

CARBOHYDRATES

1. Which elements are found in carbohydrates? _____
 What is the ratio of hydrogen to oxygen? _____
2. Monosaccharides = ___ sugar; disaccharide = ___ sugars; polysaccharide = _____ sugars.
3. Dissaccharides and polysaccharides are formed by linking _____.
 What type of reaction links these monomers? _____
 What type of reaction splits the polymers into monomers? _____
4. A monosaccharide is a _____ (*complex or simple*) carbohydrate.
 List 3 monosaccharides. _____
5. A disaccharide is a _____ (*complex or simple*) carbohydrate.
 List 3 disaccharides _____
6. A polysaccharide is a _____ (*complex or simple*) carbohydrate.
 List 3 polysaccharides _____
7. What are the functions of complex carbohydrates? _____
 and _____
8. _____ is the sugar storage product of plants. This carbohydrate _____
 (*can / cannot*) be digested.
9. _____ is the complex carbohydrate that gives structural support to plant
 cell walls. This carbohydrate is a good source of dietary fiber. It _____
 (*can / cannot*) be digested.
10. _____ is the sugar storage product in animals. It is stored in the
 _____ and _____.
11. Matching - carbohydrates

	Monosaccharide found in RNA
	Storage form of energy in animals
	Glucose + glucose
	Preferred nutrient for making energy
	Fruit sugar
	Monosaccharide found in DNA
	Polysaccharide that cannot be digested by humans
	Glucose + galactose
	Storage form of energy in plants
	Part of milk sugar
	Found in liver and muscle cells
	Glucose + fructose

A	Deoxyribose
B	Ribose
C	Maltose
D	Sucrose
E	Lactose
F	Starch
G	Glycogen
H	Cellulose
I	Glucose
J	Fructose
K	Galactose

LIPIDS

12. Which elements are found in lipids? _____; ratio of hydrogen to oxygen? _____
Lipids are _____ (*hydrophilic or hydrophobic*) and form _____ in water.
13. Three categories of lipids are _____.
14. Triglycerides are made up of _____
Triglycerides provide _____ (*more/less*) energy than carbohydrates.
15. A triglyceride with all C-C single bonds is said to be _____ (*saturated/unsaturated*). It is _____ (*liquid/solid*) at room temperature.
16. A triglyceride with at least one C=C double bond is said to be _____ (*saturated/unsaturated*). It is _____ (*liquid/solid*) at room temperature.
17. _____ (*saturated/unsaturated*) triglycerides build up an block arteries.
18. A lipid composed of glycerol, 2 fatty acids and phosphate is a _____.
The phosphate groups make up the _____ (*hydrophilic/hydrophobic*) heads which are _____ (*polar/nonpolar*).
The fatty acids make up the _____ (*hydrophilic/hydrophobic*) tails which are _____ (*polar/non polar*).
19. Cell membranes are made up of a _____ with _____ (*hydrophilic/hydrophobic*) heads on the outside and _____ (*hydrophilic/hydrophobic*) tails on the inside.
This structure gives the cell membranes its function of _____.
20. Lipids consisting of 4 interlocking rings with added functional groups that give certain properties to the lipid are called _____. They are the main components of testosterone and estrogen (_____) in both males and females.
_____ is a steroid found in between the phospholipids of the cell membrane and helps to maintain its fluidity.
21. What is the function of fatty acids? _____
22. What type of fatty acid acts as a local hormone for cell signaling? _____
23. What type of reaction combines glycerol with fatty acids? _____
What type of reaction splits lipids into monomers? _____
24. Matching - lipids

	Glycerol + 3 fatty acids
	One or more double bonds between carbons; liquid
	Glycerol + 2 fatty acids + phosphate
	Cell membrane
	No double bonds between carbons; solid
	Found between phospholipids in plasma membrane
	Ring shaped lipids with added functional groups

A	Triglycerides
B	Saturated triglycerides
C	Unsaturated triglycerides
D	Phospholipids
E	Phospholipid bilayer
F	Steroids
G	Cholesterol

PROTEINS

25. Proteins are composed of _____; a chain of these monomers is called a _____ chain.

26. Dehydration synthesis reactions form _____ bonds between the _____ group of one amino acid and the _____ group of another amino acid.

27. Give an example of these protein functions.

- support/structure _____
- storage _____
- transport _____
- regulation _____
- receptors _____
- carriers _____
- protection _____
- catalysts _____

28. The 20 different amino acids used to make proteins differ only in the _____ groups attached to the central carbon. Different proteins are formed from different combinations and sequences of _____.

29. Protein structures

	Protein formed by bonding of 2 or more polypeptide chains
	Formed by sulfide bonds between distant amino acids
	Sequence of amino acids that make up protein
	α helix; β pleated sheets formed by hydrogen bonds between amino acids

A	Primary
B	Secondary
C	Tertiary
D	Quaternary

30. Hemoglobin, carrier proteins and enzymes are _____ proteins.

Skin, hair and nails are _____ proteins. (*globular/fibrous*)

31. The loss of protein shape caused by changes in the physical or chemical environment is called _____. This causes the protein to be _____.

32. Matching - proteins

	Specific to a particular protein
	Enzymatic action
	Structural support
	Building blocks of protein
	α helix; β pleated sheet
	Two or more polypeptide chains together
	Hemoglobin transports oxygen
	Bonds formed by amino acids
	Loss of shape causes loss of protein function
	Sequence of amino acids
	Give proteins their properties
	Amino group + central carbon + carboxyl + R group
	Formed sulfide bonds

A	Amino acids
B	Protein function
C	Peptide
D	Functional groups
E	Primary structure
F	Secondary structure
G	Tertiary structure
H	Quaternary structure
I	Denaturation
J	R groups

ENZYMES

- 33. Substrates/reactants fit in _____ on enzymes.
- 34. Enzymes _____ (*increase/decrease*) the activation energy required for a chemical reaction.
The enzyme is _____ (*changed/unchanged*) at the end of a reaction.
- 35. _____ stimulate enzymes to put substrates together to form products. Vitamins are an example.
- 36. List 2 things that will affect the activity of enzymes. _____
- 37. Define saturation kinetics. _____

NUCLEIC ACIDS

- 38. The monomers making up nucleic acids are _____ each of which is made up of a _____, _____ and _____.
- 39. The two nucleic acids are _____ and _____.
What type of sugar is found in DNA? _____
What type of sugar is found in RNA? _____
- 40. What is the function of DNA? _____
- 41. Name the five nitrogenous bases found in nucleic acids and give their symbols:

- 42. Which are found in DNA? _____
Which are found in RNA? _____

43. What is the difference between the structures of purines and pyrimidines:

44. Which bases are purines? _____

Which bases are pyrimidines? _____

45. What type of bonds hold the bases together? _____

46. DNA has a _____ strand; RNA has a _____ strand. (*single/double*)

47. What is the Central Dogma? _____

ATP - adenosine triphosphate

48. What is the structure of ATP? _____

What type of bonds are between the phosphates? _____

49. What is the function of ATP? _____

Breaking the bonds between the phosphates _____ energy. (*requires/releases*)

50. Name another energy molecule used by the cell. _____

51. Give the structure of a coenzyme _____

52. What is the function of cyclic AMP? _____

53. Matching - nucleic acids

	Sugar found in DNA; it lacks an oxygen atom
	2 rings; adenine and guanine
	Carries information from DNA to make proteins
	Genetic information
	supplies energy to cells
	1 ring; thymine; cytosine, uracil
	sugar, phosphate group, nitrogen base
	sugar found in RNA

A.	Nucleotide
B.	Purine
C.	Pyrimidine
D.	Deoxyribose
E.	Ribose
F.	DNA
G.	RNA
H.	ATP

1. CHO; 2 hydrogens : 1 oxygen
2. 1; 2; many
3. monosaccharides; dehydration synthesis; hydrolysis
4. simple; glucose, fructose, galactose
5. simple; maltose, sucrose, lactose
6. complex; starch, glycogen, cellulose
7. provides energy; structure
8. starch; can
9. cellulose; cannot
10. glycogen; liver; muscles
11. B, G, C, I, J, A, H, E, F, K, G, D
12. CHO; more than 2 hydrogens to each oxygen; hydrophobic; micelles
13. triglycerides, phospholipids, steroids
14. glycerol and 3 fatty acids; more
15. saturated; solid
16. unsaturated; liquid
17. saturated
18. phospholipid; hydrophilic; polar; hydrophobic; non polar
19. phospholipid bilayer; hydrophilic; hydrophobic; selective permeability
20. steroids; sex hormones; cholesterol
21. transport fats in body
22. prostaglandins
23. dehydration synthesis; hydrolysis
24. A, C, D, E, B, G, F
25. amino acids; polypeptide
26. peptide; amino; carboxyl
27. support/structure - keratin in fingernails; collagen holds tissues together
storage - stores amino acids; e.g. albumin (white of egg); casein (in milk)
transport - hemoglobin transports O_2 and CO_2 between tissues and lungs; others transport substances across hydrophobic layer
regulation - synchronizes events in body; e.g. insulin (hormone) tells cells to take up sugar; glucagon (hormone) tells cells to release sugar
receptors - on cell surface; communicate with outside world
carriers - movement; e.g. muscles; actin and myosin interact with each other to contract
protection - antibodies (cells) recognize foreign invaders (bacteria, virus, pollen), bind to it and signal immune system response
catalysts - enzymes; speed up chemical reactions
28. R; amino acids
29. D, C, A, B
30. globular; fibrous
31. denaturation; non functional
32. A, B, B, A, F, H, B, C, I, E, J, A, H
33. active sites
34. decrease; unchanged
35. coenzymes
36. temperature; pH

37. Enough substrate and enzymes are needed to make everything that is required by the body.
38. nucleotides; sugar; phosphate group; nitrogenous base
39. DNA; RNA; deoxyribose; ribose
40. carries the information to form all proteins required by the body
41. adenine (A), thymine (T), cytosine (C), guanine (G), uracil (U)
42. DNA - A, T, C, G; RNA - A, U, C, G
43. purines have two rings; pyrimidines have one ring
44. purines - A, G; pyrimidines - C, U, T
45. hydrogen
46. double; single
47. DNA makes RNA makes Protein (DNA → RNA → protein)
48. adenine base; ribose; 3 phosphate groups; hydrogen
49. stores energy; releases
50. GTP (guanine triphosphate)
51. adenine + ribose + 2 phosphates + vitamin
52. cell communication
53. D, B, G, F, H, C, A, E