhance that effect. Since 1750, the concentration of carbon dioxide has increased 36 percent while the amount of atmospheric methane has increased 148 percent.

13. Assume that both Scientist 1 and Scientist 2 were correct. How would temperature change over the next 20,000 years?

select

The average atmospheric temperature will increase and decrease in a cyclical manner.

select

The temperatures in the summers will be hotter while the temperatures in the winter will be cooler.

select

There would be an increase in atmospheric temperature, however, the rate of increase would change depending on variances in the earth's orbit.

select

The average atmospheric temperature will continue to rise at a constant rate.

Question: 14

Since the early 1900s, there has been a steady increase in the earth's atmospheric temperature, resulting in a phenomenon called "Global Warming." While the steady temperature change has been well documented, the cause of global warming remains controversial.

Scientist 1

Scientist 1 believes that "external forcings" are the cause of increased temperature over the past century. "External forcings" can direct the change in temperature over thousands of years. One example of an external force is variation in the earth's orbit around the sun. The earth orbital cycle lasts 26,000 years and causes general trends in warming and cooling.

Scientist 2

Scientist 2 believes that global warming is a man-made phenomenon due to an increase in greenhouse gases such as carbon dioxide or methane. Greenhouse gases have a natural warming effect, however, an increase in the amount of atmospheric greenhouse gases many enhance that effect. Since 1750, the concentration of carbon dioxide has increased 36 percent while the amount of atmospheric methane has increased 148 percent.

14. What is a potential cause for an increase in greenhouse gases since 1750?

select

An increase in clorofluorocarbons resulting in depletion of the ozone layer

select

An increase in the number of plants producing carbon dioxide

select

An increase in gas released from melting ice caps

select

Production of greenhouse gases during the industrial revolution and population growth

Question: 15

Since the early 1900s, there has been a steady increase in the earth's atmospheric temperature, resulting in a phenomenon called "Global Warming." While the steady temperature change has been well documented, the cause of global warming remains controversial.

Scientist 1

Scientist 1 believes that "external forcings" are the cause of increased temperature over the past century. "External forcings" can direct the change in temperature over thousands of years. One example of an external force is variation in the earth's orbit around the sun. The earth orbital cycle lasts 26,000 years and causes general trends in warming and cooling.

Scientist 2

Scientist 2 believes that global warming is a man-made phenomenon due to an increase in greenhouse gases such as carbon dioxide or methane. Greenhouse gases have a natural warming effect, however, an increase in the amount of atmospheric greenhouse gases many enhance that effect. Since 1750, the concentration of carbon dioxide has increased 36 percent while the amount of atmospheric methane has increased 148 percent.

15. In the year 2150, the United Nations institutes a global limit on the production of greenhouse gases. The average atmospheric temperature continues to increase, although the rate of increase is less than it was before 2150. Does this invalidate the theory proposed by Scientist 2? Why or why not?

select

Yes; Limiting greenhouse gas production does not solve the issue of global warming.

select

No; Increased population may have indirect effects on the concentration of greenhouse gases that can not be regulated.

select

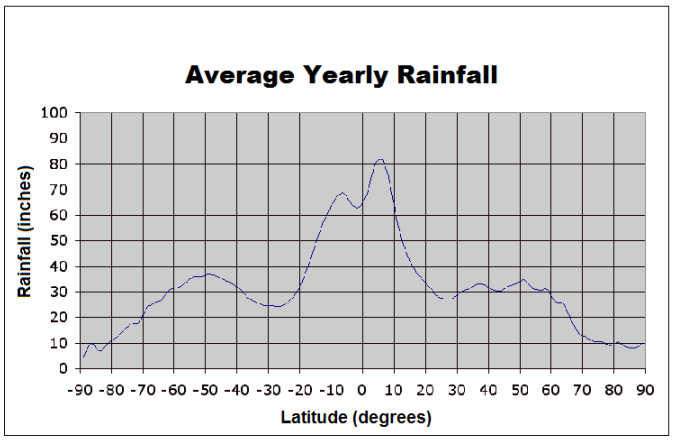
Yes; If Scientist 2's theory was correct, the atmospheric temperature would not continue to rise.

select

No; A limitation on the production of greenhouses gases will not have an effect on global warming.

Question: 16

The chart below depicts the average rainfall by location on the Earth. Zero degrees latitude corresponds to the equator. Positive latitudes are north of the equator, while negative latitudes are south of the equator. A latitude with a magnitude of 90 degrees correlates with one of Earth's poles.



16. Which best describes the rainfall trend between thirty and sixty degrees latitude?

select

None of these

select

Rainfall is approximately equal for these latitudes

select

Rainfall decreases as latitude increases

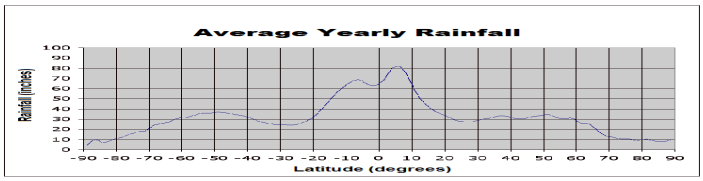
select

Rainfall increases as latitude increases

Question: 17

The chart below depicts the average rainfall by location on the Earth. Zero degrees latitude corresponds to the equator. Positive latitudes are north of the equator, while negative latitudes are south of the equator. A latitude with

a magnitude of 90 degrees correlates with one of Earth's poles.



17. Which of the following best describes the rainfall trend shown in the graph?

select

Rainfall is greatest in the Northern hemisphere

select

Rainfall is greatest near the equator and least at Earth’s poles

select

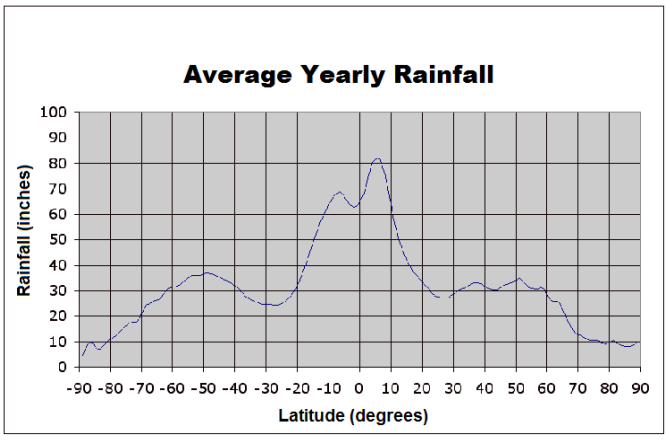
Rainfall is greatest at Earth’s poles and declines gradually as latitudes approach 0 degrees

select

Peak rainfall occurs at about −10 degrees

Question: 18

The chart below depicts the average rainfall by location on the Earth. Zero degrees latitude corresponds to the equator. Positive latitudes are north of the equator, while negative latitudes are south of the equator. A latitude with a magnitude of 90 degrees correlates with one of Earth's poles.



18. Which latitude(s) experience(s) an average rainfall of 35 inches?

select

−20 degrees and 20 degrees

select

−55 degrees and 20 degrees

select

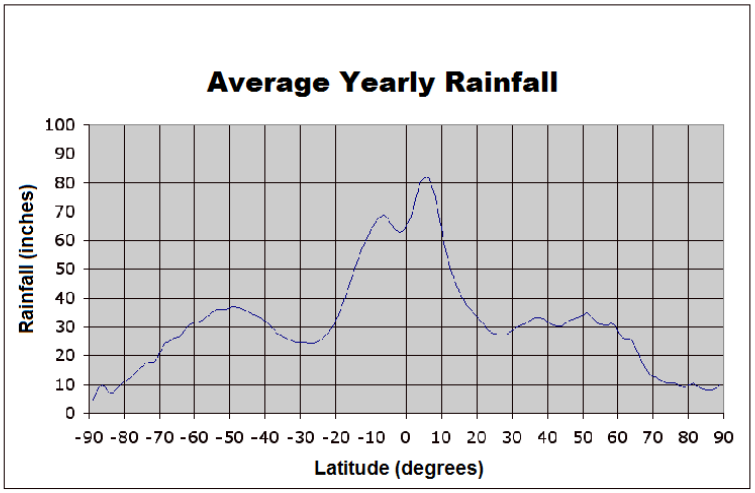
−55 degrees

select

−55 degrees, −20 degrees and 20 degrees

Question: 19

The chart below depicts the average rainfall by location on the Earth. Zero degrees latitude corresponds to the equator. Positive latitudes are north of the equator, while negative latitudes are south of the equator. A latitude with a magnitude of 90 degrees correlates with one of Earth's poles.



19. The Tropic of Capricorn is about 23.5 degrees south of the equator. Approximately how many more inches of rain does this latitude experience than the North Pole?

select

15 inches

select

20 inches

select

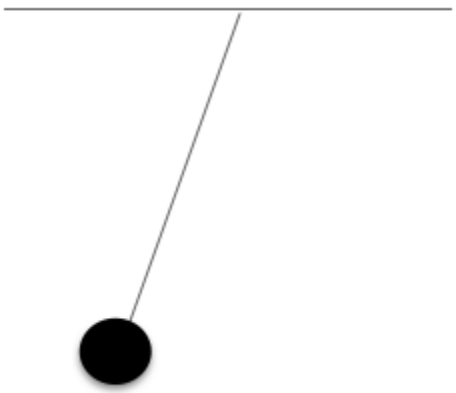
25 inches

select

10 inches

Question: 20

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to its original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

Experiment 1:

Laura created the following table for her first measurement of the pendulum's oscillations.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

20. If Laura stopped experiment 3 after 10 seconds, how many oscillations would the pendulum have gone through?

select

3

select

2.5

select

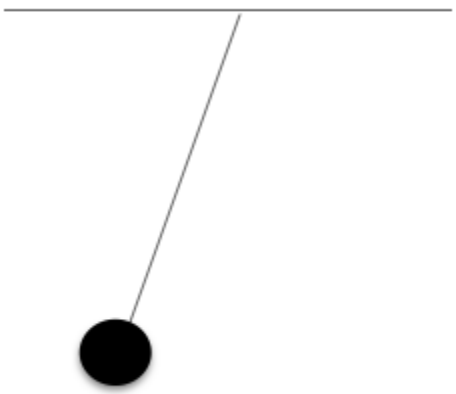
2.23

select

2

Question: 21

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

Experiment 1:

Laura created the following table for her first measurement of the pendulum's oscillations.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

21. Which of the following statements is a valid conclusion?

select

The length of time of each oscillation is directly related to the mass of the weight

select

The length of time of each oscillation is inversely related to the mass of the weight

select

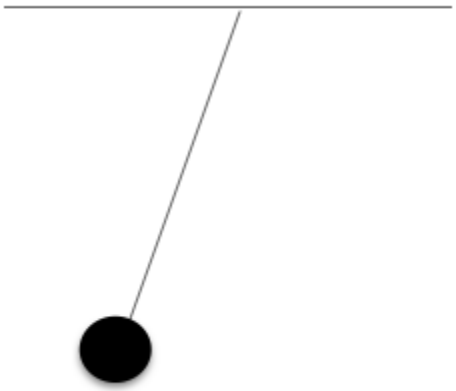
The length of time of each oscillation is inversely related to the length of the rope

select

The length of time of each oscillation is directly related to the length of the rope

Question: 22

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

Experiment 1:

Laura created the following table for her first measurement of the pendulum's oscillations.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

22. Jerry reads about this experiment, and attempts to recreate the experiment at home. He observes that when he lets go of the pendulum, it never reaches its original height. It gets close, but never fully reaches it. Why?

select

Jerry is using the wrong weight.

select

External forces acting on the pendulum.

select

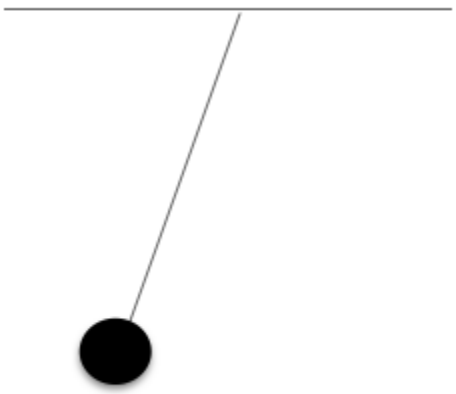
Jerry is using the wrong length of rope.

select

Jerry did not tie the pendulum to the ceiling.

Question: 23

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

Experiment 1:

Laura created the following table for her first measurement of the pendulum's oscillations.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

23. How long would 4 oscillations be, using the 3m rope and the 6kg weight?

select

13.896

select

2.565

select

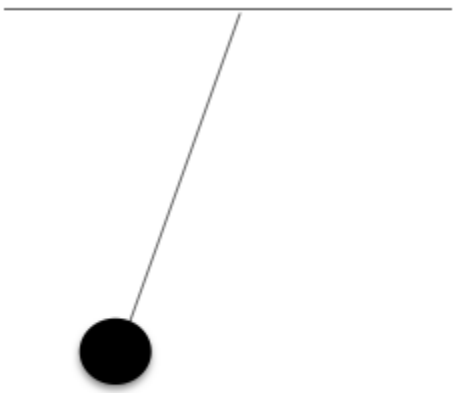
12.566

select

53.828

Question: 24

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



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Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

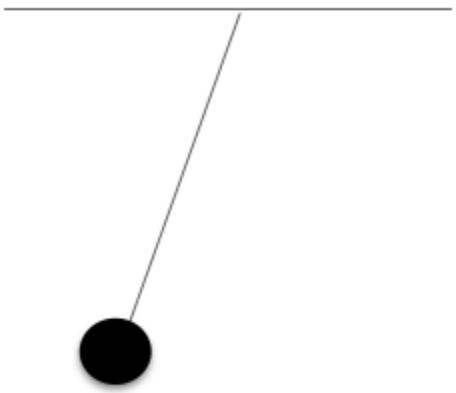
Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

24. How much longer does each oscillation in experiment 3 take in comparison to experiment 1?

select
0.682
select
1.012
select
3.14
select
1.111

Question: 25

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



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Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

25. If Laura recreated experiment 3 using a 5m rope and a 20kg weight, how long would 2 oscillations last?

select

2.243

select

35.888

select

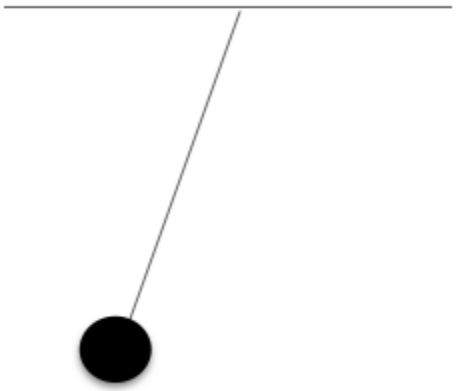
8.972

select

6.729

Question: 26

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

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Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

26.Which of the following could be an equation for the length of time of one oscillation in experiment 1? (*L* represents the length of the rope)

select $Time = 2\pi\sqrt{\frac{L}{9.81}}$

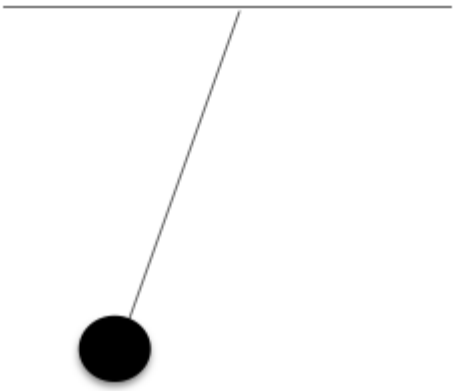
select $Time = 2L\pi\sqrt{9.81}$

select $Time = 2\pi\sqrt{\frac{mass}{9.81}}$

select $Time = 2\pi\sqrt{\frac{2L}{9.81}}$

Question: 27

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

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Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

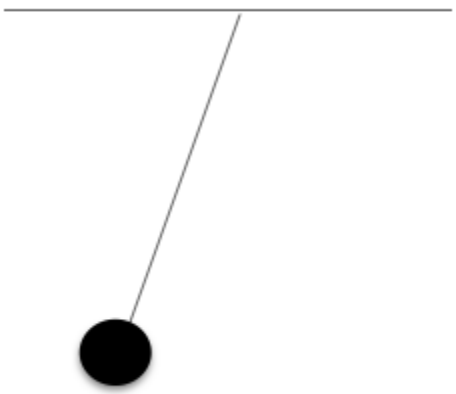
Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

27. If Laura recreates experiment 2 using a 300kg weight, how long would each oscillation last?

select
62.384
select
34.74
select
347.4
select
3.474

Question: 28

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces

outside of gravity are acting upon the pendulum). This is also called one oscillation.

Experiment 1:

Laura created the following table for her first measurement of the pendulum's oscillations.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

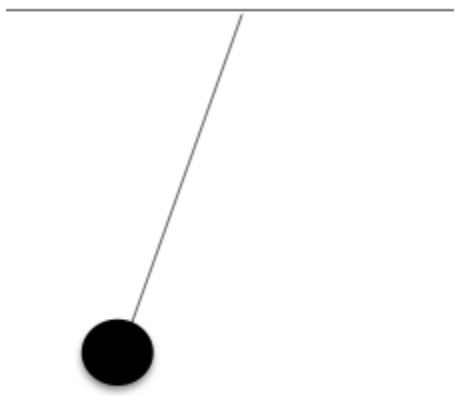
Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

28. Laura wants to run a new experiment that has a shorter length of time per oscillation than in experiment 1. Which one of the following would be a good choice for length of rope?

select
2
select
3
select
4
select
5

Question: 29

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

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Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

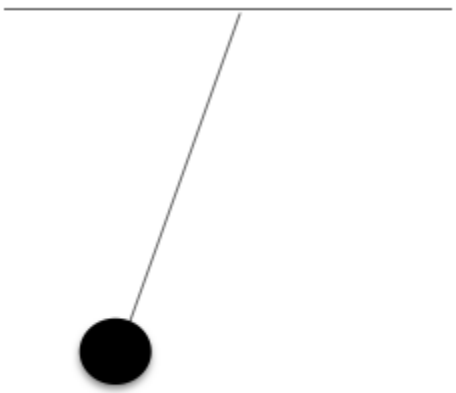
Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

29. In experiment 3, how long would 2.5 oscillations last?

select
13.457
select
13.5
select
8.5
select
11.215
select
16.5

Question: 30

Laura is performing an experiment with a 5kg weight tied to a 3m rope tied to the ceiling as shown:



Laura drops the weight and allows it to swing freely. She measures how long it takes for the weight to return to it's original position (assume no forces outside of gravity are acting upon the pendulum). This is also called one oscillation.

Experiment 1:

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Experiment 2:

Laura performed the experiment again, this time using a 6kg weight.

Number of oscillations	1	2	3
Length of time	3.474	6.949	10.424

Experiment 3:

Laura performed the experiment again, this time using a 3kg weight and a 5m rope.

Number of oscillations	1	2	3
Length of time	4.486	8.972	13.457

30. If Laura recreated experiment 1 using a 10kg weight, how long would 2 oscillations last?

select
13.898
select
6.949
select
8.972
select
10.212
select
31.416