Tucson International Academy

Academia Internacional de Tucson

Homework Packet for Twelveth Grade

Week 15

Name_____

Week Starts on/ Due on _____

Each week you are to complete your homework packet and turn it on the day the teacher assigns. Part of the homework is reading 45 minutes a day. This can be done in after school care and they can read to a younger sibling or an adult as well. Weekend reading is encouraged, each week students can get credit for reading on Saturday and/or Sunday. Reading each day is very important to help each student get better at this skill.

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Weekly Home Reading Record

Day	Reading Material	Amount of Time	How many pages
Weekend			
Monday			
Tuesday			
Wednesday			
Thursday			

Total Time Reading: Hours_____ Minutes_____

Student Signature_____ Date_____

Parent Signature_____ Date_____

Questions 42-52 are based on the following passage and supplementary material.

This passage is adapted from Richard J. Sharpe and Lisa Heyden, "Honey Bee Colony Collapse Disorder is Possibly Caused by a Dietary Pyrethrum Deficiency." ©2009 by Elsevier Ltd. Colony collapse disorder is characterized by the disappearance of adult worker bees from hives.

Honey bees are hosts to the pathogenic large ectoparasitic mite *Varroa destructor* (Varroa mites). These mites feed on bee hemolymph (blood) and can kill bees directly or by increasing their susceptibility to secondary infection with fungi, bacteria or viruses. Little is known about the natural defenses that keep the mite infections under control.

Pyrethrums are a group of flowering plants which include *Chrysanthemum coccineum*, *Chrysanthemum cinerariifolium*, *Chrysanthemum marschalli*, and related species. These plants produce potent insecticides with anti-mite activity. The naturally occurring insecticides are known as pyrethrums. A synonym for the naturally occurring pyrethrums is pyrethrin and synthetic analogues of pyrethrums are known as pyrethroids. In fact, the human mite infestation known as scabies (*Sarcoptes scabiei*) is treated with a topical pyrethrum cream.

We suspect that the bees of commercial bee colonies which are fed mono-crops are nutritionally deficient. In particular, we postulate that the problem is a diet deficient in anti-mite toxins: pyrethrums, and possibly other nutrients which are inherent in such plants. Without, at least, intermittent feeding on the pyrethrum producing plants, bee colonies are susceptible to mite infestations which can become fatal either directly or due to a secondary infection of immunocompromised or nutritionally deficient bees. This secondary infection can be viral, bacterial or fungal and may be due to one or more pathogens. In addition, immunocompromised or nutritionally deficient bees may be further weakened when commercially produced insecticides are introduced into their hives by bee keepers in an effort to fight mite infestation. We further postulate that the proper dosage necessary to prevent mite infestation may be better left to the bees, who may seek out or avoid pyrethrum containing plants depending on the amount necessary to defend against mites and the amount already consumed by the bees, which in higher doses could be potentially toxic to them.

This hypothesis can best be tested by a trial wherein a small number of commercial honey bee colonies are offered a number of pyrethrum producing plants, as well as a typical bee food source such as clover, while controls are offered only the clover. Mites could then be introduced to each hive with note made as to the choice of the bees, and the effects of the mite parasites on the experimental colonies versus control colonies.

It might be beneficial to test wild-type honey bee colonies in this manner as well, in case there could be some genetic difference between them that affects the bees' preferences for pyrethrum producing flowers.

Pathogen Occurence in Honey Bee Colonies With and Without Colony Collapse Disorder

	Percent of colonies affected by pathogen	
Pathogen	Colonies with colony collapse disorder (%)	Colonies without colony collapse disorder (%)
Viruses		
IAPV	83	5
KBV	100	76
Fungi		
Nosema apis	90	48
Nosema ceranae	100	81
All four pathogens	77	0

Adapted from Diana L. Cox-Foster et al., "A Metagenomic Survey of Microbes in Honey Bee Colony Collapse Disorder." ©2007 by American Association for the Advancement of Science.

The table above shows, for colonies with colony collapse disorder and for colonies without colony collapse disorder, the percent of colonies having honey bees infected by each of four pathogens and by all four pathogens together.

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CONTINUE

42

How do the words "can," "may," and "could" in the third paragraph (lines 19-41) help establish the tone of the paragraph?

A) They create an optimistic tone that makes clear the authors are hopeful about the effects of their research on colony collapse disorder.

B) They create a dubious tone that makes clear the authors do not have confidence in the usefulness of the research described.

C) They create a tentative tone that makes clear the authors suspect but do not know that their hypothesis is correct.

D) They create a critical tone that makes clear the authors are skeptical of claims that pyrethrums are inherent in mono-crops.

43

In line 42, the authors state that a certain hypothesis "can best be tested by a trial." Based on the passage, which of the following is a hypothesis the authors suggest be tested in a trial?

A) Honeybees that are exposed to both pyrethrums and mites are likely to develop a secondary infection by a virus, a bacterium, or a fungus.

B) Beekeepers who feed their honeybee colonies a diet of a single crop need to increase the use of insecticides to prevent mite infestations.

C) A honeybee diet that includes pyrethrums results in honeybee colonies that are more resistant to mite infestations.

D) Humans are more susceptible to varroa mites as a result of consuming nutritionally deficient food crops.

44

Which choice provides the best evidence for the answer to the previous question?

A) Lines 3-5 ("These mites . . . viruses")

B) Lines 16-18 ("In fact . . . cream")

C) Lines 19-21 ("We suspect . . . deficient")

D) Lines 24-28 ("Without . . . bees")

45

The passage most strongly suggests that beekeepers' attempts to fight mite infestations with commercially produced insecticides have what unintentional effect?

A) They increase certain mite populations.

B) They kill some beneficial forms of bacteria.

C) They destroy bees' primary food source.

D) They further harm the health of some bees.

46

Which choice provides the best evidence for the answer to the previous question?

A) Lines 1-2 ("Honey bees . . . mites")

B) Lines 6-7 ("Little . . . control")

C) Lines 31-35 ("In addition . . . infestation")

D) Lines 47-50 ("Mites . . . control colonies")

47

As used in line 35, "postulate" most nearly means to

A) make an unfounded assumption.

B) put forth an idea or claim.

C) question a belief or theory.

D) conclude based on firm evidence.

48

The main purpose of the fourth paragraph (lines 42-50) is to

A) summarize the results of an experiment that confirmed the authors' hypothesis about the role of clover in the diets of wild-type honeybees.

B) propose an experiment to investigate how different diets affect commercial honeybee colonies' susceptibility to mite infestations.

C) provide a comparative nutritional analysis of the honey produced by the experimental colonies and by the control colonies.

D) predict the most likely outcome of an unfinished experiment summarized in the third paragraph (lines 19-41).

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CONTINUE

49

An unstated assumption made by the authors about clover is that the plants

A) do not produce pyrethrums.

B) are members of the *Chrysanthemum* genus.

C) are usually located near wild-type honeybee colonies.

D) will not be a good food source for honeybees in the control colonies.

50

Based on data in the table, in what percent of colonies with colony collapse disorder were the honeybees infected by all four pathogens?

A) 0 percent

B) 77 percent

C) 83 percent

D) 100 percent

51

Based on data in the table, which of the four pathogens infected the highest percentage of honeybee colonies without colony collapse disorder?

A) IAPV

B) KBV

C) *Nosema apis*

D) *Nosema ceranae*

52

Do the data in the table provide support for the authors' claim that infection with varroa mites increases a honeybee's susceptibility to secondary infections?

A) Yes, because the data provide evidence that infection with a pathogen caused the colonies to undergo colony collapse disorder.

B) Yes, because for each pathogen, the percent of colonies infected is greater for colonies with colony collapse disorder than for colonies without colony collapse disorder.

C) No, because the data do not provide evidence about bacteria as a cause of colony collapse disorder.

D) No, because the data do not indicate whether the honeybees had been infected with mites.

STOP

If you finish before time is called, you may check your work on this section only. Do not turn to any other section.

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Writing and Language Test

35 MINUTES, 44 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

DIRECTIONS

Each passage below is accompanied by a number of questions. For some questions, you will consider how the passage might be revised to improve the expression of ideas. For other questions, you will consider how the passage might be edited to correct errors in sentence structure, usage, or punctuation. A passage or a question may be accompanied by one or more graphics (such as a table or graph) that you will consider as you make revising and editing decisions.

Some questions will direct you to an underlined portion of a passage. Other questions will direct you to a location in a passage or ask you to think about the passage as a whole.

After reading each passage, choose the answer to each question that most effectively improves the quality of writing in the passage or that makes the passage conform to the conventions of standard written English. Many questions include a "NO CHANGE" option. Choose that option if you think the best choice is to leave the relevant portion of the passage as it is.

Questions 1-11 are based on the following passage.

Shed Some Light on the Workplace

Studies have shown that employees are happier, 1 healthier, and more productive when they work in an environment 2 in which temperatures are carefully controlled. New buildings may be designed with these studies in mind, but many older buildings were not, resulting in spaces that often depend primarily on artificial lighting. While employers may balk at the expense of reconfiguring such buildings to increase the amount of natural light, the investment has been shown to be well worth it in the long run—for both employees and employers.

1

A) NO CHANGE
B) healthy, and more
C) healthier, and they are
D) healthier, being more

2

Which choice provides the most appropriate introduction to the passage?

A) NO CHANGE
B) that affords them adequate amounts of natural light.
C) that is thoroughly sealed to prevent energy loss.
D) in which they feel comfortable asking managers for special accommodations.

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CONTINUE

For one thing, lack of exposure to natural light has a significant impact on employees' health. A study conducted in 2013 by Northwestern University in Chicago showed that inadequate natural light could result in eye strain, headaches, and fatigue, as well as interference with the body's circadian rhythms. 3 Circadian rhythms, which are controlled by the 4 bodies biological clocks, influence body temperature, hormone release, cycles of sleep and wakefulness, and other bodily functions. Disruptions of circadian rhythms have been linked to sleep disorders, diabetes, depression, and bipolar disorder. Like any other health problems, these ailments can increase employee absenteeism, which, in turn, 5 is costly for employers. Employees who feel less than 100 percent and are sleep deprived are also less prone to work at their maximal productivity. One company in California 6 gained a huge boost in its employees' morale when it moved from an artificially lit distribution facility to one with natural illumination.

3

At this point, the writer is considering adding the following sentence.

> Workers in offices with windows sleep an average of 46 minutes more per night than workers in offices without windows.

Should the writer make this addition here?

A) Yes, because it supplies quantitative data that will be examined in the rest of the paragraph.
B) Yes, because it explains the nature of the bodily functions referred to in the next sentence.
C) No, because it interrupts the discussion of circadian rhythms.
D) No, because it does not take into account whether workers were exposed to sunlight outside the office.

4

A) NO CHANGE
B) bodies' biological clocks',
C) body's biological clocks,
D) body's biological clock's,

5

A) NO CHANGE
B) are
C) is being
D) have been

6

Which choice best supports the statement made in the previous sentence?

A) NO CHANGE
B) saw a 5 percent increase in productivity
C) saved a great deal on its operational costs
D) invested large amounts of time and capital

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CONTINUE

7 Artificial light sources are also costly aside from lowering worker productivity. They typically constitute anywhere from 25 to 50 percent of a building's energy use. When a plant in Seattle, Washington, was redesigned for more natural light, the company was able to enjoy annual electricity cost reductions of $500,000 8 each year.

7

In context, which choice best combines the underlined sentences?

A) Aside from lowering worker productivity, artificial light sources are also costly, typically constituting anywhere from 25 to 50 percent of a building's energy use.

B) The cost of artificial light sources, aside from lowering worker productivity, typically constitutes anywhere from 25 to 50 percent of a building's energy use.

C) Typically constituting 25 to 50 percent of a building's energy use, artificial light sources lower worker productivity and are costly.

D) Artificial lights, which lower worker productivity and are costly, typically constitute anywhere from 25 to 50 percent of a building's energy use.

8

A) NO CHANGE

B) every year.

C) per year.

D) DELETE the underlined portion and end the sentence with a period.

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CONTINUE

Among the possibilities to reconfigure a building's lighting is the installation of full-pane windows to allow the greatest degree of sunlight to reach office interiors. 9 Thus, businesses can install light tubes, 10 these are pipes placed in workplace roofs to capture and funnel sunlight down into a building's interior. Glass walls and dividers can also be used to replace solid walls as a means 11 through distributing natural light more freely. Considering the enormous costs of artificial lighting, both in terms of money and productivity, investment in such improvements should be a natural choice for businesses.

9

A) NO CHANGE
B) Nevertheless,
C) Alternatively,
D) Finally,

10

A) NO CHANGE
B) they are
C) which are
D) those being

11

A) NO CHANGE
B) of
C) from
D) DELETE the underlined portion.

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CONTINUE

Pre-Calculus (12) Week 15

Name: Gary Young

#1 Points possible: 1. Total attempts: 1

Find all solutions to $2\sin(\theta) = \sqrt{2}$ on the interval $0 \leq \theta < 2\pi$

$\theta =$ _____

Give your answers as exact values, as a list separated by commas.

#2 Points possible: 1. Total attempts: 1

Solve $4\sin\left(\frac{\pi}{6}x\right) = 2$ for the four smallest positive solutions

$x =$ _____

Give your answers accurate to at least two decimal places, as a list separated by commas

---

#3 Points possible: 1. Total attempts: 1

Solve $\sec(5x) - 6 = 0$ for the four smallest positive solutions

$x =$ _____

Give your answers accurate to at least two decimal places, as a list separated by commas

---

#4 Points possible: 1. Total attempts: 1

Solve $6\cos^2(w) - \cos(w) - 2 = 0$ for all solutions $0 \leq w < 2\pi$

$w =$ _____

Give your answers accurate to 2 decimal places, as a list separated by commas

---

#5 Points possible: 1. Total attempts: 1

Solve $12\cos^2(w) - 13\sin(w) - 15 = 0$ for all solutions $0 \leq w < 2\pi$

$w =$ _____

Give your answers accurate to 2 decimal places, as a list separated by commas

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