

800. Which population contains the most available energy?

- 1) primary consumer
- 2) secondary consumer
- 3) decomposer
- 4) **producer**

801. Which cell organelle contains genetic information for the entire cell?

- 1) ribosome
- 2) cytoplasm
- 3) **nucleus**
- 4) mitochondria

802. If you have the DNA sequence of ACGATAG, what is the corresponding DNA?

- 1) GTAGCGA
- 2) TGCTAAT
- 3) ACGATAG
- 4) **TGCTATC**

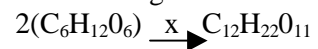
803. Which is not an abiotic factor that influences an ecosystem?

- 1) **animals eating grass**
- 2) the relative acidity of the soil
- 3) the amount of water in a given location
- 4) the amount of sunlight a plant receives

804. Uncontrolled cell division is represented by which statement?

- 1) **a man has lung cancer**
- 2) a young child has AIDS
- 3) my friend has diabetes
- 4) a woman is suffering from a stroke

805. A reaction is given below:



What does the "X" represent?

- 1) **enzyme**
- 2) glucose
- 3) water
- 4) maltose

806. Where do plants get most of their energy from:

- 1) soil
- 2) water
- 3) **sun**
- 4) minerals

807. What is one factor that would not harm a developing fetus?

- 1) use of drugs
- 2) **adequate diet**
- 3) use of tobacco
- 4) infection throughout pregnancy

808. Which one is not involved in the idea of natural selection?

- 1) over population
- 2) variations among offspring
- 3) **use and disuse**
- 4) struggle for survival

809. Which process is correctly paired with the end products.

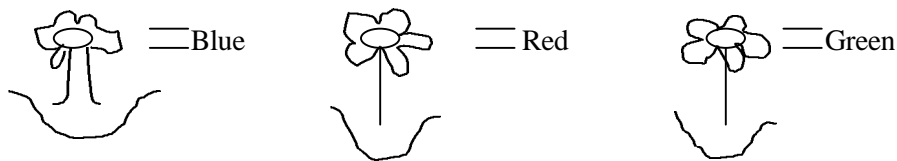
- 1) **photosynthesis → glucose**
- 2) respiration → oxygen
- 3) photosynthesis → ATP
- 4) respiration → glucose

810. A student wants to observe a sample of pond water. What 3 instruments must the student need to best observe the microorganisms in the sample? You must list at least 3 different instruments.

Rubric: Allow 1 point for each correct answer for a total of 3 points.

Ex: cover slip
slide
microscope
eye drop

A student wanted to investigate which color light made plants grow faster. She had 3 identical plants. She gave each one exactly the same amount of water, minerals and length of colored light exposure. The set-up is illustrated below.



The student did the experiment over a 3-week period of time and made the data table below.

Light Color	Amount of Size Increase
Blue	4 cm
Red	5 cm
Green	1 cm

811. What color light did the plant grow best?

Rubric: Allow 1 point for correct answer red.

812. What can the student conclude about this experiment?

Rubric: Allow 1 point for correct answers:

Ex: - plants grow best under the red light
- plants grow slower under the green light

813. What might the student do to improve this experiment?
Rubric: Allow 1 point for correct answer.
Ex: - have it run longer than 3 weeks to get more information
- more plants with more lights
814. Give two examples of how humans can negatively affect an ecosystem. [2]
Rubric: Allow 1 point for each correct answer.
Ex: - pollution
- deforestation
- over population
- over crop
- insecticides
Exemplar Response: One example of how humans can harm an ecosystem is the use of insecticides. Insecticides can pollute water and this in turn can affect food chains. Another example of how humans harm the ecosystem is deforestation. When trees are cut down many animals do not have shelter and food sources that the trees supply.
815. Give two examples of how humans can positively affect an ecosystem. [2]
Rubric: Allow 1 point for each correct answer.
Ex: - recycle
- share crop
- biological insecticides
- conservation of land and habitat
Exemplar Response: One example of how humans can positively affect an ecosystem is recycling. The idea of reuse, reduce and renew can have a major impact on the environment. If we do recycle, we take less from the environment and put less into the landfills. Another example of a positive affect is the conservation of land. An area where there is no deforestation and no human intervention allows organisms to maintain an equilibrium.
- You decide to go on a fishing trip with a close friend. You travel to Lake Ontario, rent a boat, go out on the lake, bait the hook and get ready to fish. You are out on the lake for about a half-hour and catch a large bass. It gives you a struggle, but you get it into the boat. You notice on the bass's scales there is a small long fish attached to it. The fish attached to the bass is a lamprey. It is harming the bass because where it is attached, there are sores and bloody spots on the bass.**
816. Name the symbiotic relationship between the bass and the lamprey. [1]
Rubric: Allow 1 point for correct answer parasite/host.
Exemplar Response: The relationship between the lamprey and bass is a parasite/host relationship.
817. Explain what might happen to the ecosystem if the population of lamprey increases.
Rubric: Allow 1 point for correct answer as lamprey increases and overpopulate, the bass population will decrease and eventually the lamprey will die off due to the lack of food
Exemplar Response: If the amount of lamprey increases, the fish's that are hosts such as the bass will eventually decline. In turn, the lamprey population decline due to the lack of fish to feed upon. If there is a low amount of fish, algae and insect populations will increase because fish often feed on them. Fish also serve as a food supply for wildlife such as bears, birds and raccoons. This will also be affected. The entire food web, if there are few fish, will be affected.
818. Cell structures in single-celled organisms help the cell perform life functions. These functions allow the cell to maintain internal stability. Choose the term below which refers to this stability.

- 1) synthesis
- 2) **homeostasis**
- 3) reproduction
- 4) metabolism

819. Segments of DNA molecules contain inheritable segments called:

- 1) hormones
- 2) fats
- 3) **genes**
- 4) proteins

820. Natural selection is the result of overproduction of offspring, variations among offspring, the struggle for survival, and:

- 1) **how some of the variations help those offspring adapt to their environment better**
- 2) how certain acquired traits develop during a lifetime
- 3) how the environment changes over time
- 4) how the world is warming because of holes in the ozone layer

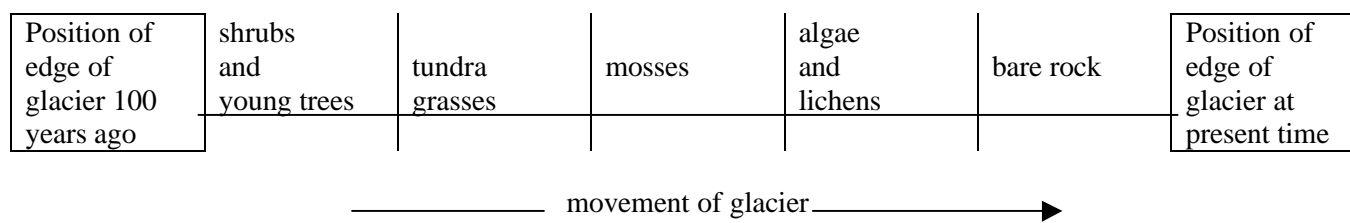
821. Human females have reproductive systems which produce gametes in the:

- 1) uterus
- 2) ureter
- 3) testes
- 4) **ovaries**

822. In all organisms, energy may be released during cellular respiration. This energy is stored in molecules of:

- 1) oxygen
- 2) glucose
- 3) **ATP**
- 4) water

823. The diagram below represents a map showing different places in an area once covered by a glacier.



The sequence of changes is an example of:

- 1) **ecological succession**
- 2) a population
- 3) a niche
- 4) energy pyramids

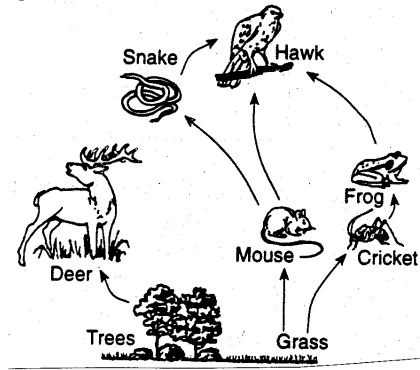
824. One way that humans modify ecosystems is through:

- 1) evolution
- 2) biodiversity
- 3) **pollution**
- 4) parasitism

825. What is the effect of humans using more land for building housing developments and industrial parks?

- 1) less carbon dioxide in the air
- 2) homeostasis of the ecological community
- 3) increase of the number of decomposers in the area
- 4) **loss of diversity of other living things in the ecosystem**

826. In the food web diagrammed below, identify one group of organisms, all of which are consumers.



- 1) frog, cricket, grass
- 2) **hawk, frog, cricket**
- 3) trees, grass, mouse
- 4) deer, trees, snake

827. Biological research generates knowledge which can be used to design ways of:

- 1) **diagnosing, preventing, and treating diseases of plants and animals**
- 2) developing ecological succession of prairies
- 3) creating atoms which cycle in the biosphere
- 4) making more energy pyramids

A child is born lacking sufficient hormones to properly develop the long bones in his/her body.

828. Describe how the child's development will be affected over a 5-year period.

Rubric: Allow 1 point for correct answer s/he will be shorter than other children of the same age.

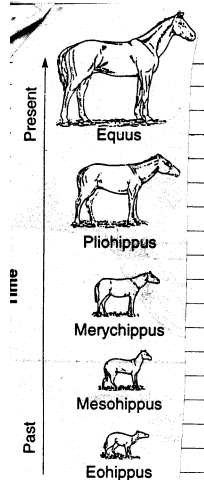
829. Suggest a possible treatment option in the first year of life and explain how it would help the child.

Rubric: Allow 1 point for correct answer:

- Ex: - hormone therapy
- synthetic hormone
- genetically engineered bacteria which naturally occurs in the intestine which will produce the missing hormone for the child

Allow 1 point for correct answer the child's bones would start growing properly and s/he will keep up the same growth as other children of the same age.

The diagram shows the gradual change over time in the anatomy of the horse constructed from the fossil record.



830. Using one or more complete sentences, state whether the biologist would use molecular similarities or structural similarities to construct these diagrams and how you decided.

Rubric: Allow 1 point for correct answer structural similarities
 Allow 1 point for correct answer only hard parts can become fossils

831. What is the change that you observe in the diagram from each horse over time from the past to the present?

Rubric: Allow 1 point for correct answer height is the change in the horse.

832. Write a hypothesis about an environmental factor which could have been favorably selected for the present-day Equus?

Rubric: Allow 1 point for correct answer:
 Ex: - longer legs escape from predators
 - larger animals can access a greater variety of food (high and low)
 - a bigger animal is stronger and can fight predators

Hypothermia: The Cold Facts

Be aware that cold water (less than 70 degrees F) can lower your body temperature. This is called hypothermia. If your body temperature goes too low, you may pass out and then drown. Even if you're wearing a life vest, your body can cool down 25 times faster in cold water than in air.

Water temperature, body size, amount of body fat, and movement in the water all play a part in cold water survival. Small people cool faster than large people. Children cool faster than adults.

HOW HYPOTHERMIA AFFECTS MOST ADULTS		
Water Temperature (Degrees Fahrenheit)	Exhaustion or Unconsciousness	Expected Time of Survival
32.5	Under 15 min.	Under 15 to 45 min.
32.5 to 40	15 to 30 min.	30 to 90 min.
40 to 50	30 to 60 min.	1 to 3 hrs.
50 to 60	1 to 2 hrs.	1 to 6 hrs.
60 to 70	2 to 7 hrs.	2 to 40 hrs.
70 to 80	2 to 12 hrs.	3 hrs. to indefinite
Over 80	Indefinite	Indefinite

Read the two paragraphs and study the chart, then answer Questions 833, 834 and 835.

833. State one possible human body system affected by being in cold water. Give a reason for your answer.

Rubric: Allow 1 point for correct answer respiratory, circulatory or nervous system

Allow 1 point for reasonable answer:

Ex: - cold water can numb nerves

- slowed respiratory system gets less oxygen into blood

- slowed circulatory system "moves" slower

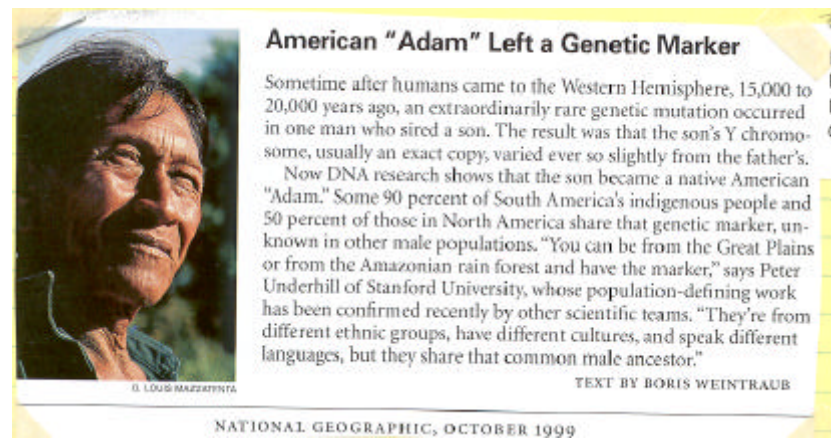
834. How do you determine how long an adult could remain conscious in water that is 50° - 60° Fahrenheit? State the amount of time. [2]

Rubric: Allow 1 point for correct answer read the time from the chart.

Allow 1 point for correct answer between one and two hours.

835. Give a scientific reason why unconsciousness is dangerous when you are in water? [1]

Rubric: Allow 1 point for correct answer if you are unconscious, you will breath in water instead of air and you will drown.



Read the article above and answer Questions 836 and 837 below:

836. Using one or more complete sentences and your knowledge of living things, what might have happened to cause the slight variation on the son's Y chromosome? [2]

Rubric: Allow 2 points for correct answer that mentions both mutagenic agent and the DNA was changed.

Allow 1 point if only one concept was mentioned.

837. Identify the continent with the greatest number of ancestors from the son with the slightly altered Y chromosome. Where do you think the gene mutation originally started and defend your decision. [3]

Rubric: Allow 1 point for correct answer South America has 90% sharing the genetic marker.

Allow 1 point for correct answer mutation was originally started in South America.

Allow 1 point for correct answer since a greater percentage (90%) of the marker is found there rather than 50% in North America.

838. Why are decomposers considered to be heterotrophs?

1) they contain chlorophyll

2) **they live off other organisms**

3) they synthesize glucose using sunlight as an energy source

4) they require water to live

839. Crocodiles guard beaches where they lay eggs. Other animals, such as turtles, lay eggs on these beaches because the crocodiles chase away predators. How might a decrease in the crocodile population affect the turtle and predator populations on the beaches?
- 1) the turtle population will increase and the predator population increase
 - 2) the turtle population will decrease and the predator population decrease
 - 3) the turtle population will increase and the predator population increase
 - 4) **the turtle population will decrease and the predator population increase**
840. Ultraviolet rays from the sun damage the DNA found in cells. How can this damage lead to skin cancer?
- 1) food can no longer be stored in the cell
 - 2) **the cells divide in an uncontrolled way**
 - 3) food can no longer be digested in the cell
 - 4) the skin cells die and are shed
841. Cocaine acts like chemicals that stimulate nerve cells by binding to receptors on the nerve cells. This usually results in overstimulation of the cells, and disrupts the body's homeostasis. The effect of cocaine is similar to that of:
- 1) ATP
 - 2) **neurotransmitter**
 - 3) carbon dioxide
 - 4) lactic acid
842. Bacteria reproduce asexually and therefore usually show little change from one generation to the next. Occasionally a new trait will develop in the strain of bacteria. This is probably due to:
- 1) inbreeding
 - 2) **a mutation**
 - 3) competition
 - 4) cloning
843. High temperatures can denature or change the shape of a protein. What would NOT be a possible effect of high temperatures in the human body?
- 1) enzymes could no longer bind to a substrate
 - 2) DNA replication could be disrupted
 - 3) hormones could lose their function
 - 4) **oxygen would not diffuse into cells**
844. Prior to the Industrial Revolution there existed two varieties of pepper moth. Most of the population of pepper moths were white with black dots; although some moths were darker colored. During the Industrial Revolution coal soot coated the trees in the area, turning the trees black. The moth population now began to be mostly dark colored moths. What could be a reason for this change in color?
- 1) coal soot caused mutations in the moths
 - 2) the black moths could find food better
 - 3) **more black moths survived predation to reproduce**
 - 4) the black color was determined by a dominant gene
845. What process contributes to the development of a zygote into a male fetus?

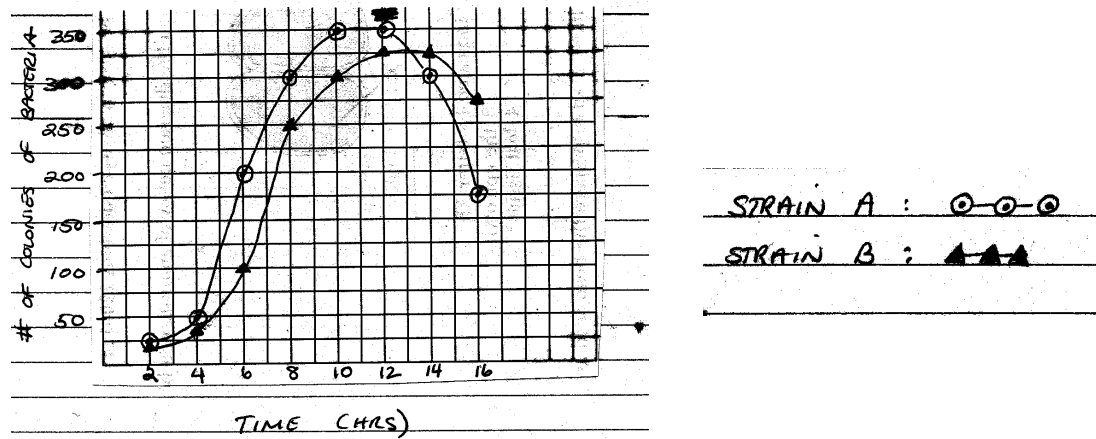
- 1) mutation
- 2) **differentiation**
- 3) meiosis
- 4) fertilization

846. Where does the energy for most food chains originally come from?

- 1) plants
- 2) autotrophy
- 3) **sun**
- 4) chemicals

847. Why is it important to maintain seed banks of different strains of corn?

- 1) to make sure we never run out of seed
- 2) to keep bad genes out of crops
- 3) **to maintain a more diverse gene pool**
- 4) to pay for food crops



848. By how many colonies did Strain B increase by between 6 and 8 hours? [1]

Rubric: Allow 1 point for 145-155 colonies.

849. Why did the number of bacteria go down after hour 13?

Rubric: Allow 1 point for any reasonable answer given in a complete sentence such as:

- the food for the bacteria ran out
- the amount of waste produced by the bacteria became toxic

Other answers may be acceptable

An experiment was designed to test which brand of antacid, A or B neutralizes stomach acid the fastest.

850. State a possible hypothesis for the outcome of this experiment using complete sentences. [1]

Rubric: Allow 1 credit for a reasonable hypothesis, which must be written in a complete sentence for full credit.

- Ex:
- Antacid A will neutralize acid more quickly than Antacid B
 - Antacid B will neutralize acid more quickly than Antacid A
 - Neither acid will neutralize acid more quickly

851. List 2 variables in this experiment that should remain constant.

Rubric: Allow 1 point for 2 correct constants.

- Ex: - same amount of antacid
- same volume of antacid
- same temperature of antacid
- same kind of acid
- same kind of container
- test antacid at the same time
Other answers may be acceptable

DOCTORS FEAR “SUPERBUG” IS EVOLVING:

Bacterium Thrives on An Antibiotic:

LONDON - Doctors say they may have seen a new “superbug” - a bacterium that not only resists antibiotics but thrives on them.

The bacterium infected two post-operative patients, and when treated with antibiotics quickly used them as a vital part of its metabolism, the patients’ doctors wrote in a letter published last week in the medical magazine *Lancet*.

“Have we at last witnessed the emergence of a true superbug?” the doctors asked.

The bacterium - *Enterococcus faecium* - caused fevers in the patients. Doctors used vancomycin, the standard treatment.

But within days, the bacterium showed resistance to the antibiotic - and then to thrive.

Antibiotics inhibit the construction of cell walls in the bacterium. Those bacteria that become resistant synthesize “bypass enzymes” to build the walls.

In this case, the bacterium apparently relied on the antibiotic to synthesize the enzymes. The doctors switched to another antibiotic, and the patients recovered.

“Here we have a bug that has taken the ultimate evolutionary step by actually becoming dependent on an antibiotic,” said Ian Eltringham of St. George’s Hospital. “Within a week and a day or two it had undergone a massive evolutionary change.”

852. How does the antibiotic normally kill the bacteria? [1]

Rubric: Allow 1 point for a response that includes that the antibiotics inhibit construction of the cell walls of the bacteria.

Ex: The bacteria can no longer build its cell walls.

853. How does the bacterium become resistant?

Rubric: Allow 1 point for a statement that indicates the bacteria used the antibiotic to build the bacteria’s own cell walls.

Ex: This bacteria makes enzymes from the antibiotic that helps build cell walls.

A student wanted to demonstrate the passing down of traits from one generation to another. She thought that coat color in mice would be an easy trait to follow. She crossed a gray mouse with a gray mouse, expecting to get all gray offspring. Instead, the offspring included a copper colored mouse, a black mouse, and a black and white spotted mouse.

854. How could the student learn more about coat color genetics in mice? [1]

Rubric: Allow 1 point for any reasonable method the student could use to get more information.

- Ex: - The student could cross the mice again.
- The student could cross the offspring.
- The student could look up information in the library.

855. Give an explanation for the variation in coat color of the offspring.

Rubric: Allow 1 point for any reasonable explanation for differences in the offspring’s coat color from the parent’s coat color.

- Ex: - Several genes control coat color.
- The female mouse may have already been pregnant.
- Coat color may change as the mice get older.

856. Which of the following is not a feature of most living organisms?
- 1) composed of cells
 - 2) able to maintain a stable internal environment
 - 3) have an unlimited life-span**
 - 4) capable of passing DNA to offspring
857. Which of the following human actions would allow a natural community to maintain the greatest biodiversity?
- 1) eliminating all predators
 - 2) protecting the community**
 - 3) removing dead or dying producers
 - 4) reducing the number of consumers
858. Scientists have found increased numbers of mitochondria in the cells of individuals who exercise. Which of the following substances might these scientists also find in greater amounts in the cells of these individuals?
- 1) uric acid
 - 2) chlorophyll
 - 3) RNA
 - 4) ATP**
859. An increase in numbers of which one of the following would be of least benefit to a runner in a five-mile race?
- 1) alveoli
 - 2) red blood cells
 - 3) white blood cells**
 - 4) capillaries
860. Which of the following cell organelles is most closely matched to its life process?
- 1) cell membrane - information storage
 - 2) mitochondria - food storage
 - 3) ribosome - protein synthesis**
 - 4) nucleus - waste disposal
861. Which of the following statements is not true about DNA?
- 1) it codes for the synthesis of proteins
 - 2) it is passed from generation to generation
 - 3) it is found only in animals**
 - 4) it is shaped like a double-helix
862. Cloning is most similar to which of the following events?
- 1) maple trees dropping seeds in a forest

- 2) bull frogs producing tadpoles in a pond
- 3) geese laying eggs in a nest
- 4) **bacteria dividing in a petri dish**

863. Which of the following pairs of items are produced by the human body in response to disease causing organisms?

- 1) **antibodies and white blood cells**
- 2) red blood cells and white blood cells
- 3) antibodies and red blood cells
- 4) antigens and antibiotics

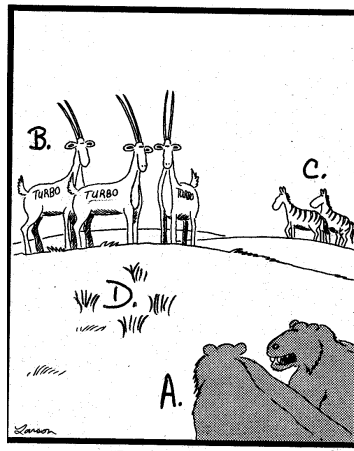
864. In the Hawaiian Islands lava flows totally destroy all plant life in some areas while in other areas former flows are returning to living communities. Which of the following terms best describes this process?

- 1) natural selection
- 2) ecological succession
- 3) genetic engineering
- 4) reproductive technology

865. Which of the following ecological terms is not a description of the role of any humans in the biosphere?

- 1) omnivore
- 2) predator
- 3) consumer
- 4) **producer**

Use the cartoon below to answer Questions 866, 867 and 868.



"Forget these guys."

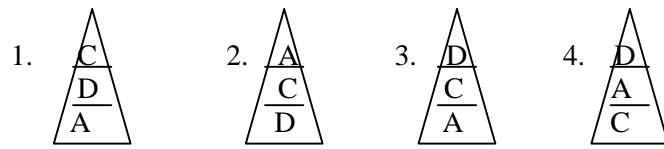
866. Using one or more complete sentences, describe a probable outcome of removing Species A from this environment. [1]

Rubric: Allow 1 point for correct answer Species A is removed, Species B and C should increase.

867. In a complete sentence, use an ecological term to describe the role of Species B and C in this environment. [1]

Rubric: Allow 1 point for correct answer the role of Species B and C is that of consumers, prey, herbivores, heterotrophs or ?

868. Select the food pyramid below which best depicts the above community. [1]



Rubric: Allow 1 point for correct answer #2.

In gray squirrel populations there are occasionally found “black” gray squirrels. The genes for black coat color are known to be recessive to genes for gray coats. Out of one of these populations a gray squirrel and a black squirrel mated and produced five offspring, two of which were black and three being gray. Using this information answer Questions 869 and 870.

869. Using G for gray genes and g for black genes, show the above cross on the provided Punnett Square.

Rubric:

	G	g	or		g	g
g	Gg	gg		G	Gg	Gg
g	Gg	gg		g	gg	gg

870. After many matings of these two squirrels, sixty-eight offspring were obtained. How many of these offspring would you expect to be black?

- 1) 0
- 2) 17
- 3) **34**
- 4) 68

871. Idont Havaklu was one of the first microscope builders over three hundred years ago. Idont decided to view many different items with his new invention. Some of the things he looked at were iron filings, frog skin, pieces of glass, and onion root tips.

Answer the following with complete sentences based on what you think Idont Havaklu should have seen:

- 1) Describe one visible difference Idont should have seen through his microscope when he compared glass and iron with frog skin and onion roots. [1]

Rubric: Allow 1 point for correct answer Idont should have seen “cells” when viewing frog skin and onion roots but not when viewing glass and iron.

- 2) Describe one visible similarity Idont should have seen through his microscope when he compared frog skin and onion roots. [1]

Rubric: Allow 1 point for correct answer Idont should have seen that both frog skin and onion roots were composed of “cells”.

- 3) Describe one visible difference Idont should have noticed when he compared frog skin and onion roots. [1]

Rubric: Allow 1 point for correct answer one difference Idont should have noticed was onion root cells had thick cell walls and frog skin cells did not.

- 4) Select one of the following parts to Havaklus’ microscope and describe its function in one or more complete sentences : [1]

a. eyepiece

- b. diaphragm
- c. stage
- d. coarse adjustment

Rubric: Allow 1 point for correct answer:

- eyepiece is used to view through or for magnification
- the diaphragm regulates the amount of light passing through scope
- the stage is used to set slides or specimens on
- the coarse adjustment is used to focus objective (low power) lens

872. Your mother has some antibiotics prescribed by a doctor for treating an infection she has. You contract a cold and your mother decides to give you some of her antibiotics. Using one or more complete sentences to answer each statement and your knowledge of biology explain the following to her:

- 1) Why the antibiotic will be ineffective against your cold. [1]

Rubric: Allow 1 point for correct answer colds are caused by viruses and antibiotics are ineffective against viral infections or antibiotics are for specific diseases and yours may be different from your mother's.

- 2) How your body can overcome the cold without taking antibiotics. [1]

Rubric: Allow 1 point for correct answer the human body has an immune system or produces antibodies or special cells to combat infections.

- 3) Why people taking antibiotics now may actually make diseases more difficult to treat in the future. [1]

Rubric: Allow 1 point for correct answer antibiotics can make infectious organisms (bacteria) develop resistant strains that may be more difficult to treat in the future.

873. In a farming community, a deer herd is growing out of control. Members of which group provide their greatest competition for food?

- 1) producers
- 2) omnivores
- 3) herbivores**
- 4) carnivores

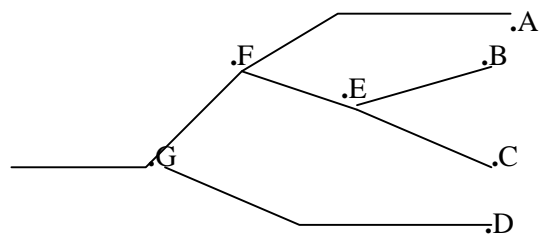
874. After a fragment of DNA, ATACGT, has been replicated, the new fragment is represented by TAGCA. This illustrates the process of:

- 1) insertion
- 2) deletion**
- 3) substitution
- 4) recombination

875. In order for a mutation to be passed on to offspring, it could not occur in a(n):

- 1) egg cell
- 2) sperm cell
- 3) zygote
- 4) polar body**

876. According to the diagram below, the most recent common ancestor shared by both organism B and D would be:



- 1) A
- 2) E
- 3) F
- 4) **G**

877. In the transition of organisms from life in the water to life on land, one of the most important adaptations to occur in the area of reproduction was:

- 1) external fertilization
- 2) **internal fertilization**
- 3) internal development
- 4) external development

878. The two human systems most responsible for maintaining homeostasis are:

- 1) circulatory and respiratory
- 2) **nervous and endocrine**
- 3) circulatory and endocrine
- 4) respiratory and nervous

879. Vaccinations were developed in the 20th century to help prevent and control disease. These vaccinations are most responsible for aiding which of the following systems in protecting the body?

- 1) circulatory
- 2) endocrine
- 3) **immune**
- 4) nervous

880. The carrying capacity of an ecosystem is limited the most by which abiotic factor?

- 1) **energy**
- 2) water
- 3) oxygen
- 4) minerals

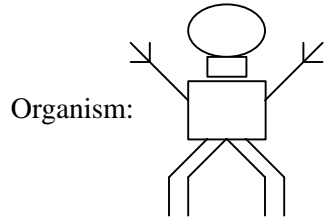
881. Changes to which of the following ecological cycles has had the greatest impact on global warming?

- 1) water
- 2) nitrogen
- 3) **carbon**
- 4) hydrogen

882. Molecules produced as a result of organic synthesis include all of the following except:

- 1) DNA
- 2) fats
- 3) proteins
- 4) **carbon dioxide**

883. A new organism was discovered by a scientist and is shown below. Your job is to classify this organism using the paired statements below.



Information:	
1a. Organism has 8 appendages	Go to 4
1b. Organism has 6 appendages	Go to 2
2a. Organism has a square head	Family Squaretop
2b. Organism does not have a square head	Go to 3
3a. Organism has 2 digits on upper appendages	Family Duodigit
3b. Organism has 3 digits on upper appendages	Family Tridigit
4a. Organism has digits on lower appendages	Family Toed
4b. Organism has no digits on lower appendages	Family Toeless

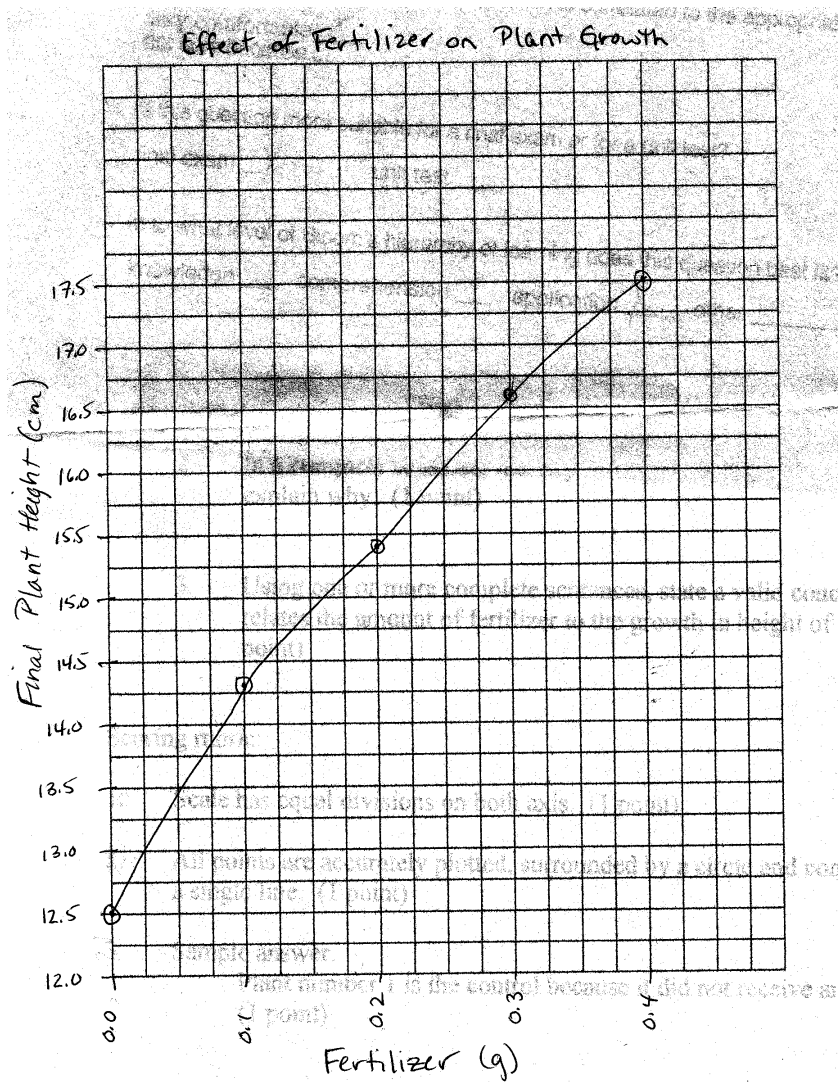
- 1) Indicate the sequence of steps which you used from the paired statements to identify the family of the new organism.
Rubric: Allow 1 point for the following sequence: 1b→ 2b→3b
- 2) Identify the family to which the new organism belongs.
Rubric: Allow 1 point for correct answer Family Tridigit.
- 3) What is the scientific tool used above called?
Rubric: Allow 1 point for correct answer dichotomous key.

884. A student did an experiment to test the effect of fertilizer on the growth of geranium plants. The student took five plants of equal height, potted them and placed them in the same area. Each plant was watered with 100 ml of water every other day for 2 weeks. Some of the plants were given fertilizer in with their water according to the chart below. Measurements of plant height were recorded on Day 14.

Plant	Fertilizer (g)	Final Height (cm)
1	0.0	12.5
2	0.1	14.3
3	0.2	15.4

4	0.3	16.6
5	0.4	17.5

- 1) Using the information provided above, construct a line graph on the grid provided on your answer sheet, following the directions below:
 - a. Mark appropriate scales on both the x and y-axis. [1]
Rubric: Allow 1 point for correct answer showing scale with equal divisions on both axis.
 - b. Plot the data from your table. Surround each point with a small circle and connect the points. [1]
Rubric: Allow 1 point if all points are accurately plotted, surrounded by a circle and connected with a single line.
- 2) In a complete sentence identify which plant was the control and explain why. [1]
Rubric: Allow 1 point for correct answer.
 Ex: Plant Number 1 is the control because it did not receive any fertilizer.
- 3) Using one or more complete sentences, state a valid conclusion that relates the amount of fertilizer to the growth in height of the plants. [1]
Rubric: Allow 1 point for correct answer.
 Ex: The greater the amount of fertilizer added, the taller the plant grew.
 Fertilizer has a direct effect on the growth of plants. The more added, the taller the plant grew.



885. Food chains/webs require a minimum of three levels in addition to the energy required from the sun or other sources such as thermal vents.

1) Identify and define the scientific terms which are used to categorize each of these three levels. Your definitions must include the energy transformations involved. [3]

Rubric: Allow 3 points if answer includes 3 of the following:

- a. producer - transforms solar energy (sunlight) to food energy or uses sunlight to make food
- b. consumer - absorbs energy from the producer or uses the producer to supply energy for metabolic activities or uses the producer for energy, but much is lost along the way.
- c. carnivore/secondary consumer - transfers energy from an herbivore (primary consumer) to use for metabolic activities or absorbs energy from an herbivore (primary consumer) or uses the herbivore (primary consumer) energy but much is lost in the transfer

or possible 3rd level could be:

decomposer - recycles energy back to the earth or recycles materials to the soil for energy

***other reasonable definitions may be accepted.**

Allow 2 points if any of the 2 terms above are used with an acceptable definition.

Allow 1 point if any one of the terms above is used with an acceptable definition.

Allow 0 points if no acceptable terms are used with a correct definition.

Sample Response: The three levels of the food chain are the producer, consumer and decomposer. The producer converts sunlight into food energy; the consumer utilizes the producer for energy to perform metabolic activities, and the decomposer recycles the energy back to the earth.

2) Construct a word diagram of a food chain which includes a representative organism for each level defined in Part A. Be sure to identify which level each organism represents. [2]

Rubric: Allow 2 points if appropriate organism for each level is correctly labeled and energy flow in the correct direction.

Allow 1 point if appropriate organism for each level but not labeled correctly or appropriate organism with appropriate label but direction flow is incorrect or inappropriate organisms used, but labels and energy flow are correct.

Sample Response:

grass →	rabbit →	bacteria
(producer)	(herbivore or primary consumer)	(decomposer)

or

grass →	rabbit →	hawk
(producer)	(herbivore)	(carnivore)

886. Use the excerpt from a recent newspaper article below and your knowledge of ecological issues to answer the questions which follow.

The beluga whale population in Alaska’s Cook Inlet, which has dropped by nearly half in the past six years, is not so imperiled that it needs protection under the Endangered Species Act, a federal agency ruled on Thursday. The National Marine Fisheries Services (NMFS) formally rejected a petition by environmental groups to list the population of small white whales as endangered or threatened.

The number of beluga whales in Cook Inlet, the wide channel linking Anchorage with the Gulf of Alaska, has dropped from 653 in 1994 to 357 in 1999, according to NMFS' latest count. The inlet has a historic carrying capacity of 1,300 belugas.

- 1) Using a complete sentence, define the term carrying capacity. [1]
Rubric: Allow 1 point for a correct definition. Give 0 points if definition is incorrect or a complete sentence is not used.
Sample Response: Carrying capacity identifies the number of individuals of a given population that can successfully occupy a given area.
- 2) Using a complete sentence, identify one possible cause of the decline in the beluga whale population. [1]
Rubric: Allow 1 point for a correct answer (other possibilities include overharvesting and pollution).
Allow 0 points if cause is incorrect or a complete sentence is not used.
Sample Response: A possible cause in the decline in the beluga population is overhunting.
- 3) Using a complete sentence, indicate one way which the beluga population could be increased.
Rubric: Allow 1 point for a correct answer.
Allow 0 points if answer is not plausible or is not in a complete sentence.
Sample Response: One way in which the beluga population could be increased is to control the hunting in the area.
Other acceptable answers would include introducing a breeding program, limit boating in the area.

887. In New York State there is an overpopulation of deer which leads to which major environmental situation?

- 1) **a depletion of limited resources**
- 2) less competition
- 3) increase in plant growth
- 4) more available land to inhabit

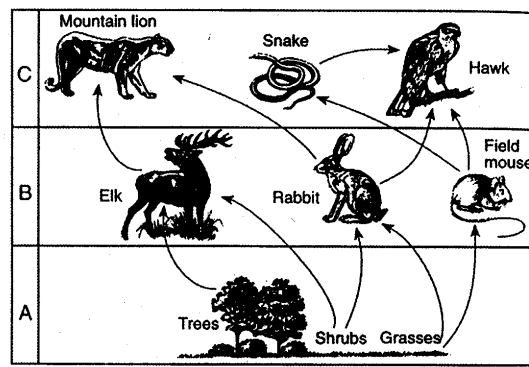
888. The overproduction of growth hormone leads to the human disorder known as gigantism. The disruption of normal hormone functioning leads to an imbalance of which life function?

- 1) reproduction
- 2) respiration
- 3) **homeostasis**
- 4) metabolism

889. During internal development, the human fetus receives nourishment through:

- 1) **placenta**
- 2) uterus
- 3) yolk
- 4) amnion

890. Which group of organisms possesses the greatest amount of energy?



- 1) A
- 2) B
- 3) C
- 4) all organisms contain the same amount of energy

891. In the environment, gray squirrels compete for biotic resources such as:

- 1) air
- 2) water
- 3) space
- 4) **reproductive mates**

892. Which structure in plants maintains homeostasis by regulating gas exchange and water loss?

- 1) chloroplasts
- 2) cell membrane
- 3) cell wall
- 4) **guard cells**

893. Which human activity can negatively alter the equilibrium in ecosystems?

- 1) biological control of pests
- 2) reforestation
- 3) **industrialization**
- 4) population control

894. After a zygote is formed, the cell undergoes a series of cell divisions known as:

- 1) meiosis
- 2) **mitosis**
- 3) differentiation
- 4) gametes

895. The sun provides a source of ultraviolet radiation which may cause melanoma, a form of skin cancer. For a mutation to be passed on to offspring, which type of cell must be affected?

- 1) skin
- 2) dermal
- 3) **sperm**
- 4) brain

896. Recently, new varieties of farm plants with larger fruit have been produced by manipulating genetic information. This process is called:

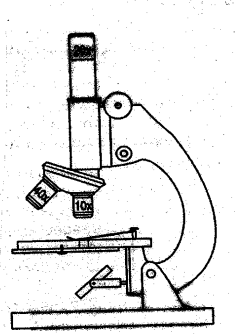
- 1) **genetic engineering**
- 2) cloning
- 3) mitosis
- 4) grafting

897. A student collected specimens from a nearby pond and prepared a wet mount to examine the specimens. After placing a coverslip over the wet mount, he placed the slide on the stage of a microscope under high power. Then he proceeded to focus the microscope using the fine adjustment knob.

In one or more complete sentences, state one problem with this student's experimental procedure. [1]

Rubric: Allow 1 point for one problem with the student's experimental procedure.

- Ex: - The student should have stained the wet mount with methylene blue or another type of stain.
- The student should have focused the slide under low power first.
 - The student did not turn the light on.



898. A student used the compound light microscope shown above to study a human cheek cell. The lowpower field of view diameter was 2 micrometers. In micrometers, what is the diameter of the highpower field of view?

Rubric: Allow 1 point for the correct answer 0.5 micrometers.

899. In one or more complete sentences, describe one laboratory procedure a student would use to see the nucleus of the cheek cell more clearly under the microscope.

Rubric: Allow 1 point for one lab procedure to stain the nucleus more clearly.

- Ex: - The student should stain the specimen using methylene blue or another stain.
- The student should clean the lenses.
 - The student should adjust the diaphragm to allow for more light.
 - The student should focus the fine/coarse adjustment knob.

900. New diet pills today contain certain substances that increase metabolic activity in the body which causes a person to lose weight. Some companies fail to identify the names and amounts of substances as part of the ingredients on the package. Describe one negative effect these diet pills may have on the body.

Rubric: - The diet pill speeds up the systems in the body which may put strain on organs such as the heart.

- A person should take use substances that are unknown. The body may have a negative reaction to the substance.

- Diet pills may cause a person to lose too much weight and therefore become malnourished.

901. To maintain homeostasis in the body, people need a well balanced diet. However, many people are participating in a diet which consists of a high protein intake and no carbohydrates. This diet results in initial weight loss mostly due to the loss of water and continued weight loss thereafter.

1) Describe the role carbohydrates have in the body and explain the effect of no carbohydrates on the body. [2]

Rubric: Allow 1 point for the role of carbohydrates in the body: carbohydrates are a source of energy.

Allow 1 point for explaining the effect of no carbohydrates on the body.

Ex: - the body will not have the energy available from the carbohydrates.

- the body will use stored energy found in fat (lipids) instead of using the energy found in carbohydrates.

Exemplar Response: Carbohydrates are the source of energy for the body. If a person has an imbalance of carbohydrate intake, there will be an effect on the homeostasis of the body. A high carbohydrate intake will cause the body to store carbohydrates as fat (lipids). A diet without carbohydrates will cause the body to find another source of energy which is fat (lipids).

2) Explain one negative impact this diet has on the body. [1]

Rubric: Allow 1 point for the negative impact this diet has on the body.

Ex: - lack of water may cause dehydration

- too much protein will cause organs (liver) to work at high levels which may lead to failure

- diets may lead to malnutrition

- the diet may lead to an overload of protein in the kidneys which may cause kidney failure

Exemplar Response: - one negative impact this diet will have on the body will be from the overload of protein. The excess protein in the diet will cause the liver to work at an extremely high rate. This may result in liver failure.

- one negative impact this diet will have on the body is an overload of protein. The excess protein will be stored in the kidneys and may result in kidney failure.

- one negative impact this diet will have on the body is the loss of water. This may cause dehydration which may lead to death.

902. Destruction of the Amazon Rainforest has a profound effect on the species that inhabit the area. Farmers of the Amazon region clearing the land by cutting and burning trees to allow for more land to farm. This land can only be farmed for a few years before it loses its valuable nutrients due to erosion. The issue that the citizens of South America are reducing the rainforest at such an alarming rate raises concerns for people all over the world.

1) Describe how the destruction of the Amazon Rainforest relates to global warming. [1]

Rubric: Allow 1 point for how the destruction of the Amazon Rainforest relates to global warming:

Ex: - global warming can be caused by excess fossil fuels in the atmosphere

- increased fossil fuels are a result of increased industrialization and CO₂ from burning the trees

- less trees available to use the CO₂ for photosynthesis

Exemplar Response: Global warming can be caused by excess fossil fuels in the atmosphere.

Due to the increased amount of industrialization and burning down of the trees,

more carbon dioxide will be present in the atmosphere. The carbon dioxide will trap the ultraviolet radiation from the sun and cause the greenhouse effect. This will lead to increased temperatures on Earth.

- 2) Give 2 examples of how the destruction of the Amazon Rainforest affects humans . [2]

Rubric: Allow 1 point for each of the following answers up to a maximum of 2 points:

- Ex: - less O₂ available in the atmosphere for respiration
- global warming (increase in temperature)
- more CO₂ in the atmosphere due to the burning of the trees and increased industrialization
- may cause undiscovered species to become extinct
- may cause known species to become extinct
- may cause the species to become extinct that can be used for medicine or cures to diseases
- longer growing seasons

Exemplar Response: One example of how the destruction of the Amazon Rainforest affects humans is that unknown species in the Amazon may be forced out of their habitat and become extinct. Another example is that these unknown species may play an undiscovered role in treating diseases and illnesses.

903. Which biotic factor is likely to influence the population distribution in a water ecosystem?

- 1) concentration of dissolved oxygen
- 2) amount of sunlight
- 3) type of predator fish present**
- 4) daily temperature fluctuations

904. Which organelle is responsible for protein synthesis?

- 1) mitochondrion
- 2) ribosome**
- 3) lysosome
- 4) vacuole

905. Genes that code for inherited traits are passed from one generation to the next one:

- 1) chromosomes**
- 2) ribosomes
- 3) vacuoles
- 4) lysosomes

906. A section of one strand of DNA has the following sequence of nitrogenous bases: GCTAATCGG
Which sequence below would compose its complimentary strand of DNA?

- 1) ATATTGCCA
- 2) CGATTAGCC**
- 3) TACGGGCAC
- 4) GCCACCTCG

907. Which of the following is not considered evidence of evolution in species:

- 1) fossil record
- 2) relative position of the planets within the Milkyway Galaxy**

- 3) structural similarities
- 4) molecular similarities

908. Which biological process results in the formation of an egg?

- 1) fertilization
- 2) respiration
- 3) **meiosis**
- 4) mitosis

909. The process by which plants and some unicellular organisms produce food is known as:

- 1) respiration
- 2) digestion
- 3) excretion
- 4) **photosynthesis**

910. A stable ecosystem must have all of the following except:

- 1) **greater number of predators than prey**
- 2) an energy source
- 3) producers
- 4) recycling of materials between living things and their environment

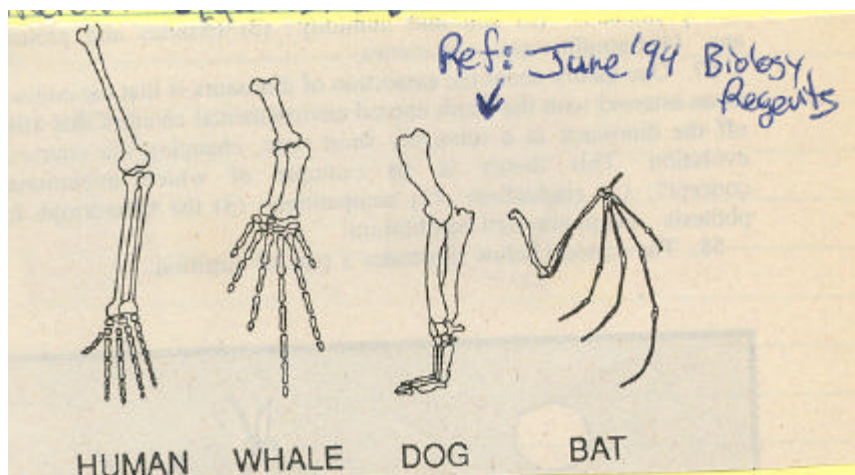
911. Humans modify ecosystems as a result of all of the following except:

- 1) population growth
- 2) consumption of resources
- 3) **observing organisms in the laboratory**
- 4) use of technology that increases pollution

912. In humans, invasions of bacteria are fought by:

- 1) sex cells
- 2) **white blood cells**
- 3) cancer cells
- 4) decomposers

The diagrams below illustrate the structure and placement of bones in the forelimbs of four different organisms.



913. Compare the diagrams. In a complete sentence, state at least one way in which they are similar.

Rubric: Allow 1 point for the following possible student responses:

- the organisms have the same general arrangement of bones
- all the limbs end in little bones (digits)
- all bones form structures used for movement
- the individual bones are similar in shape

Allow 1 point for other answers that are similar.

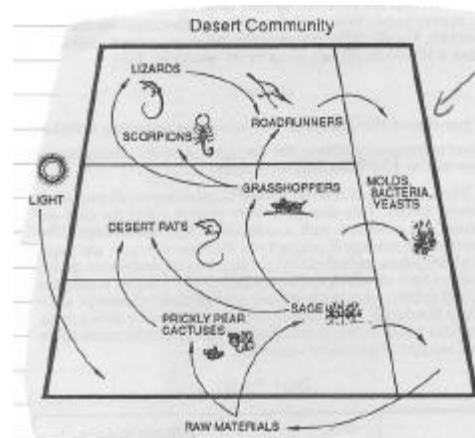
914. Similarities in structure are one form of evidence for the process of evolution. In one or more complete sentences, describe a conclusion that you can form about the evolution of these organisms from the diagram.

Rubric: Allow 1 point for answer stating that the organisms are related to one another.

Allow 2 points for answer stating that the function is a result of adaptations for environment through evolution (i.e. wings for flying).

Allow 2 points for answer stating that all four organisms share a common ancestor (or that they are evolved from the same organism).

The diagram below represents energy transfers within a desert community.



From: June'93 Biology Regents

915. Name a producer in this community. [1]

Rubric: Allow 1 point for correct answer prickly pear cactus or sage.

916. Name a carnivore in this community. [1]

Rubric: Allow 1 point for correct answer scorpion, lizard, roadrunners.

917. Assume an infectious disease kills off the entire population of grasshoppers in this community but leaves the other populations unharmed. Using complete sentences, describe two possible consequences to the community's stability if the grasshopper population is eliminated. [2]

Rubric: Allow 2 points for any 2 of the following written in complete sentences:

- increase in sage population
- decrease in roadrunner population
- decrease in scorpion population
- decrease in lizard population

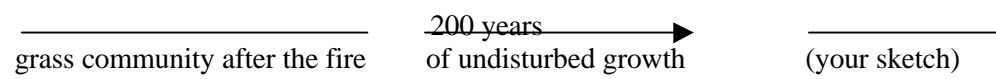
918. Which of the following choices is the least reliable source of information. [1]

- 1) published journal article
- 2) text book

- 3) encyclopedia
- 4) **Internet chatroom**

919. A forest area in NYS is destroyed by a fire. The following spring the once-burned area is populated by grasses and other small annual plants. This area is then left undisturbed for 200 years.

- 1) Predict in a drawing how you think this area will look in 200 years of undisturbed growth. Sketch this prediction in the appropriate spot on your answer sheet. You must label at least one plant and one animal. [2]



Rubric: Allow 1 point for a labeled sketch.
 Allow 2 points for sketches that include deciduous trees (maple, beech, etc.) and at least one animal (deer, fox, gray squirrel, etc.)

- 2) Use a complete sentence to describe the process by which the change in communities takes place. [1]

Rubric: Allow 1 point if the student uses a complete sentence and names the process of ecological succession.

- 3) Describe a predator-prey relationship that could be found within your predicted community. Clearly state which organism is the predator and which is the prey. [2]

Rubric: Allow 1 point if a predator and prey animal is described in the sentence.
 Allow 2 points if both the predator and prey are realistic organisms for NYS deciduous forest.

- 4) In a complete sentence, describe how observers would know if your predicted community has reached its point of stability. [1]

Rubric: Allow 1 point if the student states that the observers would notice little or no change in the types of populations found within the community.

920. Imagine you are an interplanetary explorer searching the galaxy for habitable planets. Suppose you land on Planet "X" and observe the following environmental conditions:

- heavy annual rainfall
- warm temperature
- large bodies of fresh water with strong currents
- diverse community of plants and animals with many predator-prey relationships

You observe one prey species that is about the size of a dog and lives both on land and in the water.

- 1) Use your imagination and knowledge of living things to sketch what this organism may appear like. Label two special structures on this organism that has made it better adapted to its environment.

Rubric: Drawings will vary.
 Allow 1 point if there is a drawing that has two structures labeled.
 Allow 2 points if the drawing has structures that will allow it to move on land and in water.

- 2) Using complete sentences, describe how each of the 2 evolved structures labeled in Part A increase the organisms chance for survival.

Rubric: Answers will vary but should be based on the labeled structures from Part A.
 Allow 1 point for each description that describes how the structure increases the organisms chance of survival.
 Ex: Organism has a large flipper for speed in water or organism has a large eye for excellent vision, allowing it to escape prey.

- 3) In a complete sentence, describe why it is important to the process of evolution that the organisms which are best adapted survive and reproduce.

Rubric: Allow 1 point for a complete sentence that states the need to pass favorable traits on to new generations.

- Ex: - The process of evolution requires that those organisms best adapted pass traits onto new generations so that the trait continues through time.
- New offspring must have the trait so that they are better able to survive.
- Other acceptable responses

921. Which would be an example of inversion relating to this DNA segment?

r
s
t
u
v
w

1. r
s
v
u
t
w

2. r
s
t
r
s
t
u
v

3. r
s
u
v
w

4. r
s
t
u
v
w
a
b

922. If the level of progesterone in the human female decreases, which process will occur?

- 1) reproduction
- 2) mitosis
- 3) meiosis
- 4) **menstruation**

923. During the process of DNA replication, the separation will occur between the:

- 1) thymine and guanines bases
- 2) phosphate and molecule and adenine base
- 3) sugar molecule and guanine base
- 4) cytosine and guanine bases

924. The swelling of ankles and wrists in humans could be the result of a malfunction of which system?

- 1) excretory
- 2) digestive
- 3) reproductive
- 4) respiratory

925. Catalysts for the hydrolysis of carbohydrates are called:

- 1) enzymes
- 2) ATP
- 3) vitamins
- 4) genes

926. Human nerve cells require 30 times more potassium inside them than in their surroundings. This concentration is maintained by the process of:

- 1) diffusion
- 2) active transport
- 3) synthesis
- 4) passive transport

927. A human zygote is created containing 92 chromosomes in its nucleus. Which process did not occur within the testes and ovaries.

- 1) meiosis
- 2) mitosis
- 3) respiration
- 4) circulation

928. Muscle cells are produced from the mesoderm germ layer of the gastrula by the process of:

- 1) meiosis
- 2) respiration
- 3) gestation
- 4) differentiation

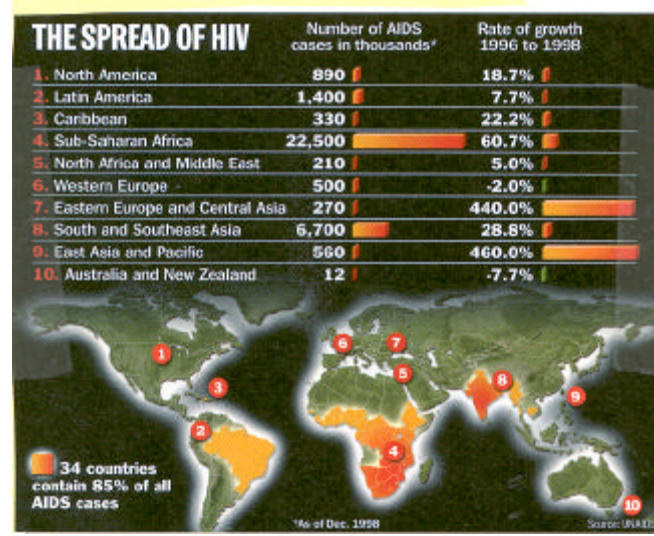
929. The concept that a grasshopper may be consumed by a frog and a snake living in the same ecosystem is illustrated by a:

- 1) food web
- 2) food chain
- 3) pyramid of energy
- 4) pyramid of biomass

930. A plant in the desert has a thicker cuticle. What advantage is this to the plant?

- 1) increases the surface area for better water absorption
- 2) increases the plant's ability to excrete O_2 to the atmosphere
- 3) decreases the amount of water the plant could release to the environment
- 4) decreases the plant's ability to produce glucose

Below is data relating to the spread of HIV in the major countries of the world.



931. Organize the data in the chart in the table below so that the number of cases of HIV increases from the top to the bottom of the paper.

Rubric: Allow 1 point for correct data chart shown below:

Countries	# AIDS in Thousands
Australia/New Zealand	12
N. Africa/Mid East	210
E. Europe/Cent. Asia	270
Caribbean	330
W. Europe	500
E. Asia/Pacific	560
N. America	890
Latin America	1,400
S. & SE Asia	6,700
Sub-Saharan Africa	22,500

932. Construct a bar graph using the information from the data chart on the graph below.

Rubric: Allow 1 point for correct bar graph.

933. Which area(s) have reported the least number of AIDS cases?

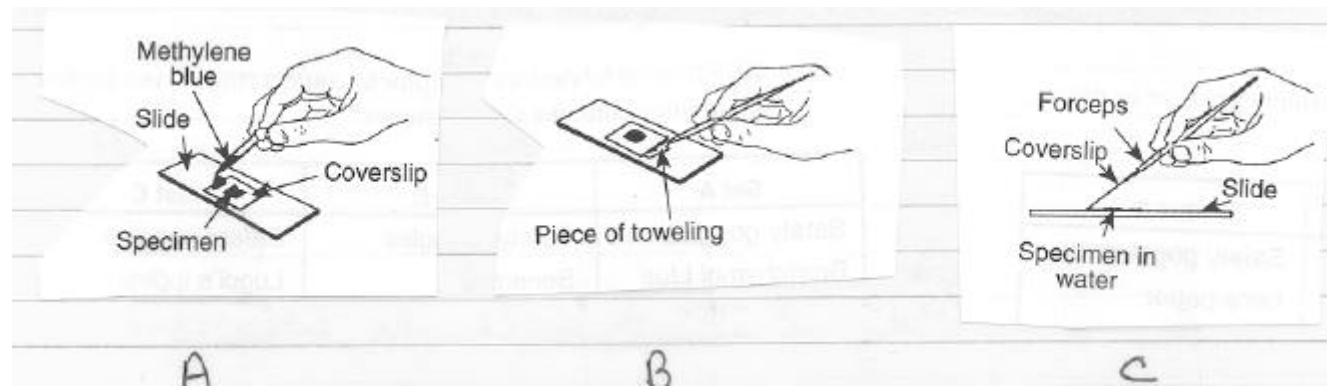
Rubric: Allow 1 point for correct answer Australia and New Zealand.

934. Based on your knowledge of Biology, discuss a reason for the low number of cases in those areas.

Rubric: Allow 1 point for correct answer:

- Ex:
- using safe reproductive controls
 - using sterile techniques, like needles
 - giving own blood for transfusions
 - a wealthier populations

The diagrams below show a student preparing a wet mount slide. Answer the following questions based on the diagram.



935. The pictures are not in order. Which is the correct order for preparing the wet mount? [1]

_____ 1st step

_____ last step

Rubric: Allow 1 point for correct answer I, II, III.

Answer the following questions in one or more complete sentences:

936. State 1 reason why methylene blue is being used in Step II? [1]

Rubric: Allow 1 point for correct answer.

- Ex:
- the cell is an animal cell
 - it is used to stain the cell
 - it will make the cell organelles, like the nucleus, to be visible

937. What is the purpose of the toweling indicated in Step III? [1]

Rubric: Allow 1 point for correct answer the toweling is used to pull the stain under the coverslip without lifting the coverslip.

938. Explain what effect a 5% decrease in the amount of sunlight reaching the earth's surface would have on the following processes:

1) photosynthesis [1]

Rubric: Photosynthesis: plants would not produce as much food and oxygen.

Allow 1 point for correct answer both a decrease in the production of food and oxygen

2) respiration [1]

Rubric: Respiration: organisms that use oxygen would not be able to carry on as much aerobic respiration, therefore not producing as much energy.

Allow 1 point if they mention aerobic respiration or decrease production of energy.

939. Discuss one way in which respiration and photosynthesis are opposite reactions. [1]

Rubric: Respiration is the process whereby glucose molecules are taken apart to release their stored energy. Photosynthesis is the process that produces energy rich glucose molecules.

Allow 1 point for answer indicating respiration produces energy; photosynthesis produces glucose.

940. A young track athlete practices the mile run for the first time. The next day her muscles are sore. Explain what happened. [1]
Rubric: Anaerobic respiration took place in the muscle cells and lactic acid was produced. Allow 1 point if answer includes both anaerobic respiration and the production of lactic acid.
941. If we were to take a trip to a 3rd world country, why would we need to be vaccinated against many diseases?
Rubric: Allow 1 point for correct answer many of the germs and viruses may not be found in the U.S. so we would not have any natural antibodies against these organisms.
942. Discuss the type of immunity gained and the process associated with this vaccination.
Rubric: Allow 2 points for correct answer active immunity would be gained. A vaccine contains a small amount of the virus and our bodies will begin to produce antibodies.
943. State a reason that people in the U.S. may want to be vaccinated against 3rd world country diseases.
Rubric: Allow 1 point for correct answer people may be concerned about bringing new organisms into the country which may not have any natural predators.
944. Explain why a newborn infant does not get an ear infection within the first 2 months of life.
Rubric: Allow 1 point for correct answer a newborn infant has temporary immunity from the mother. This temporary immunity provides borrowed antibodies that the mother has in her blood. Eventually these antibodies disintegrate and the infant gains its own antibodies.
945. Trees growing along the sides of roads often die, due to the salt spread on the roads during the winter. The excess salt in the ground takes water from the trees by the process of:
- 1) active transport
 - 2) **passive transport**
 - 3) hydrolysis
 - 4) synthesis
946. The antenna of the crayfish are used to detect odors and taste. The detection of these stimuli would travel toward the brain on a (an):
- 1) interneuron
 - 2) motor neuron
 - 3) **sensory neuron**
 - 4) reflex arc
947. Today human genes can be inserted into bacteria to produce insulin. This process of changing organisms by man is referred to as:
- 1) replication
 - 2) genetic engineering
 - 3) random alteration
 - 4) selective breeding
948. A human white blood cell contains 46 chromosomes. Which process reduces the number of chromosomes to 23?
- 1) **meiosis**

- 2) mitosis
 - 3) fertilization
 - 4) differentiation
949. Mutations occur as random chance events within cells. Within which cells of the body would mutations be passed onto the offspring?
- 1) skin cells
 - 2) liver cells
 - 3) **sperm cells**
 - 4) white blood cells
950. An apple farmer sprays his orchards with a pesticide. Only a few of the insects survive. These insects are able to pass on their survival trait through:
- 1) **sexual reproduction**
 - 2) asexual reproduction
 - 3) cloning
 - 4) selective breeding
951. As Kathy eats a candy bar, the sugar level in her blood will first increase then return to normal. Which organ of the body regulates sugar level?
- 1) small intestine
 - 2) liver
 - 3) **pancreas**
 - 4) stomach
952. Which two reactions cycle the elements: carbon, hydrogen and oxygen
- 1) synthesis and hydrolysis
 - 2) respiration and synthesis
 - 3) photosynthesis and hydrolysis
 - 4) **photosynthesis and respiration**
953. Electric companies in the Ohio Valley burn coal for the production of electricity. The burning of fossil fuel produces acid rain. Which of the following is not an effect of acid rain?
- 1) the types of vegetation which can grow in an area
 - 2) the population of amphibians in a swamp
 - 3) the pH of the soil
 - 4) the annual precipitation
954. In 1845 a potato blight ravaged Ireland. This disease destroyed the potatoes by causing them to rot. The reason the potatoes died, was that they couldn't produce.
- 1) antigens
 - 2) antibodies
 - 3) insulin
 - 4) hormones

“Dung beetles are nature’s little waste managers and recyclers. The Amazon rainforest may harbor up to 2,000 of these per hectare. Annually per hectare, they may bury 10 kilograms of dung (a quarter of the

**dung production of howler monkeys per hectare) and bring 500 kilograms of soil to the surface.”
Earthwatch, March 2000.**

955. How much dung is produced per hectare by the howler monkey annually?

Rubric: Allow 1 point for correct answer 40 kg.

956. What may happen to the dung beetle if deforestation of the rainforest continues?

Rubric: Allow 1 point for correct answer as deforestation continues, the number of dung beetles would decrease.

957. Another insect is introduced to the Amazon rainforest which occupies the same niche as the dung beetle. What conclusion can be drawn from this introduction?

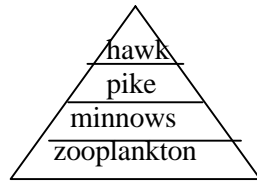
Rubric: Allow 1 point for correct answer when two species occupy the same niche, there will be competition between the species.

A laboratory investigation was performed to determine the level of DDT in different organisms and the environment. The following levels were detected:

lake water	0.0003 ppm
zooplankton	0.04 ppm
small fish (minnows)	0.5 ppm
large fish (pike)	2.0 ppm
fish eating bird (hawk)	25.0 ppm

958. Construct a pyramid of energy from producer to tertiary consumer, showing where each organism is found.

Rubric: Allow 1 point for correct pyramid as shown below:



959. Using one or more complete sentences, explain why the hawk has a greater amount of DDT than the zooplankton.

Rubric: Allow 1 point for correct answer in a food pyramid, one organism is eaten by another which in turn is eaten. In this progression, pollutants will accumulate toward the peak of the pyramid.

Cloning of body organs have both positive and negative aspects.

960. State two positive aspects of cloning.

Rubric: Allow 1 point for each correct answer for a total of 2 points.

- With cloning a person wouldn't have to worry about organ rejection. The new organ would have the same proteins as the person because they were made from the person's body cells.
- A second positive aspect would be an unlimited supply of body organs. A person would no longer have to wait for a donor.

961. State one negative aspect of cloning.

Rubric: Allow 1 point for correct answer someone may want to clone a master race. Each person would no longer be unique. The cost may be a prohibitive factor. What determines when you die?

Robin and her friends stop at Burger King and she orders a Whopper with cheese, lettuce and tomato.

962. What is the pathway for the digestion of the whopper?

Rubric: Allow 1 point for five out of the six organs of the digestive system.

- The pathway for the whopper would be mouth, esophagus, stomach, small intestine, large intestine, anus.

963. What type of digestion occurs at each part of the digestive system?

Rubric: Allow 2 points for listing five out of six organs correctly.

Allow 1 point for listing three out of six organs correctly.

- In the mouth there would be both mechanical and chemical digestion. In the esophagus there would be no digestion. The stomach would have mechanical and chemical digestion. The small intestine would continue with chemical digestion. In the large intestine there would be no digestion. The anus is where egestion occurs.

964. A person has gallstones, what affect would this have on the digestion of the whopper?

Rubric: Allow 1 point for correct answer.

- A gallstone would block the flow of bile from the gall bladder to the small intestine. Any fat in the meat would not be emulsified and would take longer to be digested in the small intestine.

965. If energy was money, the unit of exchange would be:

- 1) glucose
- 2) ADP
- 3) **ATP**
- 4) protein

966. Many organisms can move. Which of the following choices may provide a one-celled organism with this ability?

- 1) muscle
- 2) bones
- 3) roots
- 4) **cytoplasm**

967. Klinefelters syndrome results in an individual with XXY chromosomes. An explanation of this result is:

- 1) fusion of 2 sperm and 1 egg
- 2) **chromosomes not separating**
- 3) fusion of 2 eggs
- 4) this is not possible

968. A student is using a light microscope with a 10X eyepiece lens and 3 objective lens: 10X, 20X, 40X. What is the lowest power of magnification possible?

- 1) **100X**
- 2) 200X
- 3) 300X

4) 400X

969. The mouth participates in all of the following digestive functions except:

- 1) lubrication
- 2) chemical digestion
- 3) physical digestion
- 4) absorption

970. The most muscular portion of the heart (human) is:

- 1) upper
- 2) **lower**
- 3) right side
- 4) left side

971. All of the following are indications of a problem in the kidney if the following is found in the urine except:

- 1) protein
- 2) glucose
- 3) excess bacteria
- 4) **urea**

972. Which level of organisms provides the greatest amount of energy?

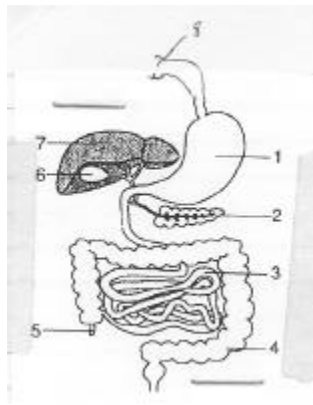
- 1) **producers**
- 2) consumers
- 3) decomposers
- 4) parasites

973. A shortage of which of the following would cause a person to feel tired?

- 1) **RBC**
- 2) WBC
- 3) platelets
- 4) carbon dioxide

974. The simplest form of nervous response is:

- 1) **reflex**
- 2) hearing
- 3) taste
- 4) sight



975. From the organs labeled above, identify by number which organs physically breakdown food. For each organ identified for this process, describe the action.

Rubric: Allow 1 point for correct answers 1 and 8.

Allow 1 point for each correct answer:

- 1 - grinding by teeth
- mixing by tongue
- 8 - mixing by stomach
- limited abrasions of food against food

976. Identify by number and name which organ secretes into both the digestive and circulatory systems.

Rubric: Allow 2 points for correct answers 2 and pancreas

Trying to develop a new pea plant, a farmer crosses a pure smooth pea plant with a pure wrinkled pea plant. W is dominant for smooth over w for wrinkled.

977. Complete the Punnett Square for this cross showing the results.

Rubric: Allow 1 points for correctly identifying genotypes of parents WW & ww.

Allow 1 point for completing the Punnett Square correctly.

	W	W
w	Ww	Ww
w	Ww	Ww

978. Considering the traits crossed, what trait would the offspring exhibit?

Rubric: Allow 1 point for correct answer smooth.

979. Compare a Punnett Square crossing the offspring from the farmers first cross.

Rubric: Allow 1 point for completing the Punnett Square correctly. (No partial credit)

	W	w
W	WW	Ww
w	Ww	ww

980. What is the ratio of smooth peas to wrinkled peas in the second cross?

Rubric: Allow 1 point for correct answer -3:1.

Jim and Carol both appear normal. They have two girls ages 3 and 5. Both girls appear normal. One year ago Carol gave birth to a boy. Over the past year it has been observed that the little boy bruises easily and has had several occasions where it has taken a long time to stop the bleeding after an injury. His parents and sisters do not exhibit these traits.

981. What is the little boy's medical diagnoses?

Rubric: Allow 1 point for correct answer hemophilia.
Exemplar Response: Hemophilia

982. Who did he get this trait from?

Rubric: Allow 1 point for correct answers Carol or his mother.
Exemplar Response: Carol

983. What is the probability Jim and Carol's next child will exhibit this trait?

a. Show Punnett Square cross

Rubric: Allow 1 point for correct Punnett Square cross.

	X	Y
X ^H	X ^H X	X ^H Y
X	XX	XY

Exemplar Response: See Punnett Square above.

b. State probability.

Rubric: Allow 1 point for correct answers 25% or 1 in 4 chance.
Exemplar Response: 25%

* If Punnett Square is incorrect leading to an incorrect Part B answer - no credit.

984. Explain in complete sentences why the two girls do not exhibit this trait?

Rubric: Allow 1 point for correct answer.

Ex: - this is sexed linked trait
- girls are XX so both X's must be defective
- girls with 1 defective X do not show trait

Exemplar Response: The girls sex chromosomes are XX. To show this trait a girl must have 2 X's that are defective with trait.

Four weeks ago Joe, a 45-year old white male, cut his big toe. The cut has not healed and actually appears worse. Joe decided to see his doctor. Upon examination the doctor found that Joe did have a quarter size ulcer on his toe that did not appear infected. The doctor also found a loss of sensation in Joe's feet and Joe's feet appear pale and feel cool. Upon questioning, the complaints of increases urination and feeling thirsty. A portion of the laboratory examination of Joe's blood is as follows:

	<u>JOE</u>	<u>NORMAL</u>	
RBC	NORMAL RANGE		
WBC	NORMAL RANGE		
PLATELETS	NORMAL RANGE		
IRON	SLIGHTLY LOW		
GLUCOSE	300	80 - 120	
CHOLESTEROL	190	<200	Values and units would be specified for each parameter

985. What is the probable diagnosis from the doctor?

Rubric: Allow 1 point for correct answer diabetes.
Exemplar Response: Diabetes

986. Give the cellular cause and effect of this disease. Use complete sentences.

Rubric: Allow 1 point for correct answer as to cause:

Ex: - insulin is not present
- the pancreas is not making insulin

Allow 1 point for correct answer as to effect:

- Ex: - glucose can not enter cells
 - the cells are starving and can not function
 - cells will die from lack of glucose
 - cells are not receiving energy

Exemplar Response:

Cause: Joe's pancreas is not producing insulin.

Effect: The lack of insulin is causing the cells of Joe's body to starve. Without insulin, glucose cannot enter Joe's body cells and remains in the blood.

987. Humans, like all other organisms:

- 1) use oxygen for respiration
- 2) carry out heterotrophic nutrition
- 3) carry out autotrophic nutrition
- 4) **are composed of one or more cells**

988. An organism has the ability to control and coordinate its internal chemical reactions. This concept is known as:

- 1) metabolism
- 2) hydrolysis
- 3) **homeostasis**
- 4) dehydration synthesis

989. Base your answer to this question on the equations below.

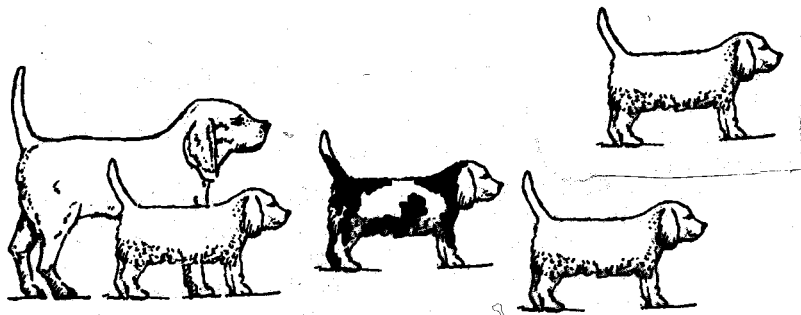
Reaction A - 2 pyruvic acid + oxygen → carbon dioxide + water + 34ATP

Reaction B - 2 pyruvic acid + oxygen → carbon dioxide + water + 34 ATP

Reaction A is complete within 17 hours and Reaction B is complete within 7 hours. The difference in reaction rates is most likely due to:

- 1) an increase in temperature in Reaction B
- 2) a decrease in temperature in Reaction B
- 3) the addition of energy in Reaction B
- 4) **the addition of an enzyme at Letter X**

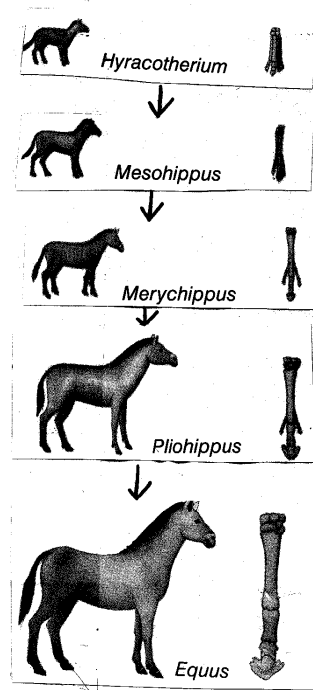
990. Which statement correctly describes the picture below?



- 1) natural selection involves the struggle of an organism to survive and reproduce in their environment
- 2) many different organisms have similar proteins and enzymes
- 3) new species evolve in forms different from a common ancestral species

4) mutations that occur in sex cells can be transmitted to offspring

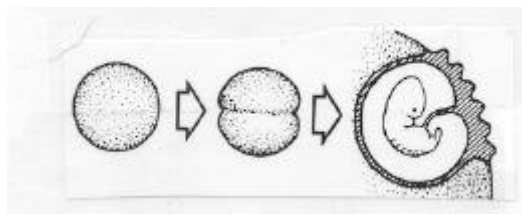
991. Refer to the diagram below and on your knowledge of the Living Environment.



This is an example of:

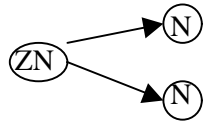
- 1) a mutation
- 2) **evolution**
- 3) modern genetics
- 4) dynamic equilibrium

992. Of the causes listed, which would have the greatest effect on the process below?



- 1) exposure to sunlight
- 2) **alcohol consumption**
- 3) breathing in excess oxygen
- 4) consumption of fatty foods

993. According to the diagram to the left, which statement concerning the offspring is not correct?



- 1) offspring have half the number of chromosomes as the parent
- 2) offspring contain the monoploid number of chromosomes
- 3) **offspring are identical to parents**
- 4) offspring are formed by reduction division

994. Which of the statements below is an end result of the other three?

- 1) technological development leads to a decrease in available food source
- 2) technological development leads to an increase in air pollution
- 3) **technological development leads to a loss of diversity of living organisms**
- 4) technological development leads to a reduction in available living space

995. Many relationships exist among organisms resulting in a balanced ecosystem. The diagram below represents which type of relationship?







- 1) predatory/prey
- 2) parasitism
- 3) **producer/consumer**
- 4) mutualism

996. The maintenance of blood sugar levels by the release of insulin from the pancreas, is an example of:

- 1) a response from the nervous system
- 2) **a feedback mechanism**
- 3) an allergic response
- 4) motor coordination

A student wished to find out the affects of acid on the growth of bean plants. The following set up was used while conducting an experiment:

				
	1	2	3	4
contents & treatment	<ul style="list-style-type: none"> • bean plant • 500 ml potting soil in ceramic pot • 25 ml of an acid solution 2x week 	<ul style="list-style-type: none"> • bean plant • 500 ml potting soil in ceramic pot • 25 ml of an acid solution 2x week 	<ul style="list-style-type: none"> • bean plant • 500 ml potting soil in ceramic pot • 25 ml of an acid solution 2x week 	<ul style="list-style-type: none"> • bean plant • 500 ml potting soil in ceramic pot • 25 ml of water 2x week

997. What was the control in this experiment? [1]

Rubric: Allow 1 point for response suggesting that pot treated with water is control.
Allow 0 points for no response.

998. What was one advantage of setting up multiple pots in which an acid solution was added to? [2]

Rubric: Allow 2 points for an explanation based on better accuracy (contamination, plant death, etc.).
Allow 0 points for no response or non-related response.

999. What is the independent variable in this experiment? [2]

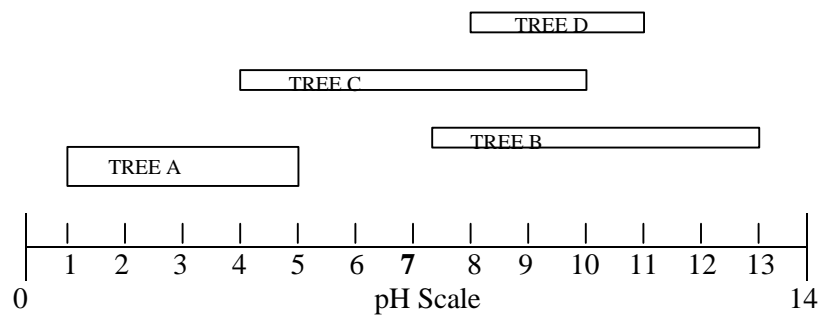
Rubric: Allow 2 points for acid solution.
Allow 1 point for plant growth.
Allow 0 points for no response or non-related response.

A variety of trees adapt to different locations depending on soil pH. Based on the pH scale below and on your knowledge of the Living Environment:

1000. Which tree(s) are adapted to a weak basic soil? [3]

Rubric: Allow 3 points for correct answer trees B, C & D.
Allow 2 points for correct answer either trees B & C, B & D or C & D. (2 choices).
Allow 1 point for correct answer either tree B, C or D. (1 choice).
Allow 0 points for no response or response tree A.

1001. The most acidic soil in which Tree C will adapt to would have a pH value of:



Rubric: Allow 2 points for acid pH of 4 only.
Allow 1 point for acid pH of 5
Allow 0 points for no response or a response within a basic range 7.1 -14.

Organisms possess various structures and behavioral patterns which enable them to perform a variety of life functions. These structures and patterns are referred to as adaptations. Adaptations make it possible for organisms to survive and reproduce in its environment. Refer to the diagrams below in answering Questions 1002 and 1003. Although these adaptations organisms are closely related, different adaptations allow them to inhabit different environments.



1002. List 2 adaptations for each of the three organisms which makes that organism will suited for its environment. [6]

Rubric: Allow 0 points for no response.
Allow 1 point for one of the following answers:

- Duck
 - webbed feet on duck make it possible to swim therefore it lives in water environment
 - thick feathers on duck that make it possible to live in cold water
 - coated feathers that make it possible to live in water environment
- Owl
 - talons on owl that help bird to perch and to grip prey
 - keen eyes on owl that allow it to live high on branches and to seek prey
 - movable head on owl that allow bird to seek prey from all directions
 - "crow's feet" that allow owl to grip branches and live in trees
- Pelican
 - webbed feet on pelican that allows bird to move/swim through water
 - thick feathers on pelican that make it possible for bird to live in cold waters
 - coated feathers that allow bird to live in water
 - large bill/pouch that enables bird to hold fish

Allow 2 points for two choices of the answers listed.

Allow 3 points for two answers from one category (duck, pelican, owl) and one answer from another.

Allow 4 points for two answers from one category and two answers from a different category.

Allow 5 points for two answers from one category, two answers from a different category and one answer from the third category.

Allow 6 points for 2 answers from each of the three categories.

1003. Discuss the adaptations that may cause these organisms to inhabit the same environment.

Rubric: Allow 0 points for no response.

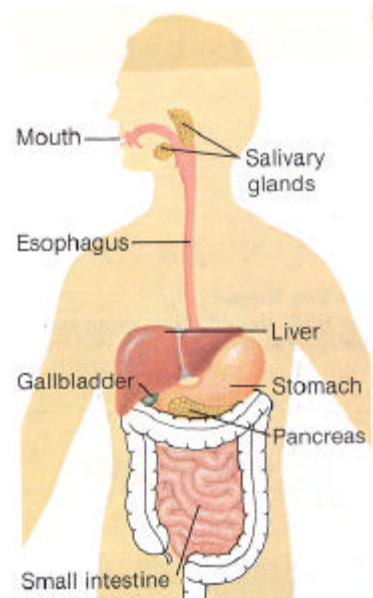
Allow 1 point for one of the following:

- thick feathers for swimming in cold waters (duck & pelican)
- coated feathers on duck & pelican that allow birds to live in water
- webbed feet on duck & pelican that allow birds to swim

Allow 2 points for two of the choices above.

Allow 3 points for all three choices above.

The digestion of food involves both mechanical and chemical processes. Refer to the diagram to the right when answering Questions 1004 and 1005.



1004. a. Discuss the regions where mechanical digestion is taking place. [3]

Rubric: Allow 0 points for no response or unrelated response.
Allow 1 point for one of the following:
- mouth (chewing & tearing by teeth)
- esophagus (peristalsis pushes food down to stomach)
- stomach (muscle contracts aiding in mechanical break down)
Allow 2 points for two answers listed above.
Allow 3 points for three answers listed above.

b. Discuss the regions where chemical digestion is taking place. [3]

Rubric: Allow 0 points for no response or unrelated response.
Allow 1 point for one of the following:
- mouth (breakdown of carbohydrates by salivary amylase)
- stomach (breakdown of proteins by proteases)
- small intestine (breakdown of lipids by lipases, breakdown of leftover carbohydrates)
Allow 2 points for two answers listed above.
Allow 3 points for three answers listed above.

1005. There are structures within the body that aid in digestion but food does not directly pass through. Name 2 of these structures and discuss their function. [3]

Rubric: Allow 0 points for no response or unrelated response.
Allow 1 point for one of the following:
- liver (produces bile which aids in breakdown of fat)
- pancreas (secretes enzymes that empties into small intestine, aids in chemical digestion)
- gallbladder (stores bile, empties secretions into small intestine, aids in breakdown of fat)
Allow 2 points for two of the items listed above.
Allow 3 points for all three answers listed above.