Week of May 4–10

Monday

In order to determine the effect of muscle fatigue on the ability of students to squeeze a clothespin, five male students did jumping jacks for three minutes and then squeezed a clothespin as many times as possible in a minute. Three other male students ran up and down the stairs for 30 seconds and then squeezed a clothespin as many times as possible for one minute. The results of the two groups were recorded. Identify *one* change that could be made to the experiment to increase the validity of the conclusion made from these results.

Tuesday

Recently, a human trachea (a respiratory organ) was produced by using a patient's own stem cells. The benefit of using the patient's own cells to produce a trachea instead of receiving one from a donor is that

(1) there will be more enzymes produced to help maintain homeostasis in the trachea

(2) there will be an increase in the quantity of antibodies that the patient produces in response to the new trachea

(3) there is less of a chance that the patient's immune system will attack the trachea

(4) there will be a greater response to any infectious agent that may enter the body

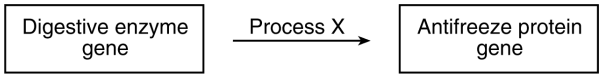
Wednesday

Base your answers to the questions on the information and diagram below and on your knowledge of biology.

Icefish Evolution

Over the last 50 million years, icefish evolved many adaptations that contributed to their success in surviving the decreasing water temperatures of the ocean surrounding Antarctica. For example, they have the ability to produce an antifreeze protein that prevents their blood from freezing in waters that are now below the normal freezing point of fresh water.

Scientists have analyzed the icefish DNA and documented genetic changes that gave rise to the antifreeze gene. Their findings are represented in the diagram below.



Process *X* is referred to as

(1) mitosis (2) mutation

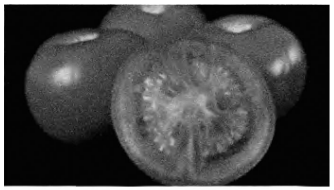
(3) differentiation (4) meiosis

Thursday

Base your answers to questions on the information and photograph below and on your knowledge of biology.

Transgenic (GMO) Tomatoes

The use of pesticides to control insects costs billions of dollars every year. Genetically modified organisms (GMOs) are an attempt to reduce this cost. Tomato plants that are genetically modified can make proteins that are poisonous to the insects that feed on them. Using these GMO tomatoes would reduce the need for the chemical control of insects.



Source: www.southeastfarmpress.com

Identify the process responsible for passing the gene for insect resistance in a leaf cell of a genetically modified tomato plant on to the cells that develop from it.

Friday

Base your answers to the following questions on the passage below and on your knowledge of biology.

Green sea slugs are animals that live in water and have developed the ability to produce their own chlorophyll. These creatures can also pass this ability to make chlorophyll to their offspring. Once the offspring have one meal of algae, they are able to make food using sunlight. This one meal provides the baby slugs with the chloroplasts needed to make use of the chlorophyll, and they are able to produce their own food in the future.

Explain how green sea slugs can be considered both a producer and a consumer.

Sat/Sun

During the process of chromosome replication, a genetic error occurs. As a result, a sequence of events occurs as described below.

Event *A*: a protein with a new sequence of amino acids is produced

Event *B*: a DNA strand with an altered base sequence is formed

Event *C*: a new inheritable trait is expressed in an organism

Event *D*: an mRNA strand with a new sequence of bases is synthesized

The usual order in which these events would occur is

(1) *B—D—A—C* (2) *B—D—C—A*

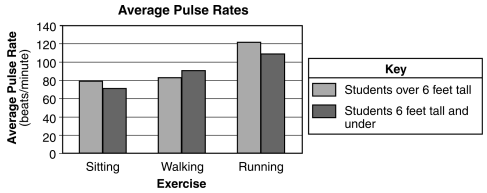
(3) *D—A—B—C* (4) *D—C—B—A*

Week of May 11–17

Monday

Base your answer to the following question on the information below and on your knowledge of biology.

Students in a high school biology class conducted an investigation on pulse rates. The thirty students performed three different activities and determined their pulse rates. Each activity was done three times. The average is shown in the graph below.



Identify *one* adaptation, other than beak size and shape, a finch species might possess and state how that would aid in its survival.

Tuesday

A rich variety of genetic material in an ecosystem will

(1) reduce the biodiversity of the ecosystem

(2) decrease the carrying capacity of the ecosystem

(3) reduce the likelihood of future medical discoveries

(4) increase the chances that some organisms will survive change

Wednesday

Many disorders are due to the inability of an individual to break down a particular chemical. Sometimes these disorders can be treated by giving the affected individual the appropriate

(1) enzymes

(2) antigens

(3) chromosomes

(4) organelles

Thursday

The chart below shows the molecular comparison between several species.

Molecular Comparison Chart

Botana curus	DNA	GTG	GAC	TGA	GGA	CTC
	mRNA	CAC	CUG	ACU	CCU	GAG
	Amino acid	His	Leu	Thr	Pro	Glu

Species X	DNA	GTG	GAC	AGA	GGA	CAC
	mRNA	CAC	CUG	UCU	CCU	GUG
	Amino acid	His	Leu	Ser	Pro	Val

Species Y	DNA	GTG	GAC	AGA	GGA	CAC
	mRNA	CAC	CUG	UCU	CCU	GUG
	Amino acid	His	Leu	Ser	Pro	Val

Species Z	DNA	GTA	GAC	TGA	GGA	CTC
	mRNA	CAU	CUG	ACU	CCU	GAG
	Amino acid	His	Leu	Thr	Pro	Glu

Identify which species is likely to be more closely related to *Botana curus*. Support your answer.

Friday

Base your answer to the following question on the information below and on your knowledge of biology.

Harmless Skin Virus Fights Acne

. . . Acne is caused when hair follicles become blocked with an oily substance called sebum, which the body makes to stop the hair and skin from drying out.

Normally harmless bacteria, such as *Propionibacterium acnes*, that live on the skin can then contaminate and infect the plugged follicles.

Phages [a type of virus] appear to help counteract this.

When the scientists sequenced the DNA coding of the phages, they discovered that, as well as sharing most of their genetic material, the viruses all had some key features in common.

All carry a gene that makes a protein called endolysin - an enzyme thought to destroy bacteria by breaking down their cell walls.

And unlike antibiotics, which kill many types of bacteria, including "good" ones that live in our gut, phages are programmed to target only specific bacteria. . .

Source: BBC News September 25, 2012

This treatment for acne, using phages, is effective because phages

(1) produce antibodies to clean out clogged pores and hair follicles

(2) eliminate bacteria by attacking specific cell structures

(3) carry genes and infect follicles

(4) attack every known type of bacteria

Sat/Sun

Some salmon have been genetically modified to grow bigger and faster than wild salmon. They are grown in fish-farming facilities. These genetically modified fish should *not* be introduced into a natural habitat because

(1) the salmon would recycle nutrients at a rapid rate

(2) their rapid growth rate could cause them to outcompete native salmon

(3) they would not have enough oxygen for survival

(4) they would reproduce asexually once they were released

Week of May 18–24

Monday

Base your answer to the following question on the information below and on your knowledge of biology.

Saving Florida Oranges

A disease that affects orange trees has led to the destruction of numerous orange trees in Florida. Orange growers have unsuccessfully tried to stop the spread of the disease by cutting down infected trees and using a variety of pesticides on the insects that spread the disease. The growers fear that if nothing further is done, entire crops could be wiped out in the near future. In hopes of saving Florida's orange industry, scientists are attempting to alter the DNA of orange trees by inserting DNA, that codes for disease resistance, from a different plant species.

Identify a trait, other than disease resistance, that the orange trees could have that would be beneficial to the growers.

Tuesday

A student was setting up beakers that contained different solutions in order to conduct a laboratory investigation, but the next day he could not tell which beaker contained the starch and water mixture. In order to find out which beaker contained starch, he took a small sample from each of the beakers and conducted a test for starch on each of them.

Describe the test for starch that the student should use and the result that would indicate the presence of starch.

Wednesday

The table below represents a segment of a DNA molecule found in a stomach cell, both before and after undergoing replication.

DNA Segment Before and After Replication

Before replication	TGT	ATG	AAA	CAC	AAT	TAT
After replication	TGT	ATT	AAA	CAC	AAT	TTT

Which statement best describes a change that would most likely be observed in the cells formed as a result of this mitotic division?

(1) An enzyme the cell produces might no longer function.

(2) The cells would begin to form gametes to be released.

(3) Many new hormones would be synthesized by the cells.

(4) Chloroplasts would be produced by the ribosomes.

Thursday

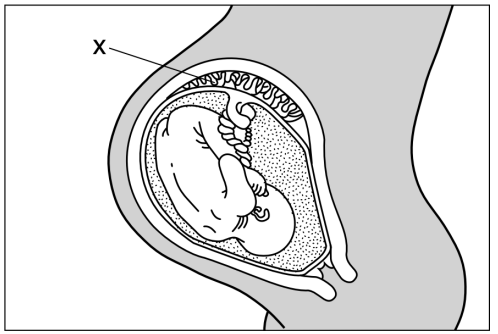
One coach of an Olympic rowing team makes his athletes warm up by doing 30 minutes of stretching and jogging in place before practicing each day. Another coach suggests that resting before practicing will result in better performance by her team. They decide to conduct an experiment to see which practice is correct. One team rests before practice, the other team warms up for thirty minutes, and they then record the time that it takes each team to row a specific distance. Identify the dependent variable in this experiment.

Friday

In some single-celled protozoans living in fresh water, such as the paramecium, contractile vacuoles are organelles used to pump excess water out of the cell. Explain why a paramecium would require contractile vacuoles while a similar protozoan living in salt water would *not*.

Sat/Sun

Which statement best describes an important process carried out by structure X?



(1) Milk passes from the mother to the fetus.

(2) Materials are exchanged between fetal and maternal blood.

(3) Maternal blood is converted into fetal blood.

(4) Oxygen diffuses from fetal blood to maternal blood.

Week of May 25–31

Monday

The instructions for the genetic traits of an organism are directly determined by the

(1) numbers of A, T, C, and G units in a sugar molecule

(2) sequence of bases in DNA molecules

(3) length of a DNA molecule

(4) way the bases are paired in the two strands of a DNA molecule

Tuesday

Base your answer to the following question on the information below and on your knowledge of biology.

Gray Wolves in the Rocky Mountains

Reintroduction of gray wolves in the northern Rocky Mountains has increased the ecological health of Yellowstone National Park in Wyoming. When all wolves in Yellowstone National Park were killed in 1920, elk soon ate trees and shrubs down to short stubs. Now that wolves are reducing elk numbers, many aspens and willow trees are taller and fuller and birds are returning to the trees to nest. The beaver population has grown from one colony to 12 colonies in 13 years. Spreading these benefits across the Rocky Mountain region would require increasing the present wolf population of 1,770 to 17,000.

In September 2012, wolves lost federal protection in Wyoming. In 2014, Wyoming closed its hunting season after meeting its quota of 26 wolves around Yellowstone and Grand Teton parks. The sizes of traps to catch wolves have been regulated to reduce the chance of trapping endangered species such as lynx and wolverines and the hunting season was shortened. Some ecologists wonder if removing the wolves from federal protection and allowing them to be hunted is a good ecological decision.

Construct a food chain using *three* organisms identified in the above passage.

Wednesday

Describe how the presence of lead in body cells could interfere with the ability of enzymes to function.

Thursday

During the last century, human impacts on our planet have led to an increasing and alarming loss of biodiversity in rainforest ecosystems. Scientists estimate that current extinction rates exceed those of some prehistoric mass extinctions. This loss of biodiversity also means loss of genetic diversity and loss of ecosystems. What could be done to minimize this loss of biodiversity?

(1) Introduce new species to rainforest ecosystems.

(2) Write and pass new environmental protection laws specific to rainforest ecosystems.

(3) Build barriers around rainforest ecosystems to keep animals and plants contained.

(4) Move all rainforest animals to new ecosystems where they will be safe.

Friday

Base your answer to the following question on the information below and on your knowledge of biology.

"Cancer is a disease of genes gone wrong. When certain genes mutate, they make cells behave in odd ways. The cells divide swiftly, they hide from the immune system that could kill them and they gain the nourishment they need to develop into tumors. . . ."

Source: Carl Zimmer, NY Times, February 6, 2014

Explain why the body of a person infected with HIV, the virus that causes AIDS, would have a different immune response to the presence of cancer cells than a person not infected with HIV.

Sat/Sun

Base your answer to the following question on the information below and on your knowledge of biology.

The placenta secretes progesterone and estrogen during pregnancy.

Progesterone is responsible for the following functions:

- maintains the lining of the uterus
- inhibits (interferes with) contractions of the uterus
- inhibits the production and release of eggs

Explain how the release of additional eggs is prevented during pregnancy.

Living Environment Daily Review 3/28/2020

1.
Answer: Example answer: increase the sample size of both groups, keep the exercise/time of exercise for each group the same
Points: 1

2.
Answer: 3
Points: 1

3.
Answer: 2
Points: 1

4.
Answer: Example answer: mitotic cell division/mitosis, asexual reproduction
Points: 1

5.
Answer: The sea slug is considered a produce when it makes it's own food using the chlorophyll and a consumer when it eats the algae
Points: 1

6.
Answer: 1
Points: 1

7.
Answer: Example answer: fast flight speed, camouflage
Points: 1

8.
Answer: 4
Points: 1

9.
Answer: 1
Points: 1

10.
Answer: species Z
Points: 1

11.
Answer: 2
Points: 1

12.
Answer: 2
Points: 1

13.
Answer: Example answer: drought resistance, insect resistance
Points: 1

14.
Answer: [explanation]
Points: 1

15.
Answer: 1
Points: 1

16.
Answer: time
Points: 1

17.
Answer: Example answers: Excess water would diffuse into the freshwater paramecium, but saltwater organism would lose water, The saltwater organism would lose water to its environment/dehydrate instead
Points: 1

18.
Answer: 2
Points: 1

19.
Answer: 2
Points: 1

20.
Answer: Example answer: trees → elk → wolves, willows → beavers → wolves
Points: 1

21.
Answer: Example answers: Give enzyme a different shape/molecular structure, enzymes work based on their shape, The enzyme will not have the right shape to do its job
Points: 1

22.
Answer: 2
Points: 1

23.
Answer: HIV/AIDs attacks immune system directly and the body is unable to deal with the invaders, damages immune system so it does not respond as effectively
Points: 1

24.
Answer: Example answer: the presence of progesterone secreted by the placenta inhibits egg production, progesterone inhibits egg release
Points: 1