

MICHAEL L. ROA • DONNELL TINKELBERG

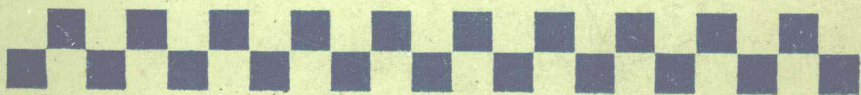


B • I • O • L • O • G • Y

TEACHER'S

INSTANT

VOCABULARY KIT



MICHAEL L. ROA • DONNELL TINKELBERG



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With ready-to-use crosswords
& wordsearches for grades 7-12



THE CENTER FOR APPLIED
RESEARCH IN EDUCATION
West Nyack, New York 10995

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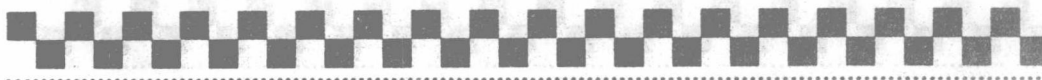
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About the Authors

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About This Book

Today's students have been exposed to many educational television programs, such as *Sesame Street* and *Nova*, and to educational toys, books, and computer games. Making learning fun, entertaining, and enjoyable is a wonderful thing, but the classroom teacher usually doesn't have the resources (time, money, skills) to produce lessons along the lines of *Sesame Street's* excellent programs. Students, though, sometimes expect school to be as entertaining as Kermit and Big Bird.

While many teachers *are* very entertaining in their presentations, most teachers welcome materials that will help them make their lessons both enjoyable and educationally worthwhile. Many teachers are frustrated by the need to be both educator and entertainer. Students demand that schooling be enjoyable, and the teacher who doesn't provide enjoyable lessons is often met with frustrated and bored students. Thus, you are left with three choices:

1. Spend vast amounts of time and energy trying to provide lessons that are enjoyable, perhaps neglecting content in favor of the method of presentation.
2. Ignore the reality of the student's starting point and expectations by adopting an attitude of "This is school—it's not supposed to be fun."
3. Attempt to provide lessons that the students will enjoy while they learn.

The third choice, of course, is the best—both for the student and the teacher. Therefore, *Biology Teacher's Instant Vocabulary Kit* is intended to provide you with puzzles that can add variety to your life science and biology classes in grades 7–12.

These puzzles, which cover 36 life science and biology topics, are meant to supplement other course materials such as lab guides, reference books, and texts.

For each of the 36 topics included in *Biology Teacher's Instant Vocabulary Kit*, you will find:

- Basic vocabulary lists at the life science level
- Advanced vocabulary lists of terms that would be taught in a biology course
- Definitions of all vocabulary terms
- Crossword puzzle using the basic vocabulary terms
- Crossword puzzle using the advanced vocabulary words

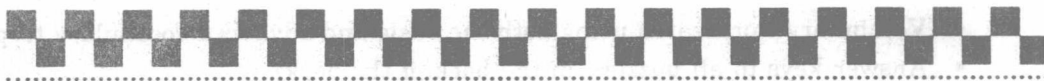
- Vocabulary wordsearch using both the basic and advanced vocabulary terms
- Answer keys to all puzzles (in the back of the book)

The 108 puzzles in this book will help you in several ways:

1. The activities require the students to think and to use terms and concepts correctly.
2. If you are absent, the activities can easily be used by a substitute teacher as self-contained lessons.
3. The puzzles can be reproduced as many times as necessary for different classes.
4. The activities provide models from which you can develop your own puzzles.
5. The vocabulary and concepts are those used and taught in most life science and biology courses and texts. You can easily adapt the materials to your own courses and objectives.

In short, *Biology Teacher's Instant Vocabulary Kit* will help you vary your Biology and Life Science lessons, and inject just the right amount of fun into both teaching and learning!

Michael L. Roa
Donnell Tinkelenberg



How to Use and Modify the Puzzles in This Book

You are encouraged to use the activities in this book as you see fit. The guidelines are just that—guidelines. The puzzles can be used in many creative ways and can be modified to suit your individual style and needs. You are also encouraged to use this book and these puzzles as a basis for creating your own puzzles that are correlated to your own texts, vocabulary, and concepts.

HOW TO USE THE VOCABULARY LISTS

Authors of biology textbooks select the terms they think are the most important for the students using the text to learn. Our comparison of nine of the most commonly-used biology and life science textbooks revealed a wide range of vocabulary that was considered important. We have selected vocabulary from the terms most commonly included in those texts.

The *basic* vocabulary lists are the most basic terms—those most likely to be included in a life science or very basic biology course. The *advanced* vocabulary lists supplement the basic vocabulary with terms that would probably be used in an academic biology course but not in a life science course. The basic vocabulary, of course, would also be included in an academic course.

The inclusion of a term in the vocabulary list does not necessarily mean that it is included in the puzzles. Some terms are used in one activity, some in several, and some not at all. The lists are the “word banks” from which we selected terms to use in the puzzles. If you want to add terms to an activity, or to change the terms, you will find instructions later in this section for doing so.

Since each text is different, it is important that you compare the vocabulary presented in this kit to that used in your classroom text. If terms are included in our activities that are not included in the text being used, you should either delete the term from the activity, “give” that answer to the students, or teach the term. (Each chapter contains definitions for all vocabulary words.)

HOW TO USE THE CROSSWORD PUZZLES

The crossword puzzles can be used to review vocabulary. Teachers have the option of allowing students to refer to the vocabulary lists while working on the puzzles.

Two crossword puzzles are provided for each topic: the first one uses the terms from the basic vocabulary list, and the second uses terms from both the basic and advanced vocabulary lists.

Modification of Crossword Puzzles

1. *Deletion of terms:* Black out spaces for any "unwanted" terms. Be careful not to eliminate letters from intersecting "wanted" words. The clue for that term would have to be removed and the spaces renumbered.
2. *Addition of terms:* Create spaces by using self-adhesive labels over blacked-out squares, or by gluing white paper over them. Lines would then be added to separate the spaces for letters, and clues added and new spaces numbered appropriately. It might be simpler and produce a better-looking crossword puzzle, however, if you use the one provided in this book as a model and copy it, adding additional terms, onto a new graph-paper grid.

HOW TO USE THE WORDSEARCHES

A *Vocabulary Wordsearch* is provided for each topic. Students must first use the clues (definitions) to figure out the terms and then find the terms in the grid.

Modification of Wordsearches

1. *Deletion of terms:* Terms or definitions can easily be deleted from the word list or list of definitions. The grid can be left as is. This would leave unused words in the grid, which is not a problem.
2. *Addition of terms:* Adding or changing terms within the grid would require retyping of the entire grid, unless the added word(s) are obvious. Words might be added within the grid if care is taken not to change any of the other words in the grid. Words can also be easily added to the perimeter of the grid. Of course, the definition list would have to be altered accordingly.
3. *Open-ended wordsearch:* One interesting way to use the wordsearch is to not give the students any clues. The students would be instructed to find and write down as many words pertinent to the chapter as possible in a given time period.
4. *Wordsearch plus:* Another variation is to have the students locate the terms as in paragraph 3 and use them in sentences to demonstrate their knowledge of the meanings.

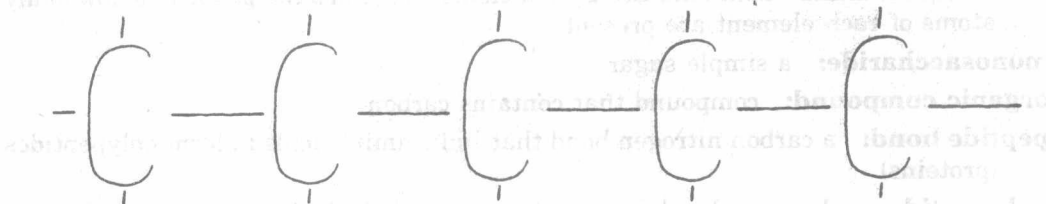


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1: ORGANIC CHEMISTRY



VOCABULARY

Basic

amino acid
carbohydrate
chemical energy
enzyme
fats
glucose
inorganic compound
kinetic energy

molecular formula
organic compound
peptide bond
potential energy
protein
radiant energy
structural formula
substrate

Advanced

(all of the basic vocabulary)
activation energy
dehydration synthesis
disaccharide
fatty acid
glycerol
hydrolysis
lipids
monosaccharide
polypeptide
polysaccharide
radical

DEFINITIONS

activation energy: the energy needed to change potential energy into kinetic energy

amino acid: the nitrogenous building blocks of protein molecules

carbohydrate: organic compound made up of carbon, hydrogen, and oxygen, including sugars, starches, and cellulose

chemical energy: one form of potential energy stored in chemical bonds

dehydration synthesis: the formation of complex organic compounds in which water is given off

disaccharide: sugar formed by the chemical combination of two molecules of simple sugar

enzyme: protein that acts as a catalyst in living things; changes the rate of a chemical reaction without being changed itself

fats: molecules containing fatty acids and glycerol

fatty acid: molecule that combines with glycerol to form lipids

glucose: simple sugar that is the main fuel in both plant and animal cells

glycerol: alcohol molecule that combines with fatty acids to form lipids

hydrolysis: the chemical breakdown of a substance by combination with water

inorganic compound: compound not produced by living things and not containing carbon

kinetic energy: action energy that is doing work or causing change

lipids: fatty substances made up of carbon, hydrogen, and oxygen

molecular formula: notation stating what elements are in a compound and how many atoms of each element are present

monosaccharide: a simple sugar

organic compound: compound that contains carbon

peptide bond: a carbon-nitrogen bond that links amino acids to form polypeptides (proteins)

polypeptide: a large molecule made of amino acids linked by peptide bonds

polysaccharide: large molecule formed by joining monosaccharide molecules through dehydration synthesis

potential energy: stored energy or energy of position

protein: complex chain of amino acids essential to cell structure and function

radiant energy: energy that includes electric waves, radio waves, heat, visible light, and X-rays

radical: the only part of an amino acid molecule that varies

structural formula: diagram showing the atoms in a molecule and how they are bonded

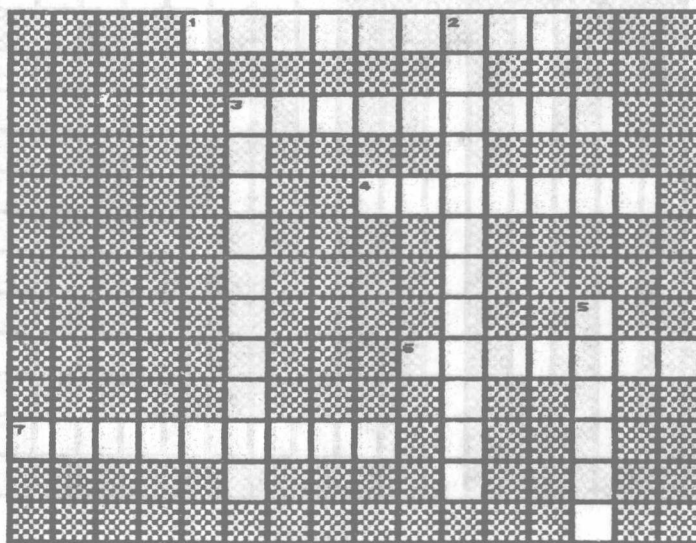
substrate: the substances that enzymes cause to react

Name _____

Date _____

Class _____

ORGANIC CHEMISTRY: BASIC TERMS CROSSWORD PUZZLE



ACROSS

1. One of the nitrogen-containing "building blocks" of proteins (two words)
3. Substance upon which an enzyme acts
4. Chain of amino acids; very important group of compounds
6. Chemical containing carbon; formed by living things
7. Compound not containing carbon

DOWN

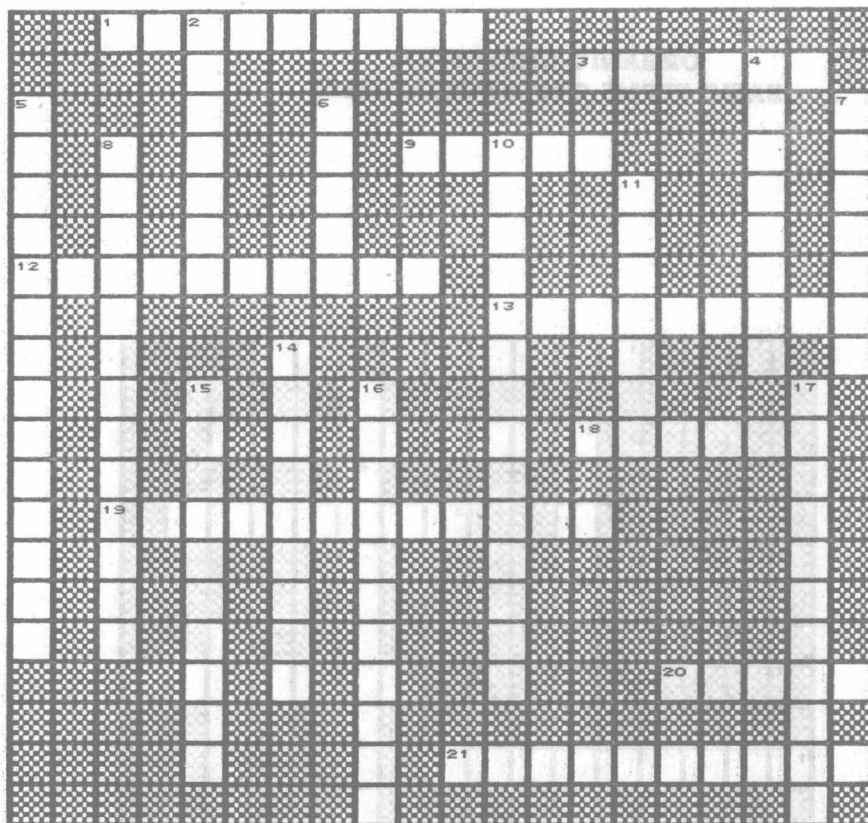
2. Organic compound containing carbon, hydrogen and oxygen; includes sugars and starches
3. A _____ formula is a diagram showing the atoms in a compound and how they are arranged
5. Organic catalyst

Name _____

Date _____

Class _____

ORGANIC CHEMISTRY: ADVANCED TERMS CROSSWORD PUZZLE



ACROSS

1. Not containing carbon; not formed by living things
3. Polysaccharide made of glucose units organized into branched chains
9. A type of fatty substance
12. A _____ formula is a diagram showing the atoms in a molecule and how they are bonded
13. Formation as of chemical compounds
18. Organic catalyst
19. Organic compound made of carbon, hydrogen, and oxygen; examples are sugars, starch, cellulose
20. _____ acids combine to form fats
21. _____ energy is the energy needed to start a chemical reaction

DOWN

2. Chemical containing carbon; formed by a living thing
4. Something that affects the rate of a chemical reaction without being changed itself
5. Simple sugar
6. A type of carbohydrate; examples are glucose, maltose, lactose
7. One of the simple sugars
8. Very large molecule having a long carbon chain
10. Molecule made up of many sugar molecules combined
11. Made up of many amino acids
14. Nitrogen-containing "building block" of proteins
15. Chemical breakdown of a substance by combination with water
16. Large molecule made up of amino acids subunits linked by peptide bonds
17. _____ synthesis is the formation of complex organic compounds in which water is given off

Name _____ Date _____

Class _____

ORGANIC CHEMISTRY: VOCABULARY WORDSEARCH

The wordsearch below contains terms related to our study of organic chemistry. The words can be found horizontally in either direction, vertically in either direction, and diagonally in either direction. Clues are given to help you find the words.

```

F L P K L F Y D E S O C U L G X M L G A
J A X W U H O M X A C T I V A T I O N N
E J T U K E D U P E L A C I D A R Z N D
H T G T E D R X N Z Q H Z U B D P H W Y
Q E J Q Y I E J Z A G L Y C E R O L U R
X T P R O R U Y L P D W E J L L L F Y C
H A E W F A D A H N N E C J S I Y Y X A
R R M N Q H W V V I H M R K H A P B T R
K T Y H B C L X I E B N W P S Y E I E B
T S Z Y T C J U Z T V O J Q H I P D D O
S B N O F A W J F O B V Z B V V T I O H
O U E S I S Y L O R D Y H U Q H I C U Y
E S E X V O F M B P M Y N O U Z D A D D
K B N K J N D R O R G A N I C X E O E R
P J R T X O W H C E L L U L O S E N J A
H X V D K M R M V Z S U T V N X H I P T
L W L N A X W L P M V H Z C Q L P M A E
N X W P H T T S Y L A T A C O B U A Z N
  
```

CLUES

- Chemistry of carbon or molecules produced by organisms
- Simple sugar
- An alcohol that is part of fat molecules
- Amino acid chain with peptide links
- Substance on which enzymes act or which enzymes cause to react
- Nitrogen-containing "building blocks" of proteins (two words)
- Group of compounds containing carbon, hydrogen, and oxygen
- Chemical breakdown of a substance by combination with water
- Chain of amino acids
- Organic catalyst with protein core
- _____ energy is the energy needed to change potential energy to kinetic energy, or to get a reaction started
- _____ acids: along with glycerol, the "building blocks" of fats
- Large polysaccharide; forms strong fibers in plants
- Fatty substances
- Group of atoms that remain together in a chemical change, acting as if they were an atom; for example, OH⁻
- A chemical that increases the rate at which other chemicals react
- A simple sugar that is the main "fuel" for cells

2: CELL STRUCTURE AND FUNCTION



VOCABULARY

Basic

cell
cell specialization
cell wall
chlorophyll
chloroplast
chromatin
chromosome
cytoplasm
endoplasmic reticulum
eukaryote
Golgi body
leukoplast
lysosome
mitochondria

multicellular organism
nuclear membrane
nucleolus
nucleus
organ
organ system
organelle
plasma membrane
plastid
prokaryote
ribosome
unicellular organism
vacuole

Advanced

(all of the basic vocabulary)
carotene
cell fractionization
cell theory
centriole
cytology
grana
microfilament
microtubule
middle lamella
primary wall
Matthias Schleiden
Theodor Schwann
secondary wall
xanthophyll

DEFINITIONS

carotene: an orange pigment found in chloroplasts

cell: the basic structural and functional unit of all living things

cell fractionization: the process of separating parts of cells with the aid of a centrifuge

cell specialization: the adaptation of a cell for a particular function

cell theory: theory stating that the cell is the unit of structure and function of all living things, and that cells arise only from other cells

cell wall: the outer, rigid layer of plant cells and some protist cells

centriole: organelle in most animal and some plant cells that is involved in the process of cell reproduction.

chlorophyll: the green pigment in plants that traps energy from the sun for use in photosynthesis

chloroplast: plastid containing chlorophyll

chromatin: irregular mass of thin threads of DNA, RNA, and protein that forms the chromosomes

chromosome: contains the genetic code in the form of genes, or units of heredity of DNA

- cytology:** the study of the structure, organization, and function of cells
- cytoplasm:** protoplasm outside the nucleus of the cell
- endoplasmic reticulum:** canal-like membrane system within the cytoplasm
- eukaryote:** cell with a well-defined nucleus enclosed in a nuclear membrane
- Golgi body:** organelle made up of a series of closely stacked, flattened sacs that packages substances to be secreted from the cell
- grana:** membrane in a chloroplast that is made up of proteins, chlorophyll, and lipids
- leukoplast:** plastid that stores food
- lysosome:** round organelle containing enzymes, found mainly in the cytoplasm of animal cells
- microfilament:** protein fibers in a cell's cytoplasm involved in changes in the cell's shape
- microtubule:** hollow, cylindrical structure in the cytoplasm of animal cells that maintains cell shape and transports substances
- middle lamella:** outer layer of cell wall that contains a jelly-like substance called pectin
- mitochondria:** complex oval- and rod-shaped structures in the cytoplasm that function during cellular metabolism
- multicellular organism:** complete living thing that consists of more than one cell
- nuclear membrane:** membrane that surrounds the cell nucleus
- nucleolus:** body within nucleus made up of RNA and protein
- nucleus:** oval or spherical structure within a cell that contains most of the genetic material necessary for growth and reproduction; the cell's control center
- organ:** a structure composed of specialized tissues
- organ system:** a collection of several organs working together to perform a function
- organelle:** organized structure within a cell that carries out a life function of the cell
- plasma membrane:** flexible membrane separating the inside of a cell from its surroundings
- plastid:** organelle that makes or stores food
- primary wall:** thin layer of cell wall made of cellulose and pectin
- prokaryote:** cell without a true nucleus; cell in which the nuclear material is not enclosed in a nuclear membrane
- ribosome:** organelle that makes proteins
- Matthias Schleiden:** German botanist who proposed that all plants are made of cells
- Theodor Schwann:** German zoologist who proposed that all animals are made of cells
- secondary wall:** rigid layer of cell wall that remains after the cell dies
- unicellular organism:** a complete living thing that is made up of only one cell
- vacuole:** cavity within the cytoplasm of a cell often filled with food, water, enzymes, and other materials needed by the cell
- xanthophyll:** a yellow pigment found in plants