



# Ponce de Leon Middle School Biology Honors



## Summer 2018 Instructional Packet

### DIRECTIONS:

1. You are required to complete the Summer Instructional Packet.
2. Turn in your completed package to your Science teacher, when you return to school in August.

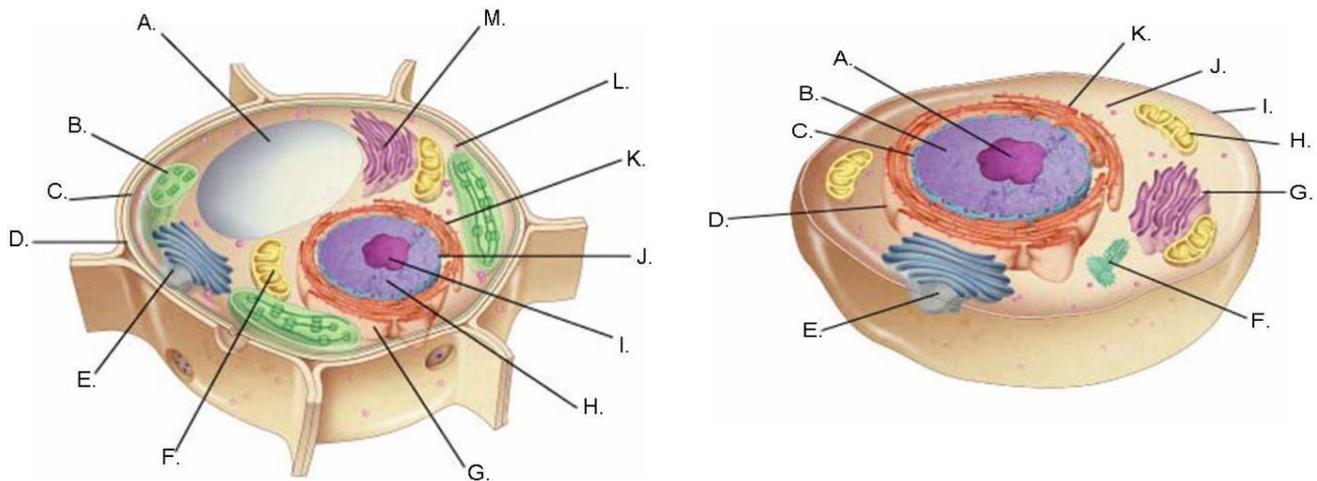


## Biology Honors Summer '18 Instructional Review Package

### A. Vocabulary – Please define the following terms and attach a paper with definitions:

Integumentary, endocrine, cerebellum, cerebrum, medulla, pons, hypothalamus, pituitary, spinal cord, parietal lobe, occipital lobe, temporal lobe, frontal lobe, antibodies, red blood cells, white blood cells, macrophages, T-cells, B-cells, pathogens, prokaryotes, eukaryotes, arteries, capillaries, aorta, veins, xylem, phloem, anther, pistil, pollen, angiosperms, gymnosperms, amino acids, nucleic acids, lipids, proteins, meiosis, mitosis, autotroph, heterotrophy, heterozygous, homozygous, ovary, uterus, cervix, zygote, morula, gastrula, blastula, embryo, fetus, decomposer, consumer, allele, cellular respiration, photosynthesis, phenotype, genotype

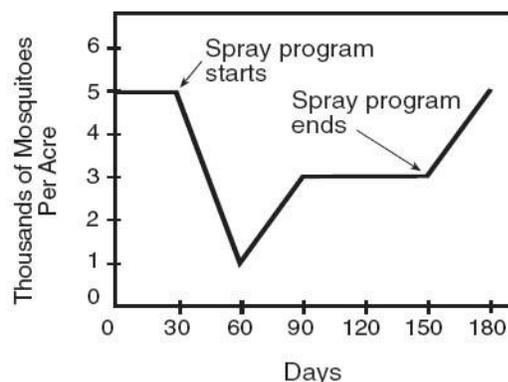
### B. Know the plant and animal cells; parts and functions: LIST and DESCRIBE on a separate paper.



### C. Multiple Choice - Identify the choice that best completes the statement or answers the question.

- 1 All of the following factors contribute to Earth's climate EXCEPT  
A latitude. B longitude. C transport of heat by winds. D shape and elevation of landmasses.
- 2 Earth has three main climate zones because of the differences in latitude and, thus,  
A amount of precipitation received. B distribution of sunlight. C ocean currents. D prevailing winds.
- 3 No two species can occupy the same niche in the same habitat at the same time  
A because of the interactions that shape the ecosystem. B unless the species require different abiotic factors.  
C because of the competitive exclusion principle. D unless the species require different biotic factors.
- 4 Which landforms are not classified into a major biome?  
A prairies B mountain ranges C coastlines D islands
- 5 Are you likely to find zooplankton in the aphotic, benthic zone of an ocean?  
A Yes. Zooplankton are chemosynthetic autotrophs. B Yes. Zooplankton can photosynthesize in the dark. C No. Zooplankton feed on phytoplankton and phytoplankton cannot photosynthesize in the dark. D No. Zooplankton cannot chemosynthesize in the dark without the presence of oxygen in the water.
- 6 Which of the following is NOT a freshwater ecosystem?  
A a river B a lake C an estuary D a stream
- 7 Freshwater ecosystems that often originate from underground sources in mountains or hills are  
A estuaries. B rivers and streams. C lakes and ponds. D wetlands.

- 8** A wetland that contains a mixture of fresh water and salt water is called  
 A an estuary. B a stream. C a river. D a pond.
- 9** Which of the following is a factor that makes estuaries unique?  
 A They contain both phytoplankton and zooplankton. B They are very deep and dark but contain a lot of producers. C They are found in mountain ranges and are formed by melting snow. D They have a lot of biomass but not a large variety of species.
- 10** Which of the following statements is NOT true about the open ocean?  
 A The open ocean has low levels of nutrients. B Organisms in the deep ocean are exposed to frigid temperatures and total darkness. C The open ocean begins at the low-tide mark and extends to the end of the continental shelf. D Most of the photosynthetic activity on Earth occurs in the open ocean within the photic zone.
- 11** The pattern of spacing between individuals across the range of a population is its  
 A growth rate. B distribution. C density. D habitat.
- 12** There are 150 Saguaro cactus plants per square kilometer in a 10-square-kilometer area of Arizona desert. To which population characteristic does this information refer?  
 A growth rate B geographic range C age structure D population density
- 13** If you know the range of a population, then you know  
 A the number of individuals that live in an area. B the areas that are inhabited by the population. C the birth rate and the death rate. D the type of climate it lives in.
- 14** A small farming community in Texas covers 14 square kilometers. There are 420 individuals who live within the town limits. What is the population density of this community?  
 A 0.03 individuals per square kilometer B 53 individuals per square kilometer C 30 individuals per square kilometer D 10.24 individuals per square kilometer
- 15** The movement of organisms into a range is called  
 A immigration. B emigration. C population shift. D carrying capacity.
- 16** Which are two ways a population can decrease in size?  
 A immigration and emigration B increased death rate and immigration C decreased birthrate and emigration D emigration and increased birthrate
- 17** Which of the following is a density-independent limiting factor?  
 A earthquake B disease C emigration D parasitism
- 18** After a natural disaster such as a hurricane or a drought, a population  
 A can thrive and increase. B can be mostly killed off. C will experience exponential growth. D will reach its carrying capacity.



**Figure 5-3**

- 19 The graph in Figure 5–3 shows the changes in a mosquito population. What caused the changes seen in the graph?  
 A a reduction in resources B a increase in predation. C a density-independent limiting factor D a density-dependent limiting factor
- 20 Which of the following best describes the relationship between the nucleus and the cytoplasm?  
 A The cytoplasm is a fluid that fills the inside of the nucleus. B The cytoplasm is an organelle that is usually found near the nucleus. C The nucleus is an organelle that is surrounded by the cytoplasm. D The nucleus is a fluid and it mixes with the fluid cytoplasm.
- 21 Which organelle would you expect to find in plant cells but not animal cells?  
 A mitochondrion B ribosome C chloroplast D smooth endoplasmic reticulum
- 22 The primary function of the cell wall is to  
 A support and protect the cell. B store DNA. C direct the activities of the cell. D help the cell move.
- 23 Unlike the cell membrane, the cell wall is  
 A found in all organisms. B composed of a lipid bilayer. C selectively permeable. D a rigid structure.
- 24 Which of the following is a function of the cell membrane?  
 A breaks down lipids, carbohydrates, and proteins from foods B stores water, salt, proteins, and carbohydrates  
 C keeps the cell wall in place D regulates the movement of materials into and out of the cell
- 25 Which term describes the relatively constant internal physical conditions of an organism?  
 A cell specialization B homeostasis C organ system D unicellularity
- 26 An organ system is a group of organs that  
 A are made up of similar cells. B are made up of similar tissues. C work together to perform a specific function.  
 D work together to perform all the functions in a multicellular organism.
- 27 Compared to small cells, large cells have more trouble  
 A dividing. B producing daughter cells. C storing needed materials and waste products. D moving needed materials in and waste products out.
- 28 Which of the following happens when a cell divides?  
 A The cell's volume increases. B It becomes more difficult for the cell to get rid of wastes. C Each daughter cell receives its own copy of the parent cell's DNA. D It becomes more difficult for the cell to get enough oxygen and nutrients.

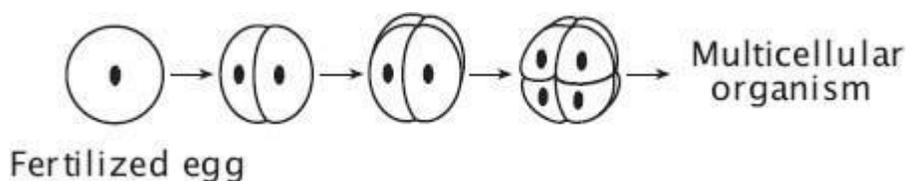


Figure 10–2

- 29 A multicellular organism begins life as a single cell—a fertilized egg with a complete set of chromosomes. The picture in Figure 10–2 above shows how the cell divides to become two cells, then four cells, eight cells, and so on. Which of the following statements best describes what happens during this process?  
 A Chromosomes are duplicated before cell division so that each new daughter cell has a complete set.  
 B Chromosomes are divided evenly during cell division so that each new daughter cell has an equal share of the original set.

c Chromosomes are stored in the original cell to direct the division of all daughter cells, which do not have their own chromosomes.

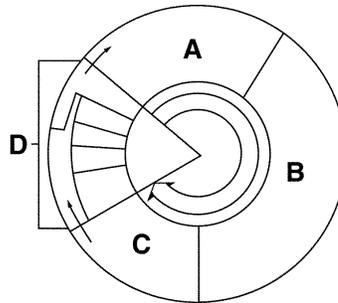
d Chromosomes are randomly distributed during cell division so that some new cells have partial sets while others have complete sets.

**30** When during the cell cycle is a cell's DNA replicated?

A G<sub>1</sub> phase B G<sub>2</sub> phase C S phase D M phase

**31** Which of the following is a correct statement about the events of the cell cycle?

A Little happens during the G<sub>1</sub> and G<sub>2</sub> phases. B DNA replicates during cytokinesis. C The M phase is usually the longest phase. D Interphase consists of the G<sub>1</sub>, S, and G<sub>2</sub> phases.



**Figure 10-3**

**32** Cell division is represented in Figure 10-3 by the letter

A A. B B. C C. D D.

**33** The first phase of mitosis is called

A prophase. B anaphase. C metaphase. D interphase.

**34** Which of the following represents the phases of mitosis in their proper sequence?

A prophase, metaphase, anaphase, telophase B interphase, prophase, metaphase, anaphase, telophase  
C interphase, prophase, metaphase, telophase D prophase, anaphase, metaphase, telophase

**35** Cells grown in a petri dish tend to divide until they form a thin layer covering the bottom of the dish. If cells are removed from the middle of the dish, the cells bordering the open space will begin dividing until they have filled the empty space. What does this experiment show?

A Cell division is a completely random process. B Once cells divide, they can never divide again. C The controls on cell growth and division can be turned on and off. D There is only a limited amount of DNA available to a given group of cells.

**36** Cyclins are a family of closely related proteins that

A regulate the cell cycle. B produce p53. C cause cancer. D work to heal wounds.

**37** Which of the following are external regulators of the cell cycle?

A cyclins B growth factors C mitotic spindles D cancer cells

**38** During early development, all cells in the embryo of a multicellular organism are identical. Later on in development, the cells will become specialized through a process called

A apoptosis. B cytokinesis. C differentiation. D interphase.

**39** The principles of probability can be used to

A predict the traits of the offspring of genetic crosses. B determine the actual outcomes of genetic crosses.  
C determine which species should be used in genetic crosses. D decide which organisms are best to use in genetic crosses.

		<i>Tt</i>	
		<i>T</i>	<i>t</i>
<i>TT</i>	<i>T</i>	<i>TT</i>	<i>Tt</i>
	<i>T</i>	<i>TT</i>	<i>Tt</i>

<i>T</i> = <i>Tall</i>
<i>t</i> = <i>Short</i>

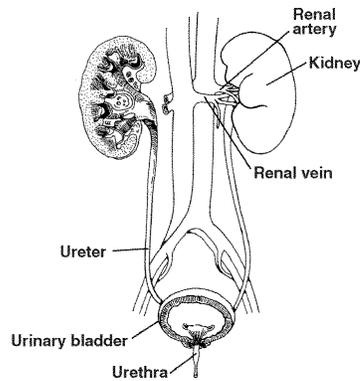
**Figure 11-1**

- 40** In the Punnett square shown in Figure 11-1, which of the following is true about the offspring resulting from the cross?  
 A About half are expected to be short. B All are expected to be short. C About three fourths are expected to be tall. D All are expected to be tall.
- 41** What principle states that during gamete formation genes for different traits separate without influencing each other's inheritance?  
 A principle of dominance B principle of independent assortment C principle of probabilities D principle of segregation
- 42** In rabbits, there are four different versions of the gene for coat color. What pattern of inheritance is this?  
 A incomplete dominance. B polygenic inheritance. C codominance. D multiple alleles.
- 43** The arctic fox is blue-gray in the summer and white in the winter. What most likely influence(s) this change?  
 A genes and the environment B dominant alleles C the environment alone D codominant alleles
- 44** Gametes are produced by the process of  
 A mitosis. B meiosis. C crossing-over. D replication.
- 45** Chromosomes form tetrads during  
 A prophase I of meiosis. B metaphase I of meiosis. C interphase. D anaphase II of meiosis.
- 46** Which of the following assort independently?  
 A chromosomes B linked genes C multiple alleles D codominant alleles
- 47** Which scientist(s) figured out that the shape of a DNA molecule is a double helix?  
 A Hershey and Chase B Griffith C Watson and Crick D Franklin

BASE	A	C	G	T
% of Total DNA	22	-	28	-

**Figure 12-4**

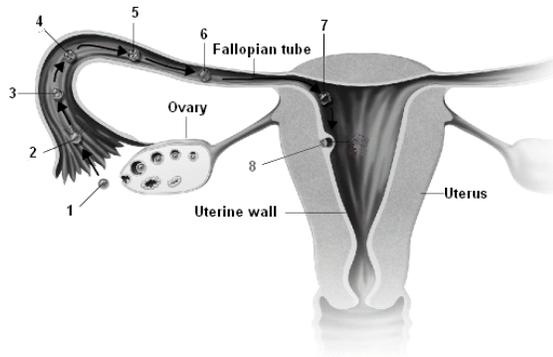
- 48** The table in Figure 12–4 shows the percentages of bases in a DNA sample. How much Thymine should you expect to find in the sample?  
A 22% B 24% C 28% D 44%
- 49** Watson and Crick discovered the two strands in DNA  
A run in perpendicular directions. B run in the same direction. C run in opposite directions. D run in random directions.
- 50** What enzyme works to add DNA to ends of chromosomes in rapidly dividing cells such as those found in an embryo, to prevent genes from being lost during replication?  
A DNA polymerase B histones C telomerase D chromatin
- 51** Which would be greater in a eukaryote than in a prokaryote?  
A The percentage of guanine nucleotides. B The total number of base pairs in a chromosome. C The number of replication forks on a strand of DNA. D The total amount of DNA in a cell.
- 52** Sex-linked genes are located on  
A the autosomal chromosomes. B the X chromosome only. C the Y chromosome only. D both the X chromosome and the Y chromosome.
- 53** Sickle cell disease is caused by a  
A change in one allele. B change in the size of a chromosome. C change in two proteins. D change in the number of chromosomes in a cell.
- 54** If nondisjunction occurs during meiosis,  
A only two gametes may form instead of four. B some gametes may have an extra copy of some genes. C the gamete cannot join another to form an organism. D the gametes redistribute chromosomes after meiosis.
- 55** The basic types of tissue in the human body are  
A cell, organ, and organ system. B sight, smell, and hearing. C thyroid, trachea, adenoid, and bronchus. D muscle, nervous, connective, and epithelial.
- 56** A car is to gasoline as your body is to  
A your stomach. B your kidneys. C food. D enzymes.
- 57** A calorie is the amount of energy needed to  
A raise the temperature of the body by 1° Celsius. B raise the temperature of 1 g of fat by 1° Celsius. C raise the temperature of 1 g of water by 1° Celsius. D raise the temperature of 1 gallon of water by 1° Celsius.
- 58** An example of foods high in fiber is  
A whole grain bread. B butter. C eggs. D fish.
- 59** Which of the following is NOT a function of the pancreas?  
A producing hormones that regulate blood sugar levels B producing enzymes that break down carbohydrates, proteins, lipids, and nucleic acids C producing bile D producing sodium bicarbonate, a base that neutralizes stomach acid
- 60** Through which structure do wastes pass into the rectum?  
A duodenum B large intestine C small intestine D villus
- 61** What enzyme found in saliva breaks chemical bonds in starches forming sugars?  
A amylase B chyme C pepsin D hydrochloric acid



**Figure 30–2**

- 62** Look at Figure 30–2. Filtered blood leaves the kidney and returns to circulation through the  
 A renal artery. B renal vein. C urinary bladder. D urethra.
- 63** Which of the following is NOT part of a nephron?  
 A urethra B Loop of Henle C glomerulus D Bowman’s capsule
- 64** A patient is diagnosed with kidney failure and visits a clinic to receive dialysis treatments three times a week. What does the process of dialysis do?  
 A carries urine to the urinary bladder B pumps blood throughout the body C filters waste from the blood D forces water into cells and tissues by osmosis
- 65** When the kidneys detect an increase in salt, they respond by  
 A excreting less salt in urine. B returning more salt to the blood by filtration. C returning more salt to the blood by reabsorption. D returning less salt to the blood by reabsorption.
- 66** The nervous system is to a telephone as the endocrine system is to a  
 A chemical message. B television set. C radio broadcast. D hormone.
- 67** Which of the following is a gland of the endocrine system?  
 A sweat gland B tear gland C pituitary gland D all of the above
- 68** Which of the following is true about the endocrine system?  
 A Each gland secretes only one hormone. B Homeostasis is often maintained by two hormones with opposing effects. C Only steroid hormones regulate important functions. D The pituitary gland regulates all the other glands.
- 69** Feedback inhibition means that an increase in a substance will  
 A decrease production of that substance. B increase production of that substance. C increase the production of other substances. D stop production of another substance.
- 70** Which hormone is largely responsible for women having wider hips than men?  
 A testosterone B estrogen C progesterone D FSH
- 71** Put the following events in the order in which they occur at the beginning of puberty.  
 I. FSH and LH are released.  
 II. Estrogens or testosterone cause the development of features such as breast development in females and the deepening of the voice in males.  
 III. The hypothalamus sends a signal to the pituitary gland.  
 IV. The gonads begin to mature.
- A II, III, I, IV B I, III, II, IV C IV, II, I, III D III, I, IV, II

- 72** About how many sperm are in one milliliter of semen?  
 A 1,000-5,000 B 250,000-500,000 C 1-2 million D 50-130 million
- 73** Which of the following is **NOT** a phase in the menstrual cycle?  
 A menstruation B luteal C fertilization D ovulation



**Figure 34–3**

- 74** What is occurring in step 1 in Figure 34–3?  
 A fertilization B formation of a zygote C ovulation D formation of a blastocyst
- 75** Which of the following is a function of the placenta?  
 A mixing the blood of the mother and the fetus B protecting the fetus from drugs, such as alcohol, in the mother's body C providing nutrients to the fetus D cushioning and protecting the fetus
- 76** Babies usually cry when they first meet the outside world. In what way is this crying helpful?  
 A It shows that the baby can show emotion. B It is a signal to the mother that her labor is over. C It rids the baby's lungs of fluid. D It lets everyone know the baby is hungry.

**Problems/Questions:** *Answer on a separate sheet of paper and attach.*

**Characteristics of Different Biomes**

Biome	Temperatures	Precipitation	Soil Quality
Tropical Rain Forest	hot year-round	wet year-round	thin, nutrient-poor
Tropical Dry Forest	warm year-round	alternating wet and dry seasons	rich
Tropical Grassland/ Savanna/Shrubland	warm	seasonal rainfall	compact
Desert	variable	low precipitation	rich in minerals but poor in organic material
Temperate Grassland	warm to hot summers; cold winters	moderate and seasonal	fertile
Temperate Woodland and Shrubland	hot summers, cool winters	dry summers; moist winters	thin, nutrient-poor
Temperate Forest	warm summers; cold to moderate winters	stable year-round	fertile
Northwestern Coniferous Forest	mild temperatures	dry summers; abundant precipitation in the fall, winter, and spring	rocky, acidic

Boreal Forest	short mild summers; long cold winters	moderate precipitation	acidic, nutrient-poor
Tundra	short summers; long, cold, dark winters	low precipitation	poorly developed

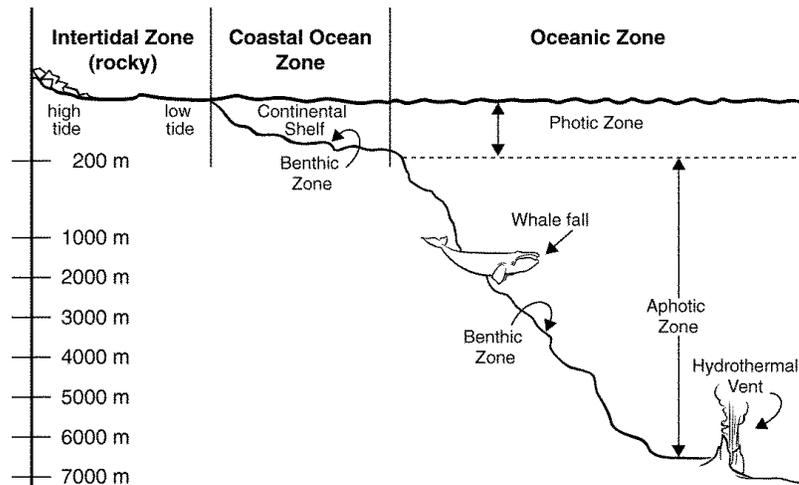
**Figure 4–5**

**77 Draw Conclusions** Which biome in Figure 4–5 do you live in? Explain your reasoning.

**Some Organisms of a Marine Ecosystem**

Intertidal Zone	Coastal Ocean Zone	Open Ocean Zone	
		Photic Zone	Aphotic Zone
Algae	Coral	Sea birds	Angler fish
Sea anemone	Dolphins	Dolphins	Deep-sea octopus
Barnacles	Jellyfish	Herring	Hatchet fish
Birds:	Kelp	Jellyfish	Krill
Gulls	Lobsters	Marlin	Lantern fish
Hérons	Otters	Penguins	Sea cucumbers
Plovers	Plankton	Plankton	Sponges
Terns	Sailfish	Salmon	Squids
Clams	Sea stars	Sea snakes	<b>Deep-Sea Vent</b>
Crustaceans	Sea urchins	Sea turtles	Chemosynthetic
Sand dollars	Seals	Sharks	bacteria
Mussels	Sharks	Shrimp	Clams
Sea urchins	Small fish	Swordfish	Crabs and other
Seaweed	Snails	Tuna	crustaceans
Snails	Whales	Whales	Tube worms

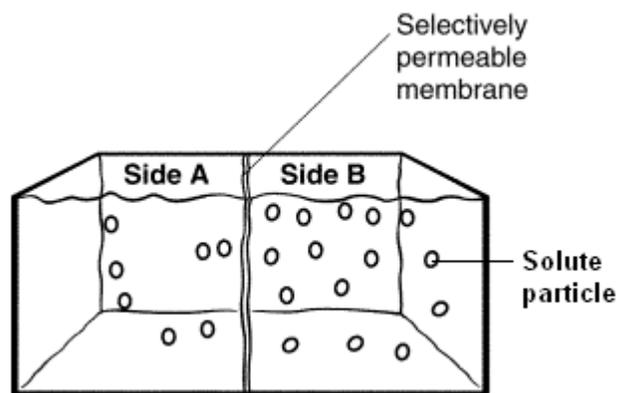
## Marine Biome Zones



**Figure 4–7**

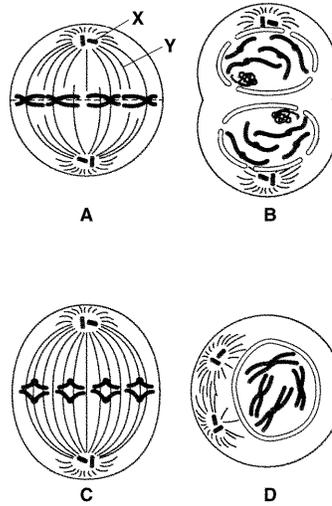
- 78 Infer** Are sea cucumbers photosynthetic? Use Figure 4–7 to explain your answer.
- 79 Draw Conclusions** Some of the organisms in Figure 4–7 are listed in more than one column. Ignoring clams and crustaceans, what zones have some organisms in common with other zones? What important factor do the zones that you listed have in common?
- 80 Compare and Contrast** Contrast the abiotic factors at high tide with those at low tide for the organisms in the intertidal zone in Figure 4–7.

A student put together the experimental setup shown below. The selectively permeable membrane is permeable to water, but not the solute shown.



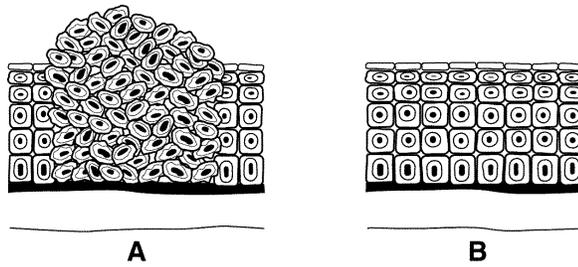
**Figure 7–10**

- 81 Compare and Contrast** How does the solution on Side A of the apparatus shown in Figure 7–10 differ from the solution on Side B?
- 82 Predict** What will the apparatus shown in Figure 7–10 look like when equilibrium is reached?



**Figure 10-10**

- 83 Infer** Identify the structures labeled X and Y in Figure 10-10.
- 84 Predict** After the steps shown in Figure 10-10 are arranged in the correct order, what would a diagram of the next step show?



**Figure 10-12**

- 85 Interpret Visuals** Look at Figure 10-12. Which diagram shows cancer cells? How do you know?

Name: \_\_\_\_\_ Science Teacher: \_\_\_\_\_ Period: \_\_\_\_ Date: \_\_\_\_\_

NOTES: