

EP BIOLOGY ANSWERS

DAY 5 Concept Map

1. The answers are on the bottom of each chapter.

DAY 6 What is Biology

1. It responds to the environment, It grows and develops, It produces offspring, It maintains homeostasis, It has complex chemistry, and It consists of cells.
2. The four unifying principles of biology are cell theory, gene theory, homeostasis and evolution.
3. The outline levels of organization of a complex, multicellular organism such as a mouse, starting with the cell is: The Cell - then Tissue – then Tissue –then Organ – then Organ System – to Finally Organism (the mouse)
4. Homeostasis is the process of maintaining a stable internal environment. Humans are an example of Homeostasis.

DAY 11 Characters Of Living Questions

1. Biology is the study of living things.
2. Cells are the smallest unit of life capable of carrying out all the functions of living things. The small structures within cells are called organelles.
3. A
4. Two types of reproduction are sexually and asexually.
5. An organism needs a constant supply of energy and materials to carry out its essential processes to stay alive.
6. Metabolism is the chemical processes that occur within a living organism in order to maintain life.
7. False
8. Homeostasis is the process of maintaining a stable internal environment.

DAY 12 Characteristics of Living Things Questions Study Guide

1. If the new discovery has cells then it is living.
2. False
3. All living things are made up of cells
4. True
5. Energy
6. Anything that causes a reaction is considered a Stimulus
7. True
8. A plant cell divides when a cell gets so large that it takes too long to obtain water and nutrients into a cell quickly.
9. Cells
10. Growth is an increase in size due to producing new cells where development is changes in the form of an organism as it proceeds to maturity.
11. Evolution
12. Become extinct
13. Metamorphosis is changes in form as an organism matures; may be complete or incomplete.
14. Homeostasis is the process of maintaining a stable internal environment.
15. One way plants can maintain a relatively stable amount of water in its tissues is that plants can close the holes underneath their leaves to prevent loss of water
16. The levels of organization of life from molecules to the biosphere are: molecule, cell, tissue, organ, organ system, organism, population, community, ecosystem and biosphere.

DAY 14

Science and the Natural World

1. Science is a distinctive way of gaining knowledge about the natural world that starts with a question and then tries to answer the question with evidence and logic. The goal of science is to understand the natural world.
2. An outline of a scientific investigation outline is
 1. Make observation,
 2. Ask a question,
 3. Form a Hypothesis,
 4. Draw a conclusion, and
 5. Communicate results.
3. A hypothesis is a possible answer to a scientific question, but it isn't just any answer. Characteristics of a hypothesis are:
 1. must be based on scientific knowledge, and it must be logical, and
 2. must be falsifiable.
4. Why does a rock fall faster than a piece of paper? -can be investigated
How does gravity work? -cannot be investigated
5. A natural study shows what actually occurs in nature. Therefore, it may provide a truer picture of what happens in the real world than an experiment does.

DAY 15

1. Independent/Manipulating Variable: the time it takes to run a kilometer
Dependent/Responding Variable: amount of exercise a person gets
2. Independent/Manipulating Variable: The higher temperature of water
Dependent/Responding Variable: the faster the egg will cook
3. Independent/Manipulating Variable: if keeping the lights on for different amounts of time each day
Dependent/Responding Variable: the number of eggs chickens laid.
4. Independent/Manipulating Variable: at different depths
Dependent/Responding Variable: the temperature of water in a lake varied
5. Independent/Manipulating Variable: is watered weekly than grass that is not watered
Dependent/Responding Variable if grass will grow taller

DAY 17

Scientific Method Video

1. Opinion
2. To build upon and support prior knowledge obtained from experiments, scientists typically repeat the experiments to confirm that it was not an error in the conclusion. Furthermore other experiments are created that will look at anything that may affect the conclusion. Science is testing one hypothesis, retesting and trying something new.
3. Aristotle was not a scientist, he never tested any of his ideas
4. Recognize the Problem, Hypothesis, Experiment's, Results Evaluated, Conclusion made. If the experiment shows the Hypothesis works, it becomes a Scientific Theory,
5. Thomas Edison tested hundreds of metals for the filament of the light bulb before he found the right one.

Metric Video

1. An example of measurement that happens all around it how far did the car drive.
2. Scientists all over the world use the metric system because it is logical and easy to use
3. The first standardized system of measurement, based on the decimal was proposed in France about 1670. However, it was not until 1791 that such a system was developed. It was called the "metric" system, based on the French word for measure.
4. The Metric system is used all over the world except the United States.
5. The United States is the only country that still uses a system that was based on Queen Elizabeth's arm.

Function	Structure
<p>Example: DNA is replicated only a few pieces at time.</p>	<p>What DNA structure regulates the replication? <i>DNA has sections that signal for the beginning of a coding sequence as well as a DNA section that signals for the ending of a coding sequence. The possibility of damage to the DNA is minimized by having only small sections opened up at any time.</i></p>
<p>Example: Hummingbirds often feed from flowers that do not have a place for them to perch.</p>	<p>How do hummingbirds access their food? <i>Hummingbirds can beat their wings fast enough to hover in midair and they have long bills and tongues which allow them to drink from the nectar of flowers.</i></p>
<p>In vertebrate organisms, the nervous system must establish an effective system of communication.</p>	<p>What structure of nerve cells (neurons) allows for communication throughout the body? <i>The nervous system is a complex network of nervous tissue that carries electrical messages throughout the body.</i></p>
<p>Muscle tissue responds to electrical charges which cause them to contract, resulting in movement.</p>	<p>How does skeletal muscle respond to the nervous signals to result in movement? <i>Skeletal muscle responds to nervous system signals and interacts with the skeleton to causes Voluntary muscle contraction.</i></p>
<p>Chlorophyll and other pigments needs isolation from the cytosol in order to perform its function.</p>	<p>What organelle isolates these pigments? <i>Plastids, Cytoplasmic organelle in plants, bounded by a double membrane that carries its own DNA and is often pigmented. Chloroplasts are plastids.</i></p>
<p>The cell membrane must be flexible enough for transport, but sturdy enough to withstand the impact of external factors.</p>	<p><i>Cholesterol is the component of the cell membrane provides stability.</i></p>
<p>Hemoglobin is a globular protein that carries multiple oxygen molecules throughout the blood stream.</p>	<p>How does the structure of hemoglobin allow it to carry oxygen?. <i>Since oxygen is not very soluble in water (the major constituent of blood), an oxygen transport protein must be used to allow oxygen to be 'soluble'. Hemoglobin (Hb) is the oxygen transport protein used in the blood of vertebrates.</i></p>
<p>Proper cell function requires the ability to digest old organelles/metabolic wastes that take up space, waste valuable resources, and may be toxic to the cell.</p>	<p>What organelles perform this function and what specific toxin do they eliminate? <i>The peroxisome gets rid of toxic peroxides and digests fatty acids. The lysosome digest proteins (these can be membrane proteins i.e. receptors).</i></p>

<p>Most fungi do not have a system of transport for water and food.</p>	<p>As heterotrophic organisms, how do fungi “find” their food? The fungus just grows on its food. They secrete a wide range of extracellular enzymes into the environment to increase the availability of the nutrients they need (eg., ligninase, hemicellulase, amylase, chitinase, keratinase) which is how they contribute to nutrient recycling in nature.</p>
<p>Some proteins are destined to stay in the cell while others are destined to leave the cell (secretion).</p>	<p>Are these two types of proteins produced in loose ribosomes? Explain. Secreted proteins are produced "in" the ER. When transcription is about to occur a ribosome interacts with the ER and "inserts" a protein in it. This protein is then transported through vesicular transport to the golgi for further processing. Soluble proteins of the cell are produced in the cytoplasm by free ribosomes.</p>
<p>ER, Golgi body and other membrane bound organelles often work together to produce a finished functional product.</p>	<p>What structure connects them? All the proteins are transported between organelles through membrane trafficking (vesicular transport) which involves the cytoskeleton (microtubules) as well as proteins that "carry" the vesicles along the microtubules.</p>
<p>Cellular respiration (specifically the electron transport chain) requires a very specific proton concentration in order to allow production of ATP.</p>	<p>What feature of the mitochondrion allows isolation of the proton gradient? The double membrane structure of the mitochondria allows for the isolation of H⁺.</p>
<p>Amoeba is a unicellular protozoan that would not survive if it were to feed only by diffusion.</p>	<p>What type of cellular transport do they use for large molecules? What features of the cell membrane permit it? Endocytosis. This is a very complex process involving receptors (receptor mediated endocytosis) the cytoskeleton as well as many proteins that "tag" the vesicles for transport to appropriate parts of the cell.</p>
<p>Eukaryotic cells have a small surface area to volume ratio compared to prokaryotic cells.</p>	<p>What compensates for that? Prokaryotic cells are cells without a nucleus and are found in single-celled organisms Eukaryotic cells are cells that contain a nucleus. Eukaryotic cells have other organelles besides the nucleus. The only organelles in a prokaryotic cell are ribosomes and are found in multi-celled organisms.</p>
<p>The evolution of plants from aquatic environments to land resulted in adaptations for vertical growth and to store water.</p>	<p>How do land plants gain stability without the buoyancy of water to keep them upright? In vascular plants, stems are the organs that hold plants upright so they can get the sunlight and air they need.</p>
<p>Some cells depend on the ability to move in order to survive.</p>	<p>What do they use for such movement? Flagella and cilia.</p>

DAY 22 **Cells Answers**

1. What type of microscope would be best for studying the structures found inside of cells?
Electron microscope
2. What are the three basic parts of the cell theory?
 1. All organisms are composed of cells.
 2. Cells are alive and the basic living units of organization in all organisms.
 3. All cells come from other cells.
3. According to the cell theory, can you create a cell by combining molecules in a laboratory? Why or why not?
NO, because all cells come from other cells

DAY 27 **Organelles**

1. The Golgi then packages the proteins into vesicles and sends them to the right place in the cell or to the cell membrane.
2. The mitochondria are the powerhouses of the cell; they provide the energy needed to power chemical reactions.
3. The rough ER is covered with ribosomes and makes proteins, while the smooth ER makes lipids.

DAY 28 **Diffusion**

1. The process of diffusion is molecules are said to flow down their concentration gradient, flowing from an area of high concentration to an area of low concentration.
2. It would be a hypertonic solution because with a hypertonic solution means the environment outside of the cell has more dissolved material than inside of the cell. If a cell is placed in a hypertonic solution, water will leave the cell. This can cause a cell to shrink and shrivel.

DAY 29 **Passive Transport** *(I found doing some research was needed to complete this assignment)*

1. Diffusion is the movement of particles from a higher concentration of particles to a lower concentration. However osmosis is the movement of water particles from a higher water concentration to a lower water concentration across a selectively permeable membrane. Diffusion can occur in any substance be it air or liquid. Osmosis is specific to only water.
2. Food can be preserved by adding salt. The water would be drawn out of the bacteria and the cell would die. Some specialist types of bacteria have evolved to be able to live in very salty conditions and have adaptations to help them survive such conditions.
3. A Paramecium need to remove water to prevent swelling a bursting
4. Your fingertips may look dried out like a prune in the sun, but they actually get creased because they are absorbing a lot of water. They do this because the skin on the palms of your hands and the soles of your feet is thicker and tougher than the skin elsewhere on the body. Those skin cells also contain more protein. (The water causes the skin particles to expand, well basically there absorbing the water, and henceforth expanding, then when there's not enough room on the finger, the skin crinkles up.)
5. Reverse Osmosis is the reversal of the natural flow of osmosis. In a water purification system, the goal is not to dilute the salt solution, but to separate the pure water from the salt and other contaminants. When the natural osmotic flow is reversed, water from the salt solution is forced through the membrane in the opposite direction by application of pressure-thus the term REVERSE OSMOSIS. Through this process, we are able to produce pure water by screening out the salts and other contaminants.
6. No, it doesn't, unless it is on a cellular level, and we don't learn most things on that level, at least consciously. Osmosis refers to something being equalized, such as the amount of salt in solution on two different sides of a penetrable membrane.

Active Transport

1. Endocytosis is the cellular uptake of biological molecules and particulate matter via formation of new vesicles from the plasma membrane. Exocytosis is the cellular secretion of biological molecules by the fusion of vesicles containing them with the plasma membrane. Basically, that means endocytosis takes IN molecules, exocytosis puts OUT molecules.
2. The difference between endocytosis and exocytosis cell membrane and chloroplasts.
3. ATP is hydrolyzed by transport proteins releasing energy. This energy is what is used to transport a molecule across a membrane and up its concentration gradient.
4. A Paramecium's contractile vacuole pumps water out of the cell is called Active Transport.
5. Active transport requires energy, unlike passive transport. The carrier proteins in active transport act as a "pump" (fueled by ATP) to carry/attach themselves to useful proteins for the cell.

DAY 33 **Cell Cycle**

1. The two main components of a Cell Cycle are interphase and the mitotic phase.
2. Interphase is the stage when the cell mostly performs its "everyday" functions.
 1. The first growth phase (G1): During the G1 stage, the cell doubles in size and doubles the number of organelles.
 2. The synthesis phase (S): The DNA is replicated during this phase. In other words, an identical copy of all the cell's DNA is made. This ensures that each new cell has a set of genetic material identical to that of the parental cell. This process is called DNA replication.
 3. The second growth phase (G2): Proteins are synthesized that will help the cell divide. At the end of interphase, the cell is ready to enter mitosis.
3. During mitosis, the nucleus divides. One nucleus becomes two nuclei, each with an identical set of chromosomes. Mitosis is followed by cytokinesis, when the cytoplasm divides, resulting in two cells.
4. Cancer is a disease that occurs when the cell cycle is not regulated and cells divide out of control.

DAY 34 **Chemistry Questions**

1. Ionic is made by one atom giving up electrons to another. Ionic is formed by metal and nonmetal. Covalent bond is sharing of electrons, made by two non metals. In the living system (assuming human body), there is salt, so NaCl for ionic, and there is also water, H₂O for covalent. Covalent is known to be stronger than ionic, but there is some debate to this based on the compounds that are used to compare. Number of protons in the atom. Defines which element it is.
2. Atomic Number: Determine the identity of the atom, it is the number of protons in the atom. It can mean the difference between lead and gold.
3. Valence: number of electrons that an atom has to share, or wants to take. I'm having trouble coming up with the answer for the rest, it's too wordy to put into a sentence.
4. polar bonds: stronger bond, more IMF, due to dipole-dipole.
non-polar: usually weaker in terms of bonding due to lack of dipole-dipole
5. Intermolecular forces: IMF, is basically the forces that two covalently bonded atoms have on each other. Hydrogen bonds are formed through hydrogen bonding with the following atoms: F, O, and N. It is the strongest intermolecular force. In water, H bonds are responsible for water's unusually high boiling point.
6. Ions are an atom or molecule with a net electric charge due to the loss or gain of one or more electrons. Two examples of Ions are:
 1. Calcium ion: Involved in the release of neurotransmitter. Regulates enzyme activity. Stored in bones and teeth. And
 2. Potassium ion: Important to neural function and osmotic equilibrium.
7. Electronegativity: is the "desire" of an atom for electrons, or more specifically, its pull on electrons. F atom is known to have the highest electronegativity. Electro. Is responsible for polar covalent bonds because it is the amount of pull that one atom has in a compound. For example, in the imaginary compound, CCl₃Br, there are for chlorine atoms and one bromine atom. In this compound, there is equal sharing of electrons. However, because Br is weaker in terms of electronegativity, it upsets the balance of

the compound (because the Cl atoms are pulling to the side more strongly than the Br atom) and causes polarity within the compound.

8. Acid: a substance which when added to water produces hydrogen ions [H⁺].
Base: a substance which when added to water produces hydroxide ions [OH⁻].
Their roles are to buffer one another, I guess. There are weak acids that buffer strong bases, and weak bases that buffer strong acids. That's about all I can give you, you have to be more specific.
9. A chemical reaction occurs when a compound decomposes, or two or more compounds react together to create one or more different compounds.
10. Styrofoam and plastic are usually polymers. Organic molecules in living matter are much more complex and diverse. Such molecules aid in the structural integrity of other biochemical molecules.
11. Isomers are compounds with the same molecular formula but different structural formulas. An example of isomers are alkanes, they are the simplest class of organic compounds. They contain only tetravalent (making 4 covalent bonds) carbon atoms and hydrogen. Butane and methyl propane are two examples which can be found on this page. As you can find on the other pages of this site they can only be involved in structural isomerism.
12. Enantiomer each of a pair of molecules that are mirror images of each other. When an enantiomer is manipulated by a living organism, the enzymes used to manipulate it must be tailor made to fit the enantiomer. A given enzyme might be made to manipulate or synthesize one enantiomer but would be incompatible with the other (like trying to put a right hand glove on a left hand). Although it would be possible to synthesize both enzymes (to handle both enantiomers), it's more efficient to just make one (since it would require two sets of genetic material). Therefore, chiral (enantiomer) molecules typically only exist in one of their forms within a living system.

DAY 36

Macromolecules

1. All organic chemical compounds possess one thing in common.-all of them contain the element is Carbon
2. The carbohydrates are made up of three different elements in a ratio of 1:2:1. In order, these elements are its carbon, hydrogen, and oxygen.
3. A simple sugar called _Glucose_, whose chemical formula is C₆H₁₂O₆ is broken down during glycolysis.
4. Anabolism is the process of building up larger molecules from smaller ones. Anabolism is a metabolic function.
5. The three elements that make up lipids are carbon, hydrogen, and oxygen.
6. Energy is stored in the chemical bonds of lipids.
7. Proteins are made up of chains of simple molecules called _Amino Acids_.
8. Enzymes are the protein molecules which are involved in the metabolic reactions in the body. (To accelerate a reaction in the body. There are many different kinds with very specific roles - ranging from energy production to DNA replication.)
9. Nucleic acids are made up of chains of simple molecules called nucleic acids.
10. The nucleus of a eukaryotic cell contains the DNA, the genetic material of the cell. The DNA contains the information necessary for constructing the cell and directing the multitude of synthesis tasks performed by the cell in the process of life and reproduction. (The nucleus is the "brain" of the cell, it controls all the cell's activities) (this is the best answer we could come up with, if you learned something different please let me know)

DAY 39

Protein Structure

Helpful Sites: http://newburyparkhighschool.net/malone/BioH/RESOURCES/Animation-Protein_structure.swf
<http://www.proteinstructures.com/Structure/Structure/amino-acids.html>

1. Hydrophilic (polar) amino acid side chains may form side chain-side chain or side chains-main chain hydrogen-bonds (with polar amide carbonyl groups). It has been observed that all polar groups capable of forming hydrogen bonds in proteins do form such bonds. And since these interactions are often crucial for the stabilization of the protein three-dimensional structure,

they are normally conserved

2. The tertiary structure is the overall three-dimensional structure of the protein.
3. Proteins that consist of only one subunit do not have a quaternary structure