QUIZ for "MAPPING THE BODY WITH ART" lesson 1 Name/Date _____

1) How many protons does a hydrogen atom have? a) 0 b) 1 c) 2 d) 8

2) What percentage of an adult human body is water molecules?
a) 60 to 70 percent c) 80 percent c) 30 percent

3) TRUE or FALSE? The oxygen atom of the water molecule has a slightly negative charge to it.

4) TRUE or FALSE? A hydrogen ion is the same thing as a proton.

5) TRUE or FALSE? Water is a polar molecule.

6) What causes salt to dissolve in water?
a) The fact that salt is an unstable crystal. b) The presence of ions in the water.
c) The temperature of the water. d) The pull of the water molecules' postive and negative charges.

7) TRUE or FALSE? The words "hydrogen ion" and "proton" can be used interchangeably.

8) Why does the "ear" side of the water molecule have a positive electrical charge?
a) Because the electrons spend more time around the hydrogens than anywhere else.
b) Because the hydrogen atoms don't get the shared electrons very often.
c) Because the hydrogens are far away from the oxygen's nucleus.
d) Because the hydrogens don't have any neutrons.

9) Which one of these does a water molecule NOT do?
a) vibrate b) split apart c) dissolve a lot of substances
d) share electrons with other molecules

10) Water molecules can break apart into and H+ and an OH-. What is the OH- part called?
a) hydroxide ion b) hydronium ion c) hydrogen ion

11) What do you call H_3O?
a) ozone b) hydronium ion c) hydroxide ion d) hydrogen ion

12) When a molecule has one side that is more negative and one side that is more positive, we say that the molecule is...
a) polar b) covalent c) radioactive d) an ion

13) An oxygen atom has how many protons? a) 2 b) 6 c) 8 d) 16

14) NaOH (sodium hydroxide) will dissolve in water because it is...
a) negative b) positive c) polar d) alkaline

15) The Periodic Table is a complete list of all known... a) elements b) molecules c) chemicals

16) TRUE or FALSE? Regular water never has any ions (H+ or OH-) in it.

QUIZ for "MAPPING THE BODY WITH ART" lesson 2 Name/Date _____

1) How many protons does a carbon atom have? (which is the same as its atomic number)
a) 4 b) 6 c) 8 d) 12

2) How many carbon atoms does propane have?
a) 1 b) 2 c)3 d) 4

1-b
2-c
3-a
4-a
5-b

3) What is one reason that two carbon atoms would bond with each other?
a) They are each missing a hydrogen. b) They are both lonely.
c) They are in the middle of a molecule. d) They have too many hydrogens.

4) Which part of a fatty acid is the acid part?
a) COOH (carboxyl group) b) chain of carbon atoms c) both d) neither

5) Why is COOH called an acid?
a) Because the OH falls off easily, putting hydroxide ions into the environment around it.
b) Because the H can fall off easily, putting protons into the environment around it.
c) Because it stings if you get it on your skin. d) Because it has two oxygen atoms.

6) What is the "fat" part of a fatty acid?
a) the chain of carbon atoms b) the COOH
c) the last carbon at the end of the chain
d) neither

7) What makes methane a non-polar molecule?
a) The fact that the hydrogen atoms have only one proton in their nucleus.
b) The fact that carbon is found in the top portion of the Periodic Table.
c) The fact that it has 8 electrons in its outer shell.
d) The fact that the electrons travel around the molecule evenly, not spending more time in any one place.

8) Which shape is most similar to a methane molecule?
a) star b) cube c) pyramid d) sphere

9) TRUE or FALSE? True or false? Water molecules are very likely to intereact with methane molecules.

10) TRUE or FALSE? A fatty acid is a COOH group attached to a chain of carbons (with H's attached to them).

QUIZ for "MAPPING THE BODY WITH ART" lesson 3 Name/Date _____

1) Which part of a fatty acid is the acid part?
a) COOH (carboxyl group) b) chain of carbon atoms c) both d) neither

2) What makes a saturated fatty acid saturated?
a) It has a COOH at the end. b) Each carbon atom has all the hydrogen atoms it can possibly hold.
c) The carbon chain has lost some hydrogen atoms. d) It is a liquid at room temperature.

3) What molecule can attach to one, two, or three fatty acids?
a) glycerol b) the carboxyl group c) nitroglycerin d) long chains of carbon atoms

4) What is another word for glycerol? a) nitroglycerin b) glyphosate c) glucose d) glycerin

5) How many carbon atoms are in a glycerol molecule? a) 1 b) 2 c) 3 d) 6

6) Which of these statements has nothing to do with why unsaturated fatty acids look bent at the end?
a) Some hydrogen atoms are "missing." b) There is a double bond where the bend is.
c) Dehydration synthesis took place. d) Hydrgogens hate to be next to each other and move as far apart as possible.

7) What common household item is glycerol most like? a) spoon b) sock c) sponge d) hanger

8) Which of these fatty acids is the shortest? a) lauric acid b) stearic acid c) oleic acid d) palmitic acid

9) What do you call fatty acids that our bodies cannot make but must get from food?
a) triglycerides b) unsaturated fatty acids c) saturated fatty acids d) essential fatty acids

10) What is required to attached a fatty acid to a glycerol?
a) a water molecule b) a special enzyme c) glue d) nothing

11) What is the process called when two molecules are joined together by taking an OH off of one molecule and an H off of the other, and form water as a byproduct?
a) hydrogen bonding b) dehydration synthesis
c) covalent bonding d) dehydration

12) What does the 3 mean in an omega-3 fatty acid?
a) The double bond is the 3rd carbon up from the bottom. b) It is part of a triglyceride and tri means 3.
c) It has 3 missing hydrogens. d) It has 3 oxygen atoms.

13) What is a good source of oleic acid? a) butter b) bone marrrow c) olive oil d) coconut oil

14) Which of these words is actually related to the "lin" in linoleic acid? a) line b) linen c) lion d) linoleum

15) Which are liquids at room temperature? a) saturated fats b) unsaturated fats

16) Does glycerol ALWAYS have three fatty acids attached to it? a) yes b) no

17) Does it matter if you have a lot of triglycerides floating around in your blood? a) yes b) no

18) What kind of cell stores triglycerides? a) skin cells b) brain cells c) muscle cells d) fat cells

19) Where do you find a lot of palmitic acid?
a) in palms but also in human fat cells. b) in olive oil c) only in plants such as palms and coconuts.

20) How many fatty acids does a diglyceride have? a) 1 b) 2 c) 3

QUIZ for "MAPPING THE BODY WITH ART" lesson 4 Name/Date _____

1) How many bonds does phosphorus usually want to make? a) 1 b) 2 c) 3 d) 4 e) 5

2) Phosphate is: a) P b) POH c) PO_2 d) PO_4

3) TRUE or FALSE? Phosphate is negatively charged.

4) An electrically unbalanced molecule is called: a) an ion b) an electron c) a proton d) an acid

5) A very basic phospholipid molecule is composed of:
a) a glycerol, a phosphate, and two fatty acids. b) a glycerol, 2 phosphates, and a fatty acid.
c) a phosphate and two fatty acids. d) a phosphate and a fatty acid.

6) TRUE or FALSE? Water molecules are attracted to the phosphate head of the phospholipid.

7) "Hydrophillic" means: a) "makes" water b) "splits" water c) "loves" water d) "hates" water

8) EPA and DHA are:
a) phosphates b) phospholipids c) saturated fatty acids d) unsaturated fatty acids

9) TRUE or FALSE? There are many different kinds of omega-3 fatty acids.

10) TRUE or FALSE? An unsaturated fatty acids has no double bonds in its hydrocarbon chain.

11) TRUE or FALSE? EPA and DHA are "good" fatty acids.

12) TRUE or FALSE? The "tail" of a phospholipid is hydrophilic.

13) TRUE or FALSE? Carbon atoms cannot form rings; only long hydrocarbon chains like those found in fatty acids.

14) The part of the phospholipid that is hydrophobic is the
a) tail b) head c) phosphate

QUIZ for "MAPPING THE BODY WITH ART" lesson 5 Name/Date _____

1) Which part of a phospholipid molecule loves water-- the head or the tails?
a) head b) tails c) both d) neither

2) What is the electrical charge of a phosphate ion?
a) +1 b) -1 c) +3 d) -3

3) An empty phospholipid sphere is called a:
a) vesicle b) lysosome c) liposome d) membrane

4) lipsome that is filled with water or air is called a:
a) vacuole b) vesicle c) lysosome d) membrane

5) The Greek word for "dissolve or break apart" is: a) soma b) lipo c) lys d) vacuus

6) How many different types of digestive enzymes might be in a lysosome? a) 1 b) 3 c) 8 d) 50

7) As a general rule, can an enzyme do more than one job? a) yes b) no

8) When a cell needs a bag to store or transport something, it uses a:
a) zipper-lock baggie b) phospholipid c) lysosome d) vesicle

9) What is the inside of a lysosome like? a) acicic b) basic (alkaline) c) neutral d) salty

10) REVIEW: Is water polar or non-polar? a) polar b) non-polar

11) REVIEW: What does hydrophilic mean? a) water-hating b) water-loving

12) REVIEW: A glycerol hanger with three fatty acids attached is called a:
a) phospholipid b) triglyceride c) hydrophobic tail d) saturated fat

13) An acid donates what to its environment? a) protons b) electrons c) hydroxide ions

14) What important job does the lysosome do?
a) Builds cell membranes. b) Transports things across the cell.
c) Stores fats and protein molecules. d) Breaks down proteins, starches and fats so their parts can be recycled.

15) What geometric shape will phospholipids automatically form when put into a polar substance?
a) long line b) flat sheet c) circle d) sphere

5 b
6 F
7 a

QUIZ for "MAPPING THE BODY WITH ART" lesson 6 Name/Date _____

1) Diffusion is an example of:
a) active transport b) passive transport c) endocytosis d) exocytosis

2) What is true about passive transport?
a) Never uses channel proteins. b) Moves things up their concentration gradient.
c) DOES require the use of energy. d) Does NOT require the use of energy.

3) TRUE or FALSE? Facilitated diffusion is a form of passive transport.

4) TRUE or FALSE? Small molecules like oxygen and carbon dioxide can diffuse directly through a cell membrane.

5) Unlike passive transport, active transport requires the use of:
a) diffusion b) energy c) water d) ions

6) TRUE or FALSE? Nothing except water can diffuse through a cell membrane.

7) Endocytosis is an example of:
a) active transport b) passive transport c) diffusion d) facilitate diffusion

8) Aquaporin, a channel protein, helps with the facilitated diffusion of _____ across the cell membrane.
a) oxygen b) ions c) water d) steroids e) food particles

9) TRUE or FALSE? Facilitated diffusion is a form of active transport.

10) TRUE or FALSE? Proton pumps require the use of energy to work.

11) TRUE or FALSE? Pumps move molecules against their concentration gradient.

12) What is a concentration gradient?
a) The concentration of water molecules within a cell.
b) A difference in the concentration of molecules on one side of a membrane relative to the other side.
c) The attraction of polar molecules to each other.
d) The number of molecules a proton pump can transport for each ATP used.

13) In diffusion, molecules will naturally move _____ their concentration gradient.
a) across b) down c) up d) away from

14) What kinds of energy are commonly used by pumps during active transport? (Select all right answers)
a) ATP b) sugars c) proteins d) NADH e) ions f) cholesterol

15) Which of these is NOT true of exocytosis?
a) It is useful for moving large molecules. b) It moves molecules out of the cell. c) It is a form of active transport.
d) It requires the use of energy. e) It is the main transport method for ions like sodium and potassium.

16) TRUE or FALSE? Endocytosis is the process cells use to bring large molecules into the cell.

QUIZ for "MAPPING THE BODY WITH ART" lesson 7 Name/Date _____

1) When a protein passes all the way through a membrane from one side to the other, it is called a/an:
a) integral protein b) peripheral protein c) transmembrane protein d) lipid raft

2) Peripheral proteins:
a) are embedded in the membrane, all the way from one side to the other.
b) are embedded in a membrane, but don't go all the way through from one side to the other.
c) don't go inside the membrane.
d) are the same as integral proteins.

3) TRUE or FALSE? All transmembrane proteins are integral proteins, but not all integral proteins are transmembrane proteins.

4) What is the job of the enzyme Flippase?
a) moves a phospholipid from one side of the bilayer to the other.
b) takes two phospholipids and has them trade places.
c) turns the hydrophobic tails towards the outside of the membrane.
d) turns transmembrane proteins upside down.

5) What process is the enzyme Flippase especially helpful for?
a) sending messages b) moving lipid rafts c) ion exchange d) endocytosis

6) "Glyco" is Greek and "sacchar" is Latin for
a) "big" b) "sugar" c) "protein" d) "signal"

7) TRUE or FALSE? Only the cells in your reproductive system have "self" ID tags.

8) What keeps transmembrane proteins bound to the membrane?
a) They have a large hydrophilic region in their middle.
b) They have a hydrophobic region in their middle.
c) They are anchored in by many other proteins.
d) They have an ionic charge that is attracted to the phospholipid tails.

9) TRUE or FALSE? Lipid rafts help proteins that belong together, stay together.

10) Where might you find a higher concentration of cholesterol in a membrane?
a) In an oligosaccharide. b) In the enzyme Flippase.
c) In a transmembrane protein. d) In a lipid raft.

11) "Oligo" is Greek for: a) short b) long c) few d) many

12) Which layer of the membrane has more phospholipid molecules in it?
a) outer layer b) inner layer

QUIZ for "MAPPING THE BODY WITH ART" lesson 8 Name/Date _____

1) What atom do amino acids have that sugars and fats do not?
a) oxygen b) nitrogen c) carbon d) hydrogen

2) The amino functional group: a) NH_3 b) COOH c) OH d) R

3) The acid group is: a) NH_3 b) COOH c) OH d) R

4) TRUE or FALSE? All of the amino acids that make up the proteins in your body are "left handed."

5) TRUE or FALSE? Chirality (handedness) is not important to the biochemsitry of the body.

6) How many bonds does nitrogen usually want to make?
a) 1 b) 2 c) 3 d) 4

7) TRUE or FALSE? Molecules can be mirror images of each other.

8) "Chiro" is greek for: a) left b) right c) hand d) black e) white

9) Unfortunately, a drug known as _____ caused birth defects in the 1960s when it was given to pregnant women to help with nausea.
a) ibuprofen b) thalidomide c) aspartame d) penicillin

10) Left handed proteins are designated with the letter _____ in front of their name, while right handed proteins are designated by the letter _____.
a) L and D b) L and R c) D and R d) 1 and 2

QUIZ for "MAPPING THE BODY WITH ART" lesson 9 Name/Date _____

1) The bond that holds amino acids together is known as:
a) a nitrogen bond b) a hydrogen bond c) a peptide bond d) a covalent bond

2) What is the name of the process that can form peptide bonds, and in the process form water?
a) hydrogen bonding b) hydrolysis c) hydration synthesis d) dehydration synthesis

3) How many amino acids are there found in the human body?
a) 12 b) 20 c) 200 d) 2,000

4) TRUE or FALSE? Some amino acids are considered to be "non-essential" because your body really never uses them.

5) TRUE or FALSE? The R group determines the chemical characteristics of each amino acid.

6) Which (one) of these amino acids contains sulfur?
a) cysteine b) glycine c) glutamate d) valine e) tyrosine

7) TRUE or FALSE? Some amino acids can be hydrophobic.

8) The smallest, simplest amino acid is:
a) lysine b) glycine c) valine d) serine e) tyrosine

9) TRUE or FALSE? Lysine is an essential amino acid.

10) What is the difference between glutamic acid and glutamate?
a) In glutamate, the proton in the acid group dissociates, leaving COO- . Glutamic acid still has the COOH intact.
b) There is absolutely no difference, they are exactly the same molecule.
c) In glutamic acid, there is an extra acid group in its "R" group when compared to glutamate.
d) Glutamic acid undergoes a dehydration syntehsis reaction which releases water and forms glutamate.

QUIZ for "MAPPING THE BODY WITH ART" lesson 10 Name/Date _____

1) What are the two most important things to remember about proteins? (choose two answers)
a) Proteins are made of amino acids. b) All amino acids are essential.
c) The electronegativity of a protein is what allows it to do its job.
d) The shape of a protein is what allows it to do its job.
e) Amino acids are always hydrophilic, making proteins hydrophilic.
f) A protein is able to do its job because of its hydrophobic nature.
g) Polypeptides are made up of long chains of hydrocarbons.

2) The alpha helices and beta sheets are part of which protein structure tier?
a) primary structure b) secondary structure c) tertiary structure d) quaternary structure

3) What atom is the biggest "electron hog" (very electronegative)?
a) oxygen b) nitrogen c) carbon d) sulfur

4) Tertiary structure describes:
a) how amino acids make alpha and beta sheets. b) the combination of multiple proteins in a protein complex.
c) the sequence of amino acids. d) the 3D shape of a protein.

5) As a protein folds, where will you be more likely to find hydrophobic amino acids?
a) On the outside of the protein. b) On the bottom of the protein.
c) On the inside of the protein. d) Evenly distrubuted throughout the protein.

6) What helps hold alpha helices and beta sheets in their shapes?
a) Cysteine crosslinking b) Hydrogen bonding
c) Covalent bonding d) Hydrophilic/hydrophobic interactions

7) Some proteins use zinc fingers to help grab and hold what?
a) DNA b) other zinc fingers c) other proteins d) water molecules

8) Aquaporin is a protein channel made of: a) beta sheets b) zinc fingers c) helices d) beta barrels

9) TRUE or FALSE? Hydrophilic amino acids would like to be on the outside edges of a protein.

10) TRUE or FALSE? The sequence (primary structure) of a polypeptide will help determine the eventual 3D shape (tertiary structure).

QUIZ for "MAPPING THE BODY WITH ART" lesson 11 Name/Date _____

1) Which answer best describes what job a protein can do?
a) motors b) messages c) hooks d) pumps e) channels f) all of these g) none of these

2) Microtubules make up the _____ which helps the cell maintain its shape.
a) enzymes b) flagella c) cytoskeleton d) gamma globulins

3) TRUE or FALSE? Enzymes generally help to speed reactions up.

4) Kinesins and dyneins are types of what kind of protein?
a) albumins b) microfilaments c) immunoglobulins d) motor

5) Why do hydrophobic substances need to be transported through the blood inside a vessel?
a) Because the hydrophobic substance would bind with the water in your blood.
b) Because blood is mostly water, which is polar
c) Because blood is mostly cells, and the cells would uptake the substance.
d) Because the substance would dissolve in the blood.

6) TRUE or FALSE? Gamma globulins, immunoglobulins, and antibodies are all completely different protein jobs that are not similar.

7) Which of these jobs is NOT a job for the albumin proteins in your blood?
a) Speeding up reactions necessary for digestion. b) Transport free fatty acids.
c) Transport calcium ions. d) Regulate proper blood pressure.

8) Which of these proteins is NOT a type of "cable" or "rope" protein?
a) microtubules b) enzymes c) microfilaments d) intermediate filaments

9) TRUE or FALSE? The cytoskeleton can help cells to move.

10) The molecule that helps an enzyme do its job is known as a(n)
a) actin b) proenzyme c) helper protein d) coenzyme

11) TRUE or FALSE? Proteins are used for building structures in the body, not for sending messages.

12) Often we think about enzymes as proteins that act like "_____" and "_____".
a) "scissors" and "staplers" b) "hooks" and "ropes"
c) "boats" and "tags" d) "hairs" and "feet"

QUIZ for "MAPPING THE BODY WITH ART" lesson 12 Name/Date _____

1) Monosaccharide means: a) single sugar b) many sugars c) milky one d) table sugar

2) Select all 3 monosaccharides.
a) glucose b) sucrose c) sucrolose d) lactose e) galactose f) fructose

3) What process joins sugars together?
a) Dehydration synthesis b) Peptide bonding c) Hydration synthesis d) Hydrogen bonding

4) TRUE or FALSE? Just like with amino acids, your body uses left handed sugar molecules.

5) Starch molecules are long chains of: a) fructore b) sucrose c) glucose d) galactose

6) TRUE or FALSE? Your body is unable to break down cellulose, but bacteria can.

7) Which of these best describes glycogen?
a) It's a polysaccharide that stores glucose in the liver and musclces to be used for energy.
b) It's an enzyme that strings together glucose molecules into starch.
c) It's a polysaccharide that is indigestible but serves as a bulking agent to keep things moving through our intestines.
d) It's a hormone that pulls glucose from the blood and starts the assembly of large starch molecules.

8) TRUE or FALSE? To our tastebuds, sucrose is the sweetest known substance.

9) People who are lactose intolerant have lost the ability to make which enzyme?
a) cellulase b) glycogen synthase c) lactase d) tagatose

10) TRUE or FALSE? Glucose, fructose and galactose all have the same chemical formula: $C_6 H_{12} O_6$.

QUIZ for "MAPPING THE BODY WITH ART" lesson 13 Name/Date _____

1) Ribosomes are made of: a) DNA b) RNA c) proteins d) RNA and proteins

2) What do transfer RNA (tRNA) molecules carry or transfer?
a) amino acids b) proteins c) ribosomes d) mRNA (messenger RNA)

3) How many subunits are there in a ribosome? a) 1 b) 2 c) 3 d) 4

4) What protein helps other proteins fold up?
a) messenger RNA b) ribosomal protein c) large subunit d) chaperone protein

5) What comes to "park" on the three binding sites (A, P and E) in a ribosome?
a) amino acids b) tRNAs carrying amino acids c) chaperon proteins d) strips of mRNA

6) TRUE or FALSE? Proteins (polypeptides) are made from randomly strung together amino acids in no particular order.

7) What happens to a protein that hasn't folded into the right shape?
a) It is shredded and the amino acids are recycled.
b) It disintegrates immediately because it is unstable.
c) It will be assigned a new job within the cell.
d) It will start doing the job it was originally designed to do anyways.

8) A ribosome can be thought of as a:
a) amino acid taxi b) protein factory c) protein messenger d) chaperone protein

9) TRUE or FALSE? All cells have ribosomes, even bacteria.

10) Messenger RNA (mRNA) held by the ribosome waits to be matched with what molecules?
a) amino acids b) chaperone proteins c) tRNAs d) rRNAs

QUIZ for "MAPPING THE BODY WITH ART" lesson 14 Name/Date _____

1) What does the "R" stand for in RNA?
a) Ribose, a sugar b) Ribosome, a protein
c) Rizomine, an amino acid d) Retro, meaning "from the recent past"

2) What three things are nucleotides made of? (Select the three correct answers)
a) an amino acid b) a phosphate c) a proton
d) a fatty acid e) a sugar f) a nitrogenous base (like A or T)

3) Which of these bases is ONLY found in RNA?
a) Adenine b) Thymine c) Uracil d) Guanine e) Cytosine

4) The ordering of the nucleotides in a piece of messenger RNA is critically important because the nucleotides code for:
a) amino acids b) fatty acids c) RNA d) sugars

5) How many nucleotides make up a codon? a) 2 b) 3 c) 4 d) 20

6) TRUE or FALSE? Methionine is always the first amino acid in a polypeptide.

7) The codons UAG, UGA, and UAA are different from the others in that they code for
a) an amino acid b) speeding up the translation process
c) slowing down the translation process d) a "stop" or end to the translation process

8) TRUE or FALSE? Amino acids only ever have one codon that codes for/represents them.

9) Where do you find a codon? a) tRNA b) mRNA c) ribosomes d) amino acids

10) Where do you find an anticodon? a) tRNA b) mRNA c) ribosomes d) amino acids

11) When RNA nucleotides bond,
a) A binds to either U or C, and C always binds to G. b) A always binds to C, and U always binds to G.
c) A always binds to G, and U always binds to C. d) A always binds to U, and C always binds to G.

12) What would be the anticodon for the mRNA codon GAA?
a) CAA b) GAA c) CUU d) AGG e) AAG

13) TRUE or FALSE? RNA only has one job: to code for proteins.

14) TRUE or FALSE? A transfer RNA (tRNA) molecule will only ever be able to carry one specific amino acid.

QUIZ for "MAPPING THE BODY WITH ART" lesson 15 Name/Date _____

1) Select the 4 correct answers that show the differences between DNA and RNA:
a) DNA is a double stranded helix, RNA is a single stranded helix
b) DNA is made of nucleotides, RNA is made of proteins.
c) DNA has thymine, but RNA uses uracil instead.
d) DNA is made of very short strands, RNA is made of very long stands
e) DNA is found only in the nucleus, but RNA is found throughout the cell.
f) DNA has guanine, but RNA uses cytosine instead.
g) DNA has deoxyribose, RNA has ribose.

2) Which molecule makes an RNA copy from DNA?
a) DNA polymerase b) Spliceosome c) Nucleolus d) RNA polymerase

3) TRUE or FALSE? When a strand of mRNA is newly polymerized, it first needs to be spliced, or edited, before it is ready to make proteins

4) During transcription, the two strands of DNA are split apart. Once strand is the "sense" strand and the other is the "antisense" strand. Which one acts as the template for the new RNA strand?
a) "sense" strand b) "anti-sense" strand

5) What does the ending "-ase" tell you about the name of something?
a) It is a protein gadget/enzyme. b) It is a sugar.
c) It is a fatty acid. d) It is an amino acid.

6) TRUE or FALSE? DNA does not leave the nucleus.

7) What is the nuclear membrane made of?
a) One phospholipid bilayer b) Two phospholipid bilayers
c) On layer of phoshpolipids d) One phospholipid bilayer and a layer of proteins

8) Which one of these jobs does RNA polymerase NOT do?
a) Puts a methyl cap on the 5' end of the newly emerging mRNA strand.
b) "Unzippers" or splits open the two DNA strands.
c) "Staples" nucleotides together in a chain as they match up along the template strand.
d) Snaps onto DNA at the place where it is supposed to start copying.

9) What is the "m" short for in "mRNA"? a) many b) mobile c) messenger d) methyl

10) Which of these is NOT true about the nucleolus?
a) It is a place where the DNA is very dense. b) It is inside the nucleus.
c) It is surrounded by its own membrane. d) It is where ribosomes are made.

11) How does mRNA get out of the nucleus?
a) Through pores in the nuclear membrane. b) They diffuse across the nuclear membrane.
c) They don't need to get out, all translation happens in the nucleus. d) Through exocytosis of the nuclear membrane.

12) On a piece of pre-mRNA, which are the pieces that need to be kept and spliced back together to make a finished mRNA strand?
a) Antisense strands b) Polyatrons c) Introns d) Exons

QUIZ for "MAPPING THE BODY WITH ART" lesson 16 Name/Date _____

1) What is FALSE about prokaryotes?
a) They can have cell walls. b) They have ribosomes.
c) hey do not have a nucleus. d) They do not have DNA.

2) Bacterial cell walls are made of peptidoglycan, which is a word that means
a) "outside" "wall" b) "protein" "sugar"
c) "before" a "nut or kernel" d) "old" "proteins"

3) What does penicillin do in bacteria?
a) Interferes with the enzyme that crosslinks the peptidoglycan cell wall.
b) Interferes with protein translation on the bacterial ribosome.
c) Prevents the process of conjugation.
d) Interferes with the bacteria's ability to uptake and utilize the amino acid alanine.

4) In addition to genomic DNA, bacteria often have "bonus" circlets of DNA known as
a) RNA rings. b) spools. c) plasmids. d) peptidoglycans.

5) Archae bacteria are different from other bacteria because:
a) their DNA is wound on spools similar eukaryotes (animals, plants, etc.)
b) they do not have DNA but are rather RNA organisms.
c) they do not live on the human body.
d) they do not have a nucleus.

6) What is commonly found encoded on a plasmid?
a) Enzymes for how to make ribosomes
b) Ability to form a nucleus
c) Antibiotic resistance
d) An exact copy of the genomic DNA

7) Which of these cell parts do bacteria NOT have? (select 1)
a) ribosomes b) nucleus c) plasma membrane d) cell wall e) cytoskeleton
f) vesicles and vacuoles g) cytoplams

8) Which of the bacteria shapes look like spheres? a) spirilli b) bacilli c) vibrio d) cocci

9) Which of these is NOT a function of the pili?
a) Help bacteria to stay attached to surfaces.
b) Bacteria use them like grappling hooks to hold or grab onto something.
c) Used by ribosomes in the process of protein translation.
d) Used in conjugation to transfer a plasmid to another bacteria.

10) TRUE or FALSE? You have more bacteria cells in and on your body than your own.

QUIZ for "MAPPING THE BODY WITH ART" lesson 17 Name/Date _____

1) What does "motility" mean?
a) death b) defense c) movement d) usefulness

2) What is the MOST common means of locomotion for a bacteria?
a) jet-propelled by extruding slime b) one or more flagella
c) air bubbles d) pseudopods

3) The results from a Gram stain tell us about what part of a bacteria?
a) the cell wall b) the nucleus c) the cytoplasm d) the flagellum

4) TRUE or FALSE? All bacteria that are Gram negative are bad/pathogens.

5) How are cilia different from flagella?
a) Cilia are made of proteins; flagella are made of carbohydrates.
b) Cilia are found covering the whole of a cell; there is only every one flagellum on a bacterial cell
c) Cilia are used for locomotion; flagella are not.
d) Cilia beat back and forth; flagella spin around in a circle.

6) Some bacteria have an outermost layer called the capsule. What is it made of?
a) microtubules b) phospholipids c) proteins d) polysaccharides

7) The Herxheimer reaction is when your body feels sick because it is processing toxin that are most commonly released by which kind of bacteria when they die?
a) Gram positive b) Gram negative

8) Which of these is NOT a difference between eubacteria and archae?
a) Archae has double headed phospholipids in its plasma membrane and eubacteria has a bilayer of single headed phosphopolipids.
b) Archae have a nucleus and eubacteria do not.
c) Eubacteria have cell walls made of peptidoglycan, archae do not.
d) Arcahe DNA is wound on spools called histones, while eubacteria DNA is not.

9) TRUE or FALSE? Archae bacteria are not suseptible to penicillin or erythromycin.

10) TRUE or FALSE? Until recently, archae and eubacteria used to be classified together as just "bacteria" because they are very similar.

QUIZ for "MAPPING THE BODY WITH ART" lesson 18 Name/Date _____

1) What are the 2 main parts of a virus? (Select 2 answers)
a) cytoekeleton b) nucleus c) DNA or RNA d) ribosome e) protein capsule

2) Living things are required to exhibit all of these characteristics EXCEPT one of them. Pick the wrong one.
a) move b) grow c) use energy d) respond to the environment e) have a nucleus f) reproduce

3) TRUE or FALSE? A bacteria can be attacked by a virus.

4) ATP stands for:
a) adenosine diphosphate b) adenosine triphosphate
c) adenosine tryptophosphate d) adenosine tertiary protein

5) When ATP looses a phosphate group and releases energy, what is it converted to?
a) ADP b) electrons and protons c) glucose d) NADH

6) Glycolysis means: a) breaking glucose b) building sugars c) releasing energy d) glucose storage

7) TRUE or FALSE? Glycolysis needs to occur in a specialized organelle within the cell.

8) What is the job of NAD+/NADH?
a) A "scissor" to cut glucose in half. b) A "scissor" that snips off a phosphate group.
c) A "taxi" to carry high energy electrons. d) An enzyme that attached a phosphate onto glucose.

9) What are the three carbon molecules called that are left at the end of glycolysis that used to be the two halves of glucose?
a) ATP b) NADH c) ADP d) pyruvate

10) How many ATP (net total) are made by glycolysis that can then be used by the body?
a) 1 b) 2 c) 4 d) 8

11) How many steps are there in glycolysis? a) 2 b) 4 c) 10 d) 20

12) Why don't the phosphates in ATP want to stay together? (ie. why are they like a loaded spring?)
a) Because they are all negatively charged and like charges repel.
b) Because they are all positively charged and like charges repel.
c) Because they are only hydrogen bonded to eachother.
d) Because they have positive and negative charges and opposite charges repel.

13) What are the major products (net) of glycolysis per one glucose molecule?
a) 4 ATP, 4 NADH, 2 pyruvate b) 2 ATP, 2 pyruvate
c) 1 ATP, 1 NADH, 1 pyruvate d) 2 ATP, 2 NADH, 2 pyruvate

QUIZ for "MAPPING THE BODY WITH ART" lesson 19 Name/Date _____

1) TRUE or FALSE? The sperm is the smallest human cell, but is still bigger than a bacteria by a few microns.

2) What is contained in the acrosome of a sperm cell?
a) enzymes b) acid c) sugars d) mitochondria

3) The sperm cell is a haploid cell, which means it:
a) has mitochondrial DNA instead of chromosomes.
b) has no chromosomes but lots of mitochondria.
c) has double the number of chromosomes of a normal human cell (46 instead of 23).
d) has half of the normal number of chromosomes for a human cell (23 instead of 46).

4) TRUE or FALSE? Sperm cells have lots of ribosomes for making new proteins.

5) Which of these cell structures does a sperm have that an egg cell does NOT and what is its function?
a) Mitochondria, to provide energy for the cell. b) Centrioles, to form the spindle for cell division.
c) DNA, the template for proteins. d) Ribosomes, for making proteins.

6) TRUE or FALSE? Mitochondria contain their own loop of non-genomic DNA.

7) Why are mitochondria called the "powerhouses" of the cell?
a) Because they house the electron transport chain and produce lots of ATP (energy).
b) Because they contain lots of ribosomes and make lots of proteins.
c) Because they contain all the DNA that controls the processes that happen with in the cell.
d) Because they are organelles that make sugars from light energy.

8) The "bag" inside the mitochondria has lots of folds called cristae. What is the purpose of these folds and what is the bag made of?
a) To decrease permeability; phospholipid membrane. b) To fold them up into cilia; microtubules.
c) To increase surface area; phospholipid membrane. d) To increase surface area; proteins and microtubules.

9) Where do you find the electron transport chain?
a) In the acrosome. b) Embedded in outer membrane of the mitochondria.
c) Floating in the cytoplasm. d) Embedded in the membrane of the mitochondrial matrix.

10) Why is mtDNA useful for researching ancestry?
a) Because it is inherited primarly from the mother, so you can trace maternal lineages.
b) Because only humans have mt DNA.
c) Because it contains the entire human genome.
d) Because it never mutates.

QUIZ for "MAPPING THE BODY WITH ART" lesson 20 Name/Date _____

1) What happens to the carbon dioxide that is produced during the krebs pre-step and kreb's cycle?
a) It is burned in the electron transport chain. b) It goes into the bloodstream and is exhaled by the lungs.
c) It goes into the bloodstream to be digested by the liver. d) It is oxidized in glycolysis.

2) During the Kreb's "pre-step" or pyruvate oxidation step, CO2 and what other molecule are formed?
a) Acetyl CoA b) glucose c) pyruvate d) citrate

3) The Kreb's cycle is also known as the _____ because Aof this molecule that is formed when acetyl Co comes into the cycle and binds with a four carbon molecule.
a) Carbon Dioxide Cycle b) Pyruvate Acid Cycle c) Acetyl Acid Cycle d) Citric Acid Cycle

4) At the end of the Kreb's cycle, when BOTH molecules of pyruvate (that came from one glucose molecule) have been oxidized, how many NADH are made?
a) 2 b) 3 c) 4 d) 6

5) In addition to producing NADH, the Kreb's cycle produces another high energy electron carrier called?
a) adenosine b) citrate c) $FADH_2$ d) CO_2

6) Where do the electrons go that are carried by NADH and $FADH_2$?
a) To be breathed out by the lungs b) The Kreb's cycle
c) Glycolysis d) The electron transport chain

7) What role do the electrons have in the electron transport chain?
a) As they pass through special pump proteins, they help move protons through the protein to the other side of the membrane.
b) They are needed to make CO_2 at the end of the chain.
c) They travel through protein pumps to the other side of the matrix membrane to give the outside of the membrane a slight negative charge.
d) They bind with hydrogen ions to form hydrogen molecules.

8) About how many ATP can be made from one molecule of glucose using Glycolysis, The Kreb's Cycle, and oxidative phosphorylation (ETC)?
a) 6 b) 12 c) 24 d) 36

9) TRUE or FALSE? Mitochondrial diseases are extremely rare and usually only have mild symptoms that are easily cured.

10) TRUE or FALSE? Producing ATP through glycolysis is not a sufficient amount of ATP to keep our cells alive- we need mitochondria and the Kreb's cycle and ETC.

QUIZ for "MAPPING THE BODY WITH ART" lesson 21 Name/Date _____

1) TRUE or FALSE? The ovum is the largest human cell.

2) What is the corona radiata?
a) The cell that results when a sperm fertilizes an egg.
b) The cell that results when a sperm fertilizes an egg.
c) The thick layer of glycopeptides surrounding the egg that will harden once the egg is fertilized.
d) The group of cells surrounding the egg that protect and nourish it.

3) What do the enzymes in the acrosome of the sperm help it do?
a) Stimulate the corona radiata b) Get through the zona pellucida
c) Swim faster d) Find the egg

4) Which of these is NOT a mechanism that the egg uses to keep more than one sperm from fertilizing it?
a) Through exocytosis, the egg releases enzymes that harden the zona pellucida
b) The membrane undergoes an electrical depolarization
c) The cells surrounding the ovum attack the sperm cells
d) The "finish line" receptors on the outside of the ovum's plasma membrane are disabaled as soon as one is touched.

5) The process of meiosis brings down the number of chromosomes down to _____
a) 20 b) 23 c) 46 d) 92

6) TRUE or FALSE? The ovaries start making eggs when a girl enters puberty.

7) What happens to the polar bodies that are made during the process of meiosis in an ovum?
a) They are discarded. b) They grow into four eggs ready for fertilization.
c) They nourish and protect the egg. d) They follow the egg down the fallopian tube and implant in the uterus.

8) How many chromosomes does the newly formed zygote have?
a) 20 b) 23 c) 46 d) 92

9) A cell that contains two complete genomes is called a _____ cell.
a) diploid b) haploid c) triploid d) aneuploid

10) Egg and sperm cells are also known as _____.
a) zygotes b) gametes c) polar bodies d) diploid

QUIZ for "MAPPING THE BODY WITH ART" lesson 22 Name/Date _____

1) The zygote is a totipotent cell, which means it can:
   a) survive harsh conditions. b) only become a few types of cells.
   c) fight off infections. d) become any body cell.

2) What is attached to rough Endoplasmic Reticulum (ER)?
   a) nuclear pores b) lysosomes c) ribosomes d) mitochondria

3) What does the Golgi Body/ Golgi Apparatus do?
   a) It helps to package proteins sent from the ER and directs them to where they are supposed to go.
   b) It helps to regulate the transcription of proteins via a negative feedback loop.
   c) It folds and packages DNA when it is time to condense into chromosomes for mitosis.
   d) It oversees post-transcriptional modifications of mRNA by splicing out introns.

4) How many copies of the genome are in the new diploid zygote cell?
   a) 1 b) 2 c) 4 d) 20

5) Where are you likely to find receptors and portals in the zygote?
   a) On the centrosome. b) On the ribosomes. c) On the outer membrane. d) Covering the DNA.

6) Which of these things would need to go through a nuclear pore?
   a) mRNA b) RNA c) a ribosome d) centrosome

7) Peroxisomes help to detoxify things, and often produce _____ as a byproduct and is where they get their name.
   a) Hydrogen peroxide b) Carbon dioxide c) Hydrogen ions d) Peroxygen

8) TRUE or FALSE? DNA is only bound tightly into distinct chromosomes when a cell is going through mitosis.

9) What is the main job of the MHC1 protein on the outside of cells?
   a) To help get rid of toxins and break down hydrogen peroxide.
   b) An anchor protein that helps hold a cell tightly next to another cell.
   c) A receptor to help bring large macromolecules into the cell.
   d) An ID tag to tell other cells that it is part of the body and not a foreign invader.

10) REVIEW The lysosome is like the "_____" of the cell.
   a) recycling center b) power plant c) library d) protein factory

QUIZ for "MAPPING THE BODY WITH ART" lesson 23 Name/Date _____

1) "Soma" is Greek for: a) cell b) nucleus c) body d) big

2) Centrosomes are know as:
a) the only organelle a cell can loose and still be able to divide.
b) the source of the replication proteins.
c) the site of DNA replication.
d) microtubule organizing centers.

3) In which phase is DNA replicated in preparation for cell division?
a) prophase b) metaphase c) S phase of interphase d) G phase of telophase

4) This stage of mitosis means "first" stage, and is when the chromatin condenses tightly into chromosomes.
a) prophase b) metaphase c) telophase d) anaphase

5) In this stage of mitosis, chromosome pairs line up in the middle of the cell.
a) prophase b) metaphase c) telophase d) anaphase

6) Cytokinesis is the process of:
a) the cell splitting into two. b) DNA replication.
c) centrosome duplication. d) chromosomes duplicating.

7) During DNA replication, the enzyme that is responsible for doing the actual copying of the DNA is:
a) RNA polymerase b) Ligase c) DNA helicase d) DNA polymerase

8) TRUE or FALSE? No mistakes are ever made during DNA replication- it is always copied perfectly.

9) The terms 5' and 3' used to describe what?
a) The types of polymerase enzymes.
b) The ends of the DNA strands.
c) The stages of mitosis.
d) The organization of chromosomes for mitosis.

10) In which stage of mitosis will you find two identical sets of chromosomes on opposite sides of the cells, begining to have a nucleus form around them?
a) prophase b) metaphase c) telophase d) anaphase

QUIZ for "MAPPING THE BODY WITH ART" lesson 24 Name/Date _____

1) What does "epi-genetics" roughly mean?
a) "outside of the genes" b) "within the genes" c) "without/no genes" d) "before genes"

2) TRUE or FALSE? Genes can be made up of many different DNA sections that are spread out and must be spliced together.

3) What does methylation do to DNA?
a) Opens DNA strands to promote DNA transcription.
b) Keeps the DNA strands closed so they cannot be transcribed.
c) Destroys "junk" DNA.
d) Replicates it.

4) The "switches" on nucleosomes (histone spools) can be activated by all of these molecules EXCEPT:
a) Methyl (CH_3) b) Acetyl ($COCH_3$) c) Phosphate (PO_4) d) DNA polymerase

5) When a gene is being used and being transcribed, we say it is being _____.
a) silenced b) modified c) expressed d) exposed

6) What do nucleosomes/histones help to do?
a) "Spell check" replicated DNA for errors. b) Keep DNA organized.
c) Replicate DNA. d) Translate proteins.

7) MicroRNAs or miRNAs help to regulate gene expression by
a) binding to mRNA that shouldn't be translated by a ribosome, therefore blocking the product of the gene.
b) binding to DNA polymerase and preventing it from binding to DNA strands, therefore "silencing" the gene.
c) helping DNA polymerase to bind to DNA for gene transcription, therefore "upregulating" the gene.
d) "cutting" up pieces of mRNA into little fragments so that they cannot be translated.

8) TRUE or FALSE? The DNA in the nucleus contains every bit of information that any cell will ever need for the entire lifetime of the organism.

9) How many histones come together to make the nucleosome?
a) 2 b) 4 c) 8 d) 12

10) What is the "methyl" group?
a) CH_4 b) CH_3 c) COOH d) CH_3-R

ANSWERS for quizzes for Module 1 Cell Biology

ANSWERS FOR QUIZ 1

1) b 2) a 3) T 4) T 5) T 6) d 7) T 8) b 9) d 10) a
11) b 12) a 13) c 14) c 15) a 16) F

ANSWERS FOR QUIZ 2

1) b 2) c 3) a 4) a 5) b 6) a 7) d 8) c 9) F 10) T

ANSWERS FOR QUIZ 3

1) a 2) b 3) a 4) d 5) c 6) c 7) d 8) a 9) d 10) b
11) b 12) a 13) c 14) b 15) b 16) b 19) a 18) d 19) a 20) b

ANSWERS FOR QUIZ 4

1) e 2) d 3) T 4) a 5) a 6) T 7) c 8) d 9) T 10) F
11) T 12) F 13) F 14) a

ANSWERS FOR QUIZ 5

1) a 2) d 3) c 4) a 5) c 6) d 7) b 8) d 9) a 10) a
11) b 12) a 13) a 14) d 15) d

ANSWERS FOR QUIZ 6

1) b 2) d 3) T 4) T 5) b 6) F 7) a 8) c 9) F 10) T
11) T 12) b 13) b 14) a,d 15) e 16) T

ANSWERS FOR QUIZ 7

1) c 2) c 3) T 4) a 5) d 6) b 7) F 8) b 9) T 10) d
11) c 12) a

ANSWERS FOR QUIZ 8

1) b 2) a 3) b 4) T 5) F 6) c 7) T 8) c 9) b 10) a

ANSWERS FOR QUIZ 9

1) c 2) d 3) b 4) F 5) T 6) a 7) T 8) b 9) T 10) a

ANSWERS FOR QUIZ 10

1) a,d 2) b 3) a 4) d 5) c 6) b 7) a 8) c 9) T 10) T

ANSWERS FOR QUIZ 11

1) f 2) c 3) T 4) d 5) b 6) F 7) a 8) b 9) T 10) d
11) F 12) a

ANSWERS FOR QUIZ 12

1) a 2) a,e,f 3) a 4) F 5) c 6) T 7) a 8) F 9) c 10) T

ANSWERS FOR QUIZ 13

1) d 2) a 3) b 4) d 5) b 6) F 7) a 8) b 9) T 10) c

ANSWERS FOR QUIZ 14

1) a 2) b,e,f 3) c 4) a 5) b 6) T 7) d 8) F 9) b 10) a
11) d 12) c 13) F 14) T

ANSWERS FOR QUIZ 15

1) a,c,e,g 2) d 3) T 4) b 5) a 6) T 7) b 8) a 9) c 10) c
11) a 12) d

ANSWERS FOR QUIZ 16

1) d 2) b 3) a 4) c 5) a 6) c 7) b 8) d 9) c 10) T

ANSWERS FOR QUIZ 17

1) c 2) b 3) a 4) F 5) d 6) d 7) b 8) b 9) T 10) T
11) 12)

ANSWERS FOR QUIZ 18

1) c,e 2) e 3) T 4) b 5) a 6) a 7) F 8) c 9) d 10) b
11) c 12) a 13) d

ANSWERS FOR QUIZ 19

1) T 2) a 3) d 4) F 5) b 6) T 7) a 8) c 9) d 10) a

ANSWERS FOR QUIZ 20

1) b 2) a 3) d 4) d 5) c 6) d 7) a 8) d 9) F 10) T

ANSWERS FOR QUIZ 21

1) T 2) d 3) b 4) c 5) b 6) F 7) a 8) c 9) a 10) b

ANSWERS FOR QUIZ 22

1) d 2) c 3) a 4) b 5) c 6) b 7) a 8) T 9) d 10) a

ANSWERS FOR QUIZ 23

1) c 2) d 3) c 4) a 5) b 6) a 7) d 8) F 9) b 10) c

ANSWERS FOR QUIZ 24

1) a 2) T 3) a 4) d 5) c 6) b 7) a 8) T 9) c 10) b