

Robert Prior

Word Puzzles

from **Nelson Chemistry 12**

Crossword and word search puzzles for every chapter and unit, with solutions,



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Chapter 1

Organic Compounds

Across

1. a hydrocarbon that contains at least one carbon-carbon triple bond
9. a long-chain carboxylic acid (two words)
12. a reaction in which the atoms from one molecule are added to another molecule to form a single molecule (two words)
15. a stereoisomer in which the groups of interest are located on opposite sides of a double bond (two words)
16. an organic compound that contains the sulfhydryl (-SH) group
18. a compound that has a structure based on straight or branched chains or rings of carbon atoms (two words)
21. an organic compound containing an oxygen atom between 2 carbon atoms in a chain
24. an organic compound that contains a carbonyl group bonded to a second oxygen atom which is bonded to another carbon atom
25. a reaction that involves the removal of a hydrogen atom and a hydroxyl group from the reactant, producing a slightly smaller molecule and water (two words)
26. a compound containing only carbon and hydrogen atoms
27. an organic compound that contains a carbonyl group bonded to 2 carbon atoms
29. a hydrocarbon that contains at least one carbon-carbon double bond
30. the rule for predicting the products of addition reactions: when a hydrogen halide or water is added to an alkene, the hydrogen atom generally bonds to the carbon atom within the double bond that already has more hydrogen atoms bonded to it (two words)
31. a group of atoms within a molecule that determines the properties of the molecule (two words)
10. an alcohol in which the hydroxyl group is bonded to a carbon atom with three alkyl groups bonded to it (two words)
11. a hydrocarbon with only single covalent bonds between its carbon atoms (two words)
13. an organic compound, consisting of carbon and hydrogen, with one or more double or triple bonds joining pairs of carbon atoms within the molecules (two words)
14. an unsaturated cyclic hydrocarbon with a pattern of bonding that makes it chemically stable (two words)
17. a strong dipole-dipole force between a hydrogen atom attached to a highly electronegative atom (N, O, or F) in one molecule and a highly electronegative atom in another molecule (two words)
19. a weak organic acid containing at least one carboxyl group (two words)
20. an organic molecule containing a carbonyl group that is bonded to at least 1 hydrogen atom
22. an organic compound, related to ammonia, that contains a nitrogen atom bonded to one or more alkyl groups on each molecule
23. molecules that have the same chemical formula and structural backbone, but with a different arrangement of atoms in space
28. a class of organic compound that includes fats and oils
29. organic compound that contains the hydroxyl (-OH) functional group

Down

1. an organic compound that contains a carbonyl group bonded to a nitrogen atom
2. the reaction of a carboxylic acid and alcohol to form an ester and water
3. the process of making soap by heating fats or oils with a strong base
4. a chemical reaction in which two molecules combine to form a larger molecule and a small molecule, such as water (two words)
5. an alcohol in which the hydroxyl group is bonded to a terminal carbon atom (two words)
6. the breaking of a covalent bond in a molecule by the addition of the elements of water (hydrogen and oxygen); the splitting of an ester into carboxylic acid and alcohol compounds
7. a carbon atom double-bonded to an oxygen atom, found in organic compounds such as aldehydes and ketones (two words)
8. a saturated hydrocarbon

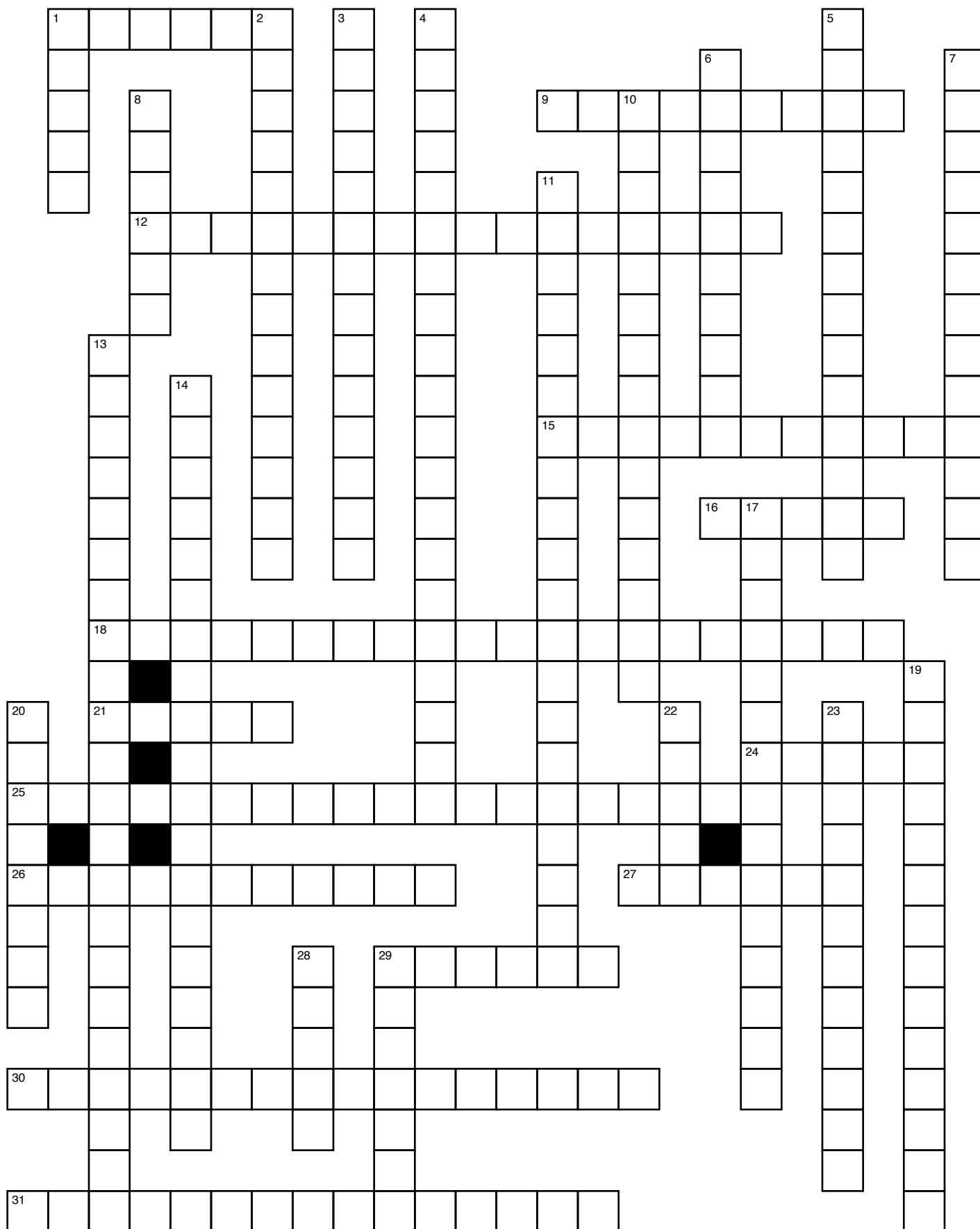




Figure 2.10 Polymers Used in the Common Plastics

Chapter 2

Polymers

Across

3. an aldehyde or ketone with 5 or 6 carbon atoms and many hydroxyl groups; a simple sugar that is the monomer of a carbohydrate
5. deoxyribonucleic acid; a polymer in the cell nucleus that stores and transmits genetic information
7. the polymer molecules that make up DNA and RNA (two words)
8. a large polymer consisting of many monosaccharides; can form when each ring forms two glycosidic bonds
10. a very long organic molecule formed as the result of addition reactions between monomers with unsaturated carbon-carbon bonds (two words)
13. polymer made of two or more different types of monomers combined
14. small molecules that make up polymers
15. a polymer formed by condensation reactions resulting in amide linkages between monomers
16. ribonucleic acid; a polymer in the cell cytoplasm that stores and transmits genetic information
17. large, usually chain-like molecules that are built from small molecules
18. an ester created when the DNA or RNA base combines with phosphoric acid

Down

1. a very long organic molecule formed as a result of condensation reactions between monomers with two functional groups (two words)
2. two or more amino acids linked together
4. a polymer food source and structural material for plants with the empirical formula $C_x(H_2O)_y$
6. a polymer formed by a condensation reaction that results in ester linkages between monomers
9. polymer of a single type of monomer
11. a compounds with a carboxyl group and an amino group attached to the same carbon atom; the building blocks of all protein (two words)
12. a synthetic substance that can be moulded (often under heat and pressure) and that then retains its given shape

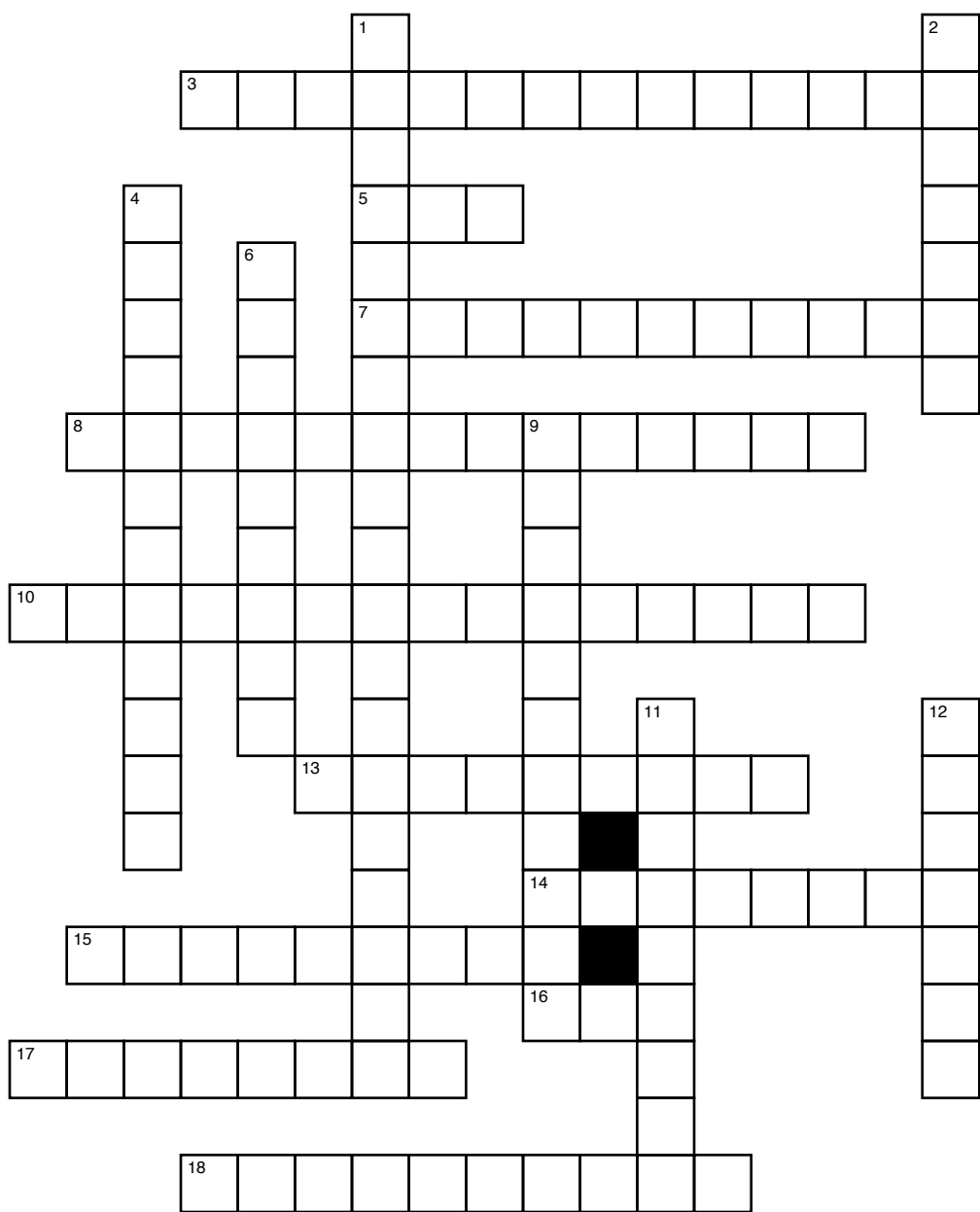




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Unit 1

Organic Chemistry

Across

4. a polymer formed by a condensation reaction that results in ester linkages between monomers
6. organic compound that contains the hydroxyl ($-OH$) functional group
15. a long-chain carboxylic acid (two words)
16. a saturated hydrocarbon
18. a polymer formed by condensation reactions resulting in amide linkages between monomers
21. a carbon atom double-bonded to an oxygen atom, found in organic compounds such as aldehydes and ketones (two words)
23. an alkane in which one or more hydrogen atoms have been substituted with one or more halogen atoms (two words)
24. a stereoisomer in which the groups of interest are located on opposite sides of a double bond (two words)
27. a group of atoms within a molecule that determines the properties of the molecule (two words)
32. a chemical reaction in which a compound reacts with oxygen, O_2 ; if the compound is a hydrocarbon, the products of the reaction are carbon dioxide, water, and thermal energy (two words)
33. a hydrocarbon with only single covalent bonds between its carbon atoms (two words)
36. ribonucleic acid; a polymer in the cell cytoplasm that stores and transmits genetic information
36. an organic compound, consisting of carbon and hydrogen, with one or more double or triple bonds joining pairs of carbon atoms within the molecules (two words)
37. a compounds with a carboxyl group and an amino group attached to the same carbon atom; the building blocks of all protein (two words)
50. a very long organic molecule formed as the result of addition reactions between monomers with unsaturated carbon-carbon bonds (two words)
52. a synthetic substance that can be moulded (often under heat and pressure) and that then retains its given shape
53. a very long organic molecule formed as a result of condensation reactions between monomers with two functional groups (two words)
54. a reaction that involves the removal of a hydrogen atom and a hydroxyl group from the reactant, producing a slightly smaller molecule and water (two words)
55. an organic compound, related to ammonia, that contains a nitrogen atom bonded to one or more alkyl groups on each molecule
58. an atom or group that replaces a hydrogen atom in an organic compound (two words)

Down

1. an organic compound that contains a carbonyl group bonded to a nitrogen atom
2. an organic compound that contains the sulfhydryl ($-SH$) group
3. a compound that has the same molecular formula as another compound, but a different structure (two words)
4. a large polymer consisting of many monosaccharides; can form when each ring forms two glycosidic bonds
5. an alcohol in which the hydroxyl group is bonded to a carbon atom with two alkyl groups bonded to it (two words)
7. an unsaturated cyclic hydrocarbon with a pattern of bonding that makes it chemically stable (two words)
8. a class of organic compound that includes fats and oils
9. two or more amino acids linked together
10. a hydrocarbon that contains at least one carbon-carbon double bond
11. a hydrocarbon in which the main structure consists of a chain of carbon atoms joined to form a closed ring (two words)
12. the breaking of a covalent bond in a molecule by the addition of the elements of water (hydrogen and oxygen); the splitting of an ester into carboxylic acid and alcohol compounds
13. the rule for predicting the products of addition reactions: when a hydrogen halide or water is added to an alkene, the hydrogen atom generally bonds to the carbon atom within the double bond that already has more hydrogen atoms bonded to it (two words)
14. an organic molecule containing a carbonyl group that is bonded to at least 1 hydrogen atom
17. an ester formed from long-chain fatty acids and glycerol
19. a strong dipole-dipole force between a hydrogen atom attached to a highly electronegative atom (N, O, or F) in one molecule and a highly electronegative atom in another molecule (two words)
20. a molecular compound of carbon, not including carbon monoxide, carbon dioxide, and hydrogen cyanide (two words)
22. a weak organic acid containing at least one carboxyl group (two words)
24. an alcohol in which the hydroxyl group is bonded to a carbon atom with three alkyl groups bonded to it (two words)
25. the process of making soap by heating fats or oils with a strong base
26. small molecules that make up polymers
28. a compound that has a structure based on straight or branched chains or rings of carbon atoms (two words)
29. a stereoisomer in which the groups of interest are located on the same side of a double bond (two words)
30. an organic compound that contains a carbonyl group bonded to 2 carbon atoms
31. the polymer molecules that make up DNA and RNA (two words)
32. a chemical reaction in which two molecules combine to form a larger molecule and a small molecule, such as water (two words)
34. deoxyribonucleic acid; a polymer in the cell nucleus that stores and transmits genetic information
38. polymer of a single type of monomer
39. a reaction in which the atoms from one molecule are added to another molecule to form a single molecule (two words)
40. the reaction of a carboxylic acid and alcohol to form an ester and water
41. a polymer food source and structural material for plants with the empirical formula $C_x(H_2O)_y$
42. an ester created when the DNA or RNA base combines with phosphoric acid
43. an aldehyde or ketone with 5 or 6 carbon atoms and many hydroxyl groups; a simple sugar that is the monomer of a carbohydrate
44. large, usually chain-like molecules that are built from small molecules
45. an alcohol in which the hydroxyl group is bonded to a terminal carbon atom (two words)
46. molecules that have the same chemical formula and structural backbone, but with a different arrangement of atoms in space
47. a carbon atom that is double-bonded to 1 oxygen atom and single-bonded to a hydroxyl group (two words)
48. one or more carbon atoms that form a branch off of the main chain of a hydrocarbon (two words)
49. a compound containing only carbon and hydrogen atoms
51. a benzene ring (minus 1 hydrogen atom) that behaves as a substituent in an organic compound (two words)
53. polymer made of two or more different types of monomers combined
55. a hydrocarbon that contains at least one carbon-carbon triple bond
56. an organic compound that contains a carbonyl group bonded to a second oxygen atom which is bonded to another carbon atom
57. an organic compound containing an oxygen atom between 2 carbon atoms in a chain

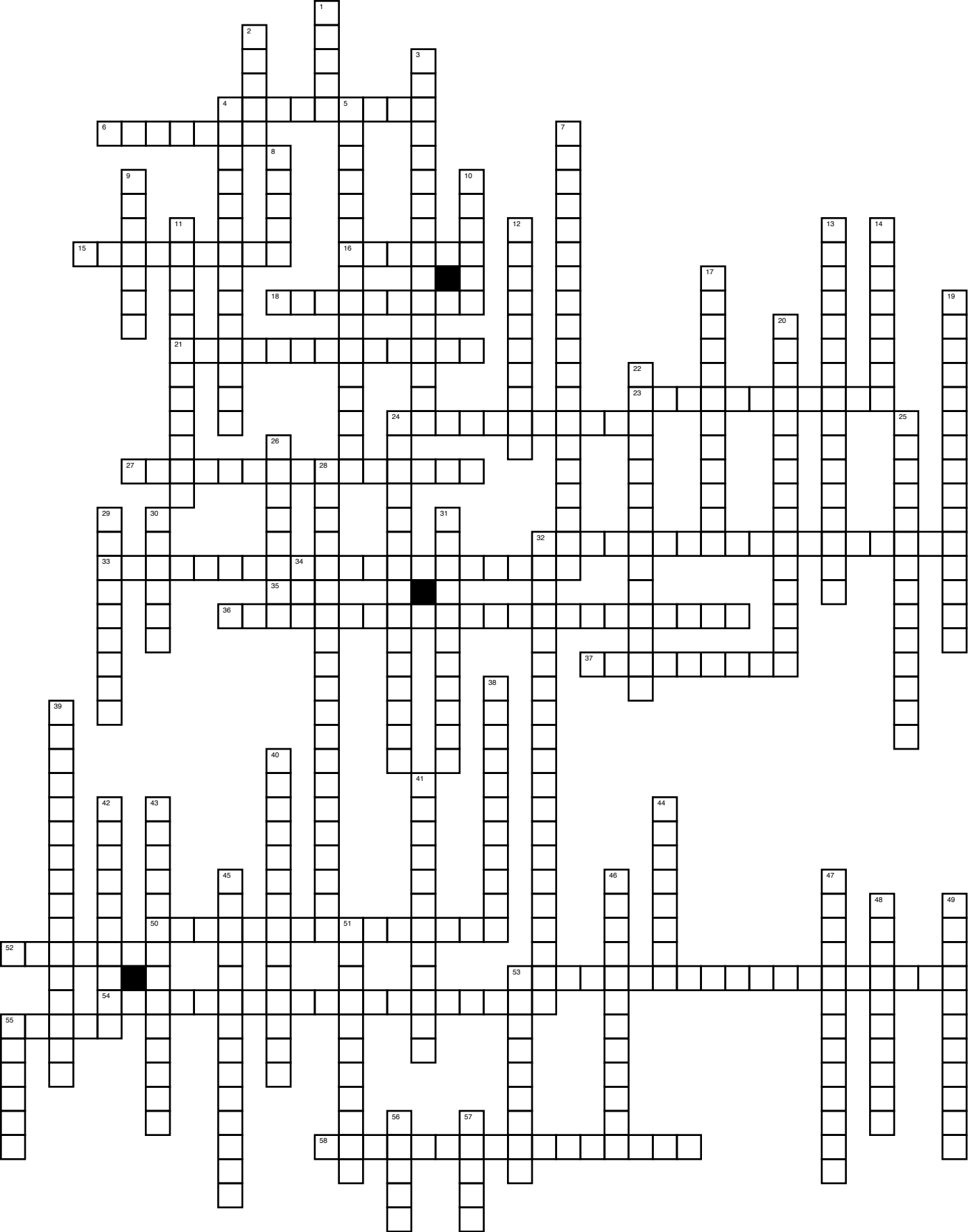




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Chapter 1

Organic Compounds

- ▶ a molecular compound of carbon, not including carbon monoxide, carbon dioxide, and hydrogen cyanide (two words)
- ▶ a compound containing only carbon and hydrogen atoms
- ▶ a hydrocarbon with only single covalent bonds between its carbon atoms (two words)
- ▶ a saturated hydrocarbon
- ▶ a hydrocarbon in which the main structure consists of a chain of carbon atoms joined to form a closed ring (two words)
- ▶ one or more carbon atoms that form a branch off of the main chain of a hydrocarbon (two words)
- ▶ an atom or group that replaces a hydrogen atom in an organic compound (two words)
- ▶ a compound that has the same molecular formula as another compound, but a different structure (two words)
- ▶ a chemical reaction in which a compound reacts with oxygen, O_2 ; if the compound is a hydrocarbon, the products of the reaction are carbon dioxide, water, and thermal energy (two words)
- ▶ an alkane in which one or more hydrogen atoms have been substituted with one or more halogen atoms (two words)
- ▶ an organic compound, consisting of carbon and hydrogen, with one or more double or triple bonds joining pairs of carbon atoms within the molecules (two words)
- ▶ a hydrocarbon that contains at least one carbon-carbon double bond
- ▶ a hydrocarbon that contains at least one carbon-carbon triple bond
- ▶ a compound that has a structure based on straight or branched chains or rings of carbon atoms (two words)
- ▶ molecules that have the same chemical formula and structural backbone, but with a different arrangement of atoms in space
- ▶ a stereoisomer in which the groups of interest are located on the same side of a double bond (two words)
- ▶ a stereoisomer in which the groups of interest are located on opposite sides of a double bond (two words)
- ▶ a group of atoms within a molecule that determines the properties of the molecule (two words)
- ▶ a reaction in which the atoms from one molecule are added to another molecule to form a single molecule (two words)
- ▶ the rule for predicting the products of addition reactions: when a hydrogen halide or water is added to an alkene, the hydrogen atom generally bonds to the carbon atom within the double bond that already has more hydrogen atoms bonded to it (two words)
- ▶ an unsaturated cyclic hydrocarbon with a pattern of bonding that makes it chemically stable (two words)
- ▶ a benzene ring (minus 1 hydrogen atom) that behaves as a substituent in an organic compound (two words)
- ▶ organic compound that contains the hydroxyl ($-OH$) functional group
- ▶ an alcohol in which the hydroxyl group is bonded to a terminal carbon atom (two words)
- ▶ an alcohol in which the hydroxyl

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



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Chapter 2

Polymers

- ▶ large, usually chain-like molecules that are built from small molecules
- ▶ small molecules that make up polymers
- ▶ polymer of a single type of monomer
- ▶ polymer made of two or more different types of monomers combined
- ▶ a very long organic molecule formed as the result of addition reactions between monomers with unsaturated carbon-carbon bonds (two words)
- ▶ a synthetic substance that can be moulded (often under heat and pressure) and that then retains its given shape
- ▶ a very long organic molecule formed as a result of condensation reactions between monomers with two functional groups (two words)
- ▶ a polymer formed by a condensation reaction that results in ester linkages between monomers
- ▶ a polymer formed by condensation reactions resulting in amide linkages between monomers
- ▶ a polymer food source and structural material for plants with the empirical formula $C_x(H_2O)_y$
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- ▶ deoxyribonucleic acid; a polymer in the cell nucleus that stores and transmits genetic information
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- ▶ the polymer molecules that make up DNA and RNA (two words)
- ▶ an ester created when the DNA or RNA base combines with phosphoric acid

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



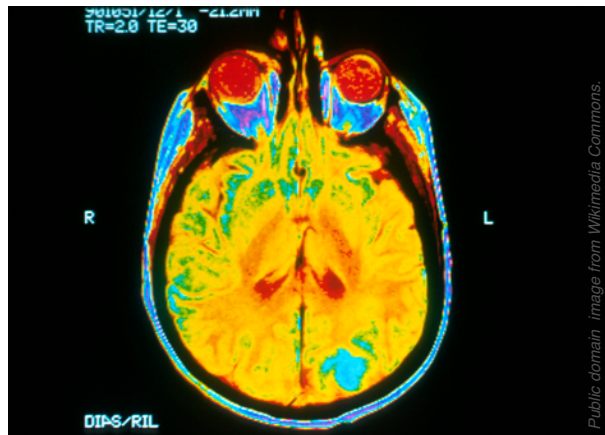
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Unit 1

Organic Chemistry

- ▶ a molecular compound of carbon, not including carbon monoxide, carbon dioxide, and hydrogen cyanide (two words)
- ▶ a compound containing only carbon and hydrogen atoms
- ▶ a hydrocarbon with only single covalent bonds between its carbon atoms (two words)
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- ▶ a hydrocarbon in which the main structure consists of a chain of carbon atoms joined to form a closed ring (two words)
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- ▶ a compound that has the same molecular formula as another compound, but a different structure (two words)
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- ▶ an organic compound, consisting of carbon and hydrogen, with one or more double or triple bonds joining pairs of carbon atoms within the molecules (two words)
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- ▶ a benzene ring (minus 1 hydrogen atom) that behaves as a substituent in an organic compound (two words)
- ▶ organic compound that contains the hydroxyl ($-OH$) functional group
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- ▶ a weak organic acid containing at least one carboxyl group (two words)
- ▶ a carbon atom that is double-bonded to 1 oxygen atom and single-bonded to a hydroxyl group (two words)
- ▶ an organic compound that contains a carbonyl group bonded to a second oxygen atom which is bonded to another carbon atom
- ▶ the reaction of a carboxylic acid and alcohol to form an ester and water
- ▶ the breaking of a covalent bond in a molecule by the addition of the elements of water (hydrogen and oxygen); the splitting of an ester into carboxylic acid and alcohol compounds
- ▶ a class of organic compound that includes fats and oils
- ▶ a long-chain carboxylic acid (two words)
- ▶ an ester formed from long-chain fatty acids and glycerol
- ▶ the process of making soap by heating fats or oils with a strong base
- ▶ an organic compound, related to ammonia, that contains a nitrogen atom bonded to one or more alkyl groups on each molecule
- ▶ an organic compound that contains a carbonyl group bonded to a nitrogen atom
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- ▶ two or more amino acids linked together
- ▶ deoxyribonucleic acid; a polymer in the cell nucleus that stores and transmits genetic information
- ▶ ribonucleic acid; a polymer in the cell cytoplasm that stores and transmits genetic information
- ▶ the polymer molecules that make up DNA and RNA (two words)
- ▶ an ester created when the DNA or RNA base combines with phosphoric acid

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



Chapter 3

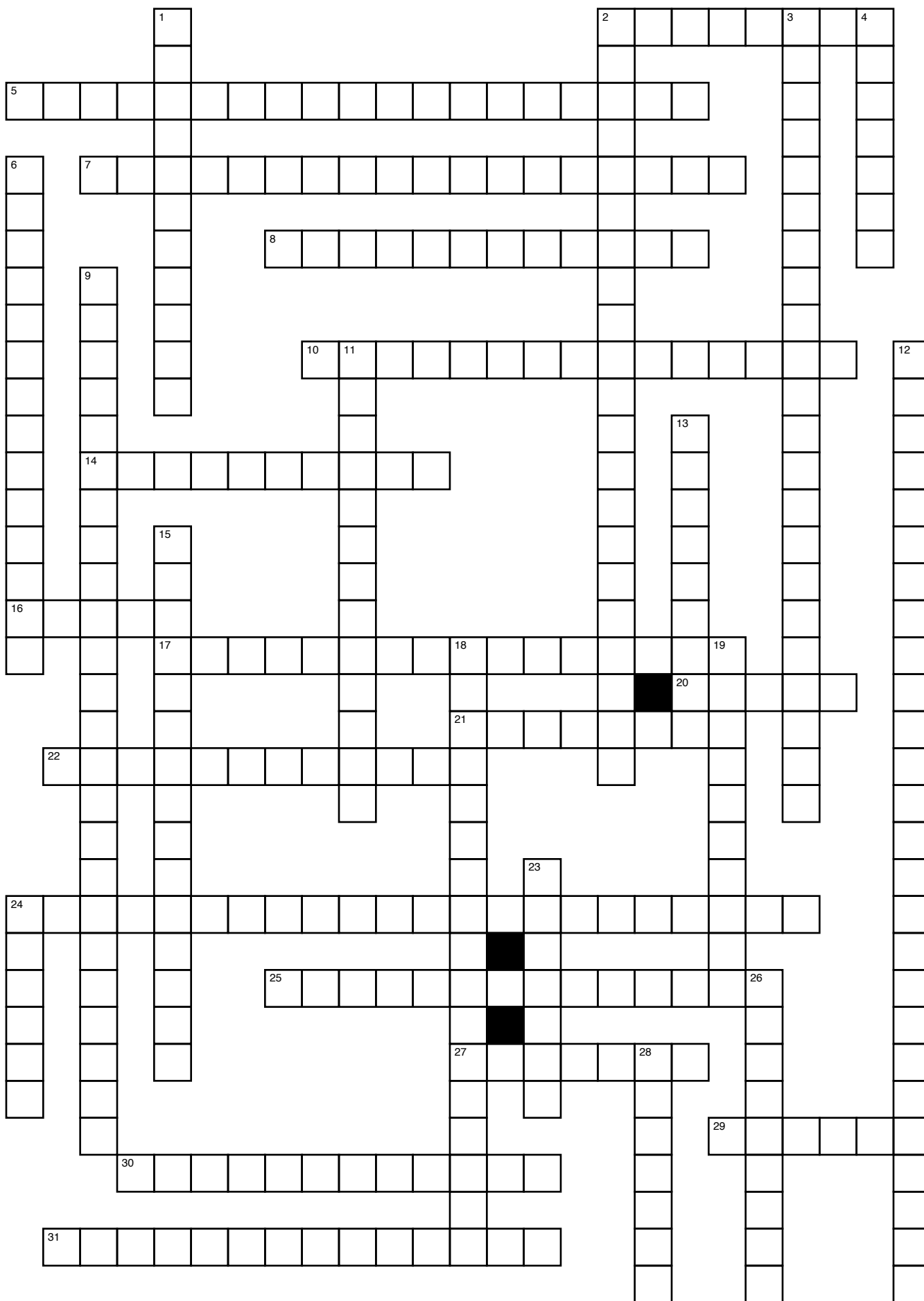
Atoms

Across

2. a negatively charged subatomic particle
5. electrons are emitted by matter that absorbs energy from shortwave electromagnetic radiation (for example, visible or UV light) (two words)
7. an emission spectrum that contains all the wavelengths in a specific region of the electromagnetic spectrum (two words)
8. an isotope that emits radioactive gamma rays and/or subatomic particles (for example, alpha and/or beta particles)
10. an element whose highest-energy electrons are in *d* orbitals (two words)
14. the movement of an electron from one energy level to another
16. an atom's main energy level, where the shell number is given by the principal quantum number, $n = 1, 2, 3, \dots$
17. the spectrum of electromagnetic radiation emitted by an atom; results when an atom is returned to a lower energy state from a higher energy state (two words)
20. a device that produces light of a single colour with all waves travelling parallel to each other
21. atoms with the same number of protons but different numbers of neutrons
22. the mathematical probability of finding an electron in a certain region of space (two words)
24. the quantum number that describes the size and energy of an atomic orbital (three words)
25. numbers that describe the quantum mechanical properties of orbitals, from the solutions to Schrödinger's wave equation (two words)
27. an electrically neutral subatomic particle
29. a unit of light energy
30. the number of protons in a nucleus (two words)
31. a diagram that represents the relative energies of the electrons in an atom (two words)
9. a medical tool in which magnetic fields interact with atoms in the human body, producing images that doctors can use to diagnose injuries and diseases (three words)
11. the spontaneous decay or disintegration of the nucleus of an atom
12. the probability of finding an electron at a given location, derived from wave equations and used to determine the shapes of orbitals; also called electron probability distribution (three words)
13. a rule stating that in a particular set of orbitals of the same energy, the lowest energy configuration for an atom is the one with the maximum number of unpaired electrons allowed by the Pauli exclusion principle; unpaired electrons represented as having parallel spins (two words)
15. an electron in the outermost principal quantum level of an atom (two words)
18. the quantum number that relates to the spin of the electron; limited to $+\frac{1}{2}$ or $-\frac{1}{2}$ (three words)
19. the total number of protons and neutrons in a nucleus (two words)
23. unit or packet of energy
24. a positively charged subatomic particle
26. orbitals of different shapes and energies, as given by the secondary quantum number; often referred to as *s*, *p*, *d*, and *f*
28. the region around a nucleus where an electron has a high probability of being found

Down

1. the lowest energy state for an atom (two words)
2. the location and number of electrons in the electron energy levels of an atom (two words)
3. those elements in the main blocks of the periodic table, which are Groups 1 to 18 (the *s* and *p* blocks) (two words)
4. the dense centre of an atom with a positive charge
6. the very strong magnetism commonly exhibited by materials that contain nickel, iron, and cobalt; applies to a collection of atoms



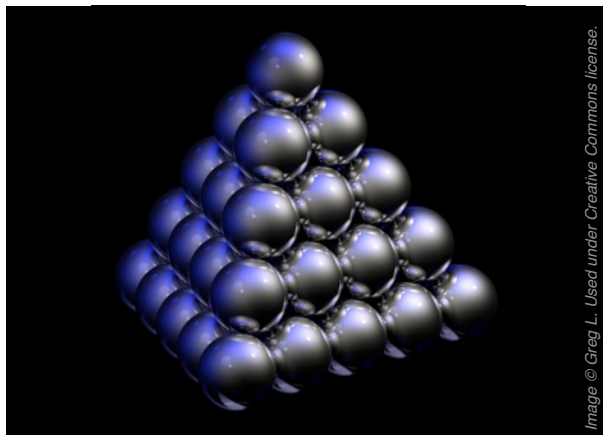


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Chapter 4

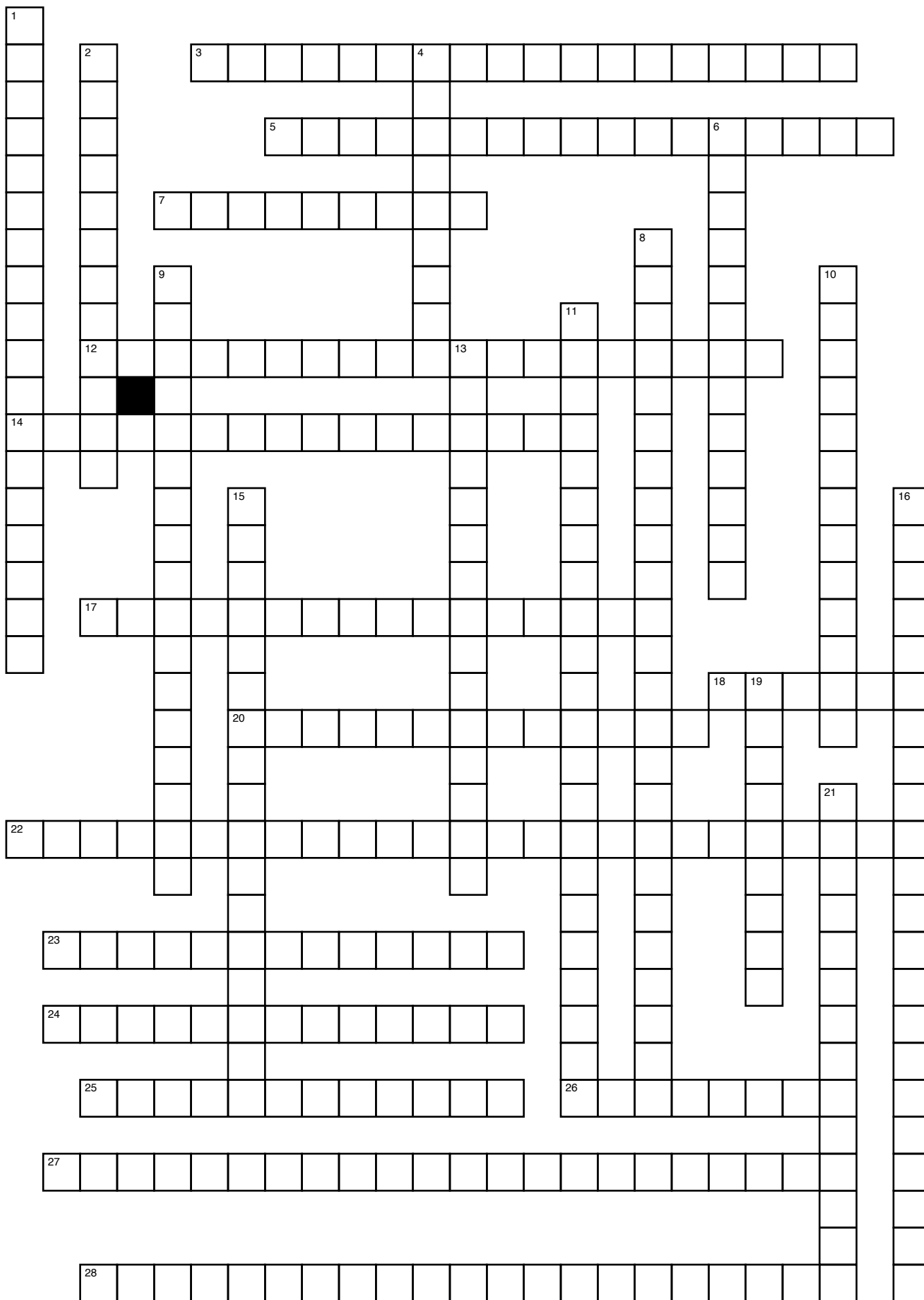
Chemical Bonding

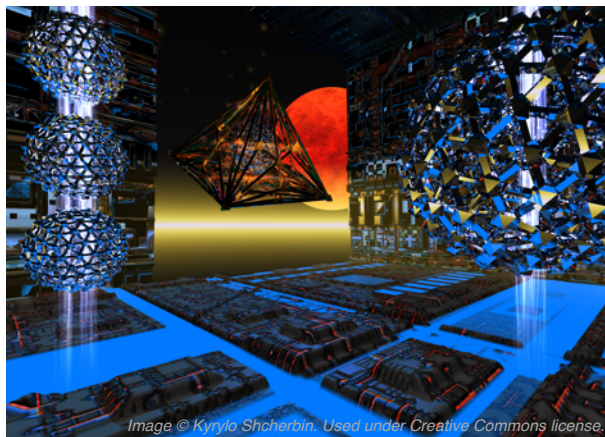
Across

3. a force that causes one molecule to interact with another molecule; occurs between molecules (two words)
5. a theory that states that the electrons in a metallic crystal move freely around the positively charged nuclei (three words)
7. the measure of a liquid's resistance to flow
12. an electron pair that is involved in bonding, found in the space between two atoms (three words)
14. a pair of valence electrons that is localized to a given atom but not involved in bonding (three words)
17. a solid composed of individual molecules held together by intermolecular forces of attraction (two words)
18. a separation of positive and negative charges in a region in space
20. having the same number of electrons per atom, ion, or molecule
22. the three-dimensional arrangement of ions or atoms making up a pure substance (two words)
23. a molecule that has a net dipole (two words)
24. an orbital that forms from the combination of at least 2 different orbitals (two words)
25. a chemical bond in which atoms share the bonding electrons (two words)
26. the observation that the complete outer shell of valence electrons when hydrogen and period 2 metals are involved in bonding (two words)
27. the intermolecular forces that exist in non-polar molecules; they increase as the molecular mass increases (three words)
28. the repulsive force that occurs between electron pairs, causing them to be positioned as far apart as possible in a molecule (two words)
6. the process of forming hybrid orbitals from the combination of at least 2 different orbitals
8. a Lewis structure in which bonding electron pairs are represented by solid lines and lone electron pairs by dots (three words)
9. many types of intermolecular forces, including dipole-dipole forces, London dispersion forces, and hydrogen bonding (four words)
10. a substance that conducts a slight electric current at room temperature but has increasing conductivity at higher temperatures
11. a covalent bond in which the electrons involved in bonding are from one atom (three words)
13. the spontaneous rising of a liquid in a narrow tube (two words)
15. a model of a molecule showing the relative sizes of the atoms and their relative orientations (two words)
16. a solid in which the atoms form covalent bonds in an interwoven network (three words)
19. the electrostatic attraction between oppositely charged ions (two words)
21. the resistance of a liquid to increase its surface area (two words)

Down

1. the chemical bond within a molecule (two words)
2. the strong dipole-dipole force that occurs when a hydrogen atom bonded to a highly electronegative atom (oxygen, nitrogen, or fluorine) is attracted to a partially negative atom in a nearby molecule (two words)
4. the observation that many atoms tend to form the most stable substances when they are surrounded by 8 electrons in their valence shells (two words)





Unit 2

Chemical Structure and Properties of Matter

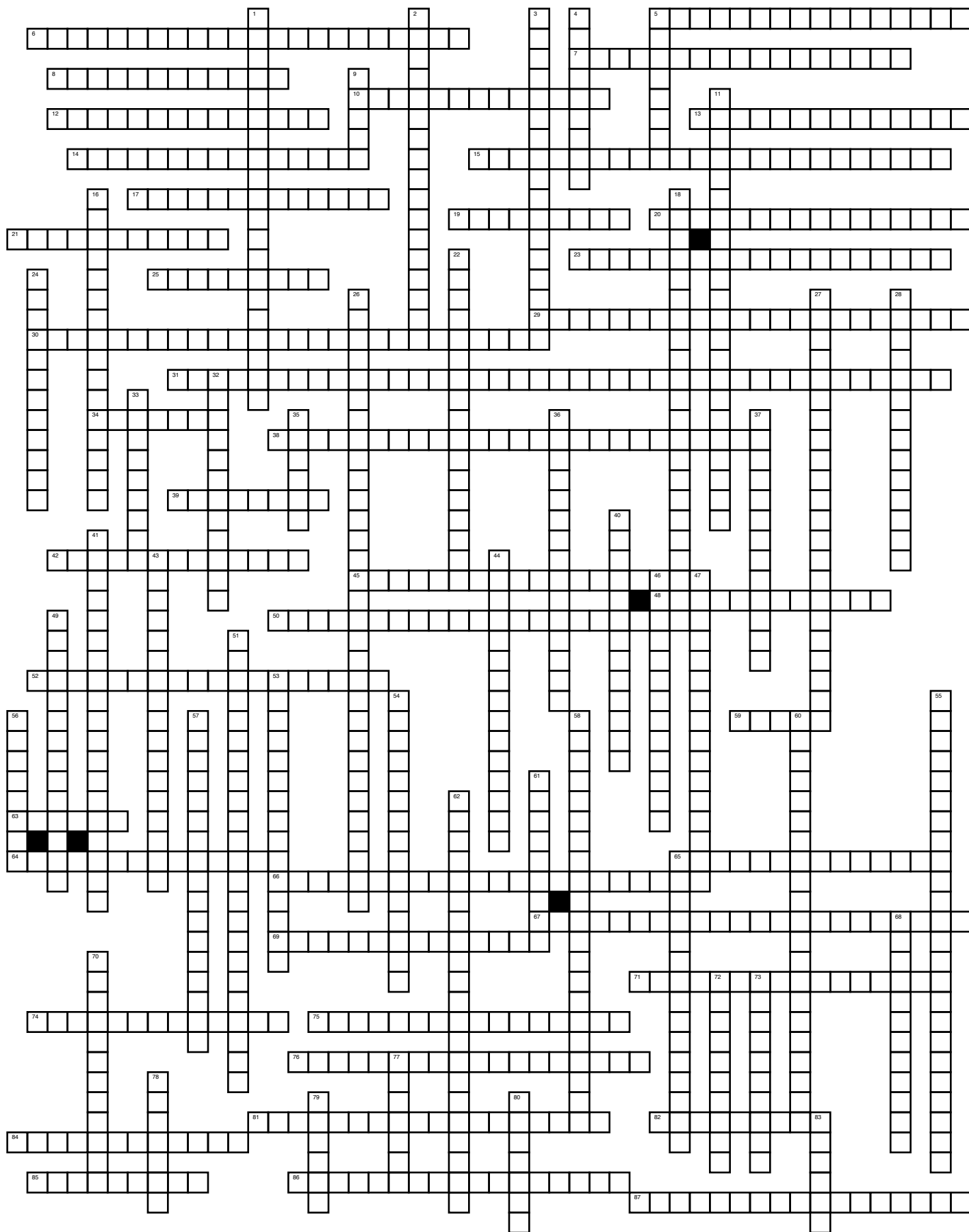
Across

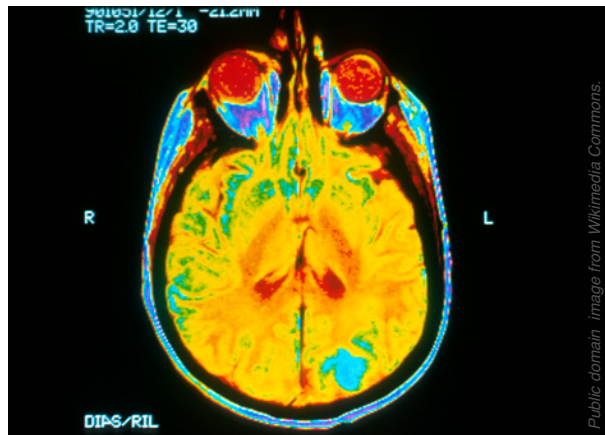
5. the intermolecular force that is caused when the dipoles of polar molecules position their positive and negative ends near each other (two words)
6. a covalent bond in which the electrons involved in bonding are from one atom (three words)
7. a model of a molecule showing the relative sizes of the atoms and their relative orientations (two words)
8. the analysis of spectra to determine properties of their source
10. the process of forming hybrid orbitals from the combination of at least 2 different orbitals
12. the ability of a substance to form a dipolar charge distribution
13. a diagram that represents the relative energies of the electrons in an atom (two words)
14. a solid with closely packed atoms held together by electrostatic interactions and free-moving electrons (two words)
15. a medical tool in which magnetic fields interact with atoms in the human body, producing images that doctors can use to diagnose injuries and diseases (three words)
17. an orbital that forms from the combination of at least 2 different orbitals (two words)
19. a bond that is formed when the lobes of 2 orbitals directly overlap end to end (two words)
20. a molecule that has only non-polar bonds, or a bond dipole sum of zero (two words)
21. the lowest energy state for an atom (two words)
23. electrons are emitted by matter that absorbs energy from shortwave electromagnetic radiation (for example, visible or UV light) (two words)
25. orbitals of different shapes and energies, as given by the secondary quantum number; often referred to as *s*, *p*, *d*, and *f*
29. those elements in the main blocks of the periodic table, which are Groups 1 to 18 (the *s* and *p* blocks) (two words)
30. the probability of finding an electron at a given location, derived from wave equations and used to determine the shapes of orbitals; also called electron probability distribution (three words)
31. a method to determine the geometry of a molecule based on the idea that electron pairs are as far apart as possible (five words)
34. an electrically neutral subatomic particle
38. the three-dimensional arrangement of ions or atoms making up a pure substance (two words)
39. a negatively charged subatomic particle
42. having the same number of electrons per atom, ion, or molecule
45. a diagram that represents the relative energies of the electrons in an atom (two words)
48. the number of protons in a nucleus (two words)
50. a model for the atom based on quantum theory and the calculation of probabilities for the location of electrons (three words)
52. a force that causes one molecule to interact with another molecule; occurs between molecules (two words)
59. a device that produces light of a single colour with all waves travelling parallel to each other
63. a bond that is formed when the sides of the lobes of 2 orbitals overlap (two words)
64. the resistance of a liquid to increase its surface area (two words)
65. a solid made of carbon atoms similar to graphite rolled into a cylinder (two words)
66. a solid in which the atoms form covalent bonds in an interwoven network (three words)
67. the intermolecular forces that exist in non-polar molecules; they increase as the molecular mass increases (three words)

69. a diagram that represents the arrangement of covalent electrons and bonds in a molecule or polyatomic ion (two words)
71. the application of quantum theory to explain the properties of matter, particularly electrons in atoms (two words)
74. the weak attraction of a substance to a magnet; applies to individual atoms
75. the spectrum of electromagnetic radiation emitted by an atom; results when an atom is returned to a lower energy state from a higher energy state (two words)
76. an emission spectrum that contains all the wavelengths in a specific region of the electromagnetic spectrum (two words)
81. the chemical bond within a molecule (two words)
82. the electrostatic attraction between oppositely charged ions (two words)
84. the strong dipole-dipole force that occurs when a hydrogen atom bonded to a highly electronegative atom (oxygen, nitrogen, or fluorine) is attracted to a partially negative atom in a nearby molecule (two words)
85. a rule stating that in a particular set of orbitals of the same energy, the lowest energy configuration for an atom is the one with the maximum number of unpaired electrons allowed by the Pauli exclusion principle; unpaired electrons represented as having parallel spins (two words)
86. a material composed of two or more distinct materials that remain separate from each other in the solid phase (two words)
87. many types of intermolecular forces, including dipole-dipole forces, London dispersion forces, and hydrogen bonding (four words)

Down

1. a covalent bond in which the electrons are shared equally between atoms (three words)
2. a covalent bond in which the electrons are not shared equally because one atom attracts them more strongly than the other atom (three words)
3. a theory that states that the electrons in a metallic crystal move freely around the positively charged nuclei (three words)
4. the measure of a liquid's resistance to flow
5. the observation that the complete outer shell of valence electrons when hydrogen and period 2 metals are involved in bonding (two words)
9. an atom's main energy level, where the shell number is given by the principal quantum number, $n = 1, 2, 3, \dots$
11. the quantum number that describes the size and energy of an atomic orbital (three words)
16. a pair of valence electrons that is localized to a given atom but not involved in bonding (three words)
18. a state of matter that consists of a collection of atoms near absolute zero; all the atoms have the lowest possible quantum energy state (two words)
22. a theory stating that atomic orbitals overlap to form a new orbital with a pair of opposite-spin electrons (three words)
24. the mathematical probability of finding an electron in a certain region of space (two words)
26. the idea that it is impossible to know the exact position and speed of an electron at a given time (three words)
27. the quantum number that describes the shape and energy of an atomic orbital, with whole-number values from 0 to $n - 1$ for each value of n (three words)
28. the very strong magnetism commonly exhibited by materials that contain nickel, iron, and cobalt; applies to a collection of atoms
32. an emission spectrum that contains only those wavelengths characteristic of the element being studied (two words)
33. a spherical arrangement of carbon atoms that forms a hollow, cage-like structure
35. a unit of light energy
36. an electron in the outermost principal quantum level of an atom (two words)
37. a substance that conducts a slight electric current at room temperature but has increasing conductivity at higher temperatures
40. a molecule that has a net dipole (two words)
41. an electron pair that is involved in bonding, found in the space between two atoms (three words)
43. the ability of an atom in a molecule to attract shared electrons to itself
44. the bonding that holds the nuclei and electrons of metals together (two words)
46. the spontaneous decay or disintegration of the nucleus of an atom
47. a solid composed of individual molecules held together by intermolecular forces of attraction (two words)
49. numbers that describe the quantum mechanical properties of orbitals, from the solutions to Schrödinger's wave equation (two words)
51. that no two electrons in the same atom can be in the same quantum state (three words)
53. the theory that an atom is "built up" by the addition of electrons, which fill orbitals starting at the lowest available energy orbital before filling higher energy orbitals (for example, 1s before 2s) (two words)
54. an element whose highest-energy electrons are in *d* orbitals (two words)
55. a Lewis structure in which bonding electron pairs are represented by solid lines and lone electron pairs by dots (three words)
56. atoms with the same number of protons but different numbers of neutrons
57. the quantum number that relates to the spin of the electron; limited to $+\frac{1}{2}$ or $-\frac{1}{2}$ (three words)
58. the location and number of electrons in the electron energy levels of an atom (two words)
60. the repulsive force that occurs between electron pairs, causing them to be positioned as far apart as possible in a molecule (two words)
61. the observation that many atoms tend to form the most stable substances when they are surrounded by 8 electrons in their valence shells (two words)
62. the quantum number that describes the orientation of an atomic orbital in space relative to the other orbitals in the atom, with whole-number values between $+1$ and -1 , including 0 (three words)
65. the spontaneous rising of a liquid in a narrow tube (two words)
68. an isotope that emits radioactive gamma rays and/or subatomic particles (for example, alpha and/or beta particles)
70. a chemical bond in which atoms share the bonding electrons (two words)
72. the movement of an electron from one energy level to another
73. the total number of protons and neutrons in a nucleus (two words)
77. the dense centre of an atom with a positive charge
78. unit or packet of energy
79. a positively charged subatomic particle
80. the region around a nucleus where an electron has a high probability of being found
83. a separation of positive and negative charges in a region in space





Chapter 3

Atoms

- ▶ a negatively charged subatomic particle
- ▶ the spontaneous decay or disintegration of the nucleus of an atom
- ▶ the dense centre of an atom with a positive charge
- ▶ a positively charged subatomic particle
- ▶ an electrically neutral subatomic particle
- ▶ atoms with the same number of protons but different numbers of neutrons
- ▶ the number of protons in a nucleus (two words)
- ▶ the total number of protons and neutrons in a nucleus (two words)
- ▶ an isotope that emits radioactive gamma rays and/or subatomic particles (for example, alpha and/or beta particles)
- ▶ electrons are emitted by matter that absorbs energy from shortwave electromagnetic radiation (for example, visible or UV light) (two words)
- ▶ unit or packet of energy
- ▶ a unit of light energy
- ▶ the analysis of spectra to determine properties of their source
- ▶ the spectrum of electromagnetic radiation emitted by an atom; results when an atom is returned to a lower energy state from a higher energy state (two words)
- ▶ an emission spectrum that contains all the wavelengths in a specific region of the electromagnetic spectrum (two words)
- ▶ an emission spectrum that contains only those wavelengths characteristic of the element being studied (two words)
- ▶ the movement of an electron from one energy level to another
- ▶ the lowest energy state for an atom (two words)
- ▶ the application of quantum theory to explain the properties of matter, particularly electrons in atoms (two words)
- ▶ the region around a nucleus where an electron has a high probability of being found
- ▶ the idea that it is impossible to know the exact position and speed of an electron at a given time (three words)
- ▶ the mathematical probability of finding an electron in a certain region of space (two words)
- ▶ the probability of finding an electron at a given location, derived from wave equations and used to determine the shapes of orbitals; also called electron probability distribution (three words)
- ▶ a model for the atom based on quantum theory and the calculation of probabilities for the location of electrons (three words)
- ▶ numbers that describe the quantum mechanical properties of orbitals, from the solutions to Schrödinger's wave equation (two words)
- ▶ an atom's main energy level, where the shell number is given by the principal quantum number, $n = 1, 2, 3, \dots$
- ▶ the quantum number that describes the orientation of an atomic orbital in space relative to the other orbitals in the atom, with whole-number values between +1 and -1, including 0 (three words)
- ▶ a rule stating that in a particular set of orbitals of the same energy, the lowest energy configuration for an atom is the one with the maximum number of unpaired electrons allowed by the Pauli exclusion principle; unpaired electrons represented as having parallel spins (two words)
- ▶ the quantum number that describes the size and energy of an atomic orbital (three words)
- ▶ orbitals of different shapes and energies, as given by the secondary quantum number; often referred to as s, p, d , and f
- ▶ the quantum number that describes the shape and energy of an atomic orbital, with whole-number values from 0 to $n - 1$ for each value of n (three words)
- ▶ the quantum number that relates to the spin of the electron; limited to $+\frac{1}{2}$ or $-\frac{1}{2}$ (three words)
- ▶ that no two electrons in the same atom can be in the same quantum state (three words)
- ▶ the location and number of electrons in the electron energy levels of an atom (two words)
- ▶ the theory that an atom is "built up" by the addition of electrons, which fill orbitals starting at the lowest available energy orbital before filling higher energy orbitals (for example, 1s before 2s) (two words)
- ▶ a diagram that represents the relative energies of the electrons in an atom (two words)
- ▶ a diagram that represents the relative energies of the electrons in an atom (two words)
- ▶ an electron in the outermost principal quantum level of an atom (two words)
- ▶ an element whose highest-energy electrons are in d orbitals (two words)
- ▶ those elements in the main blocks of the periodic table, which are Groups 1 to 18 (the s and p blocks) (two words)
- ▶ the very strong magnetism commonly exhibited by materials that contain nickel, iron, and cobalt; applies to a collection of atoms
- ▶ the weak attraction of a substance to a magnet; applies to individual atoms
- ▶ a device that produces light of a single colour with all waves travelling parallel to each other
- ▶ a state of matter that consists of a collection of atoms near absolute zero; all the atoms have the lowest possible quantum energy state (two words)
- ▶ a medical tool in which magnetic fields interact with atoms in the human body, producing images that doctors can use to diagnose injuries and diseases (three words)

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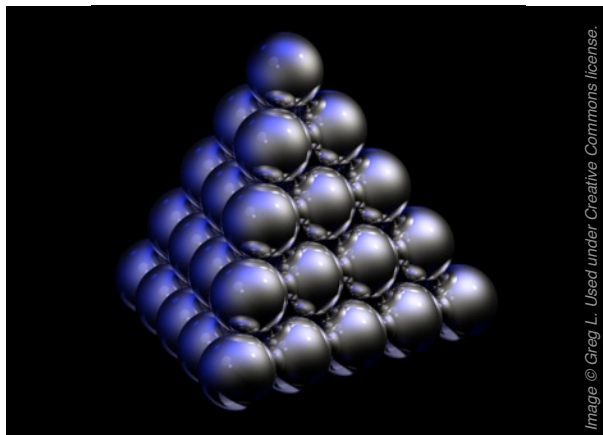


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Chapter 4

Chemical Bonding

- ▶ the electrostatic attraction between oppositely charged ions (two words)
- ▶ having the same number of electrons per atom, ion, or molecule
- ▶ a chemical bond in which atoms share the bonding electrons (two words)
- ▶ an electron pair that is involved in bonding, found in the space between two atoms (three words)
- ▶ a diagram that represents the arrangement of covalent electrons and bonds in a molecule or polyatomic ion (two words)
- ▶ the observation that the complete outer shell of valence electrons when hydrogen and period 2 metals are involved in bonding (two words)
- ▶ the observation that many atoms tend to form the most stable substances when they are surrounded by 8 electrons in their valence shells (two words)
- ▶ a pair of valence electrons that is localized to a given atom but not involved in bonding (three words)
- ▶ a Lewis structure in which bonding electron pairs are represented by solid lines and lone electron pairs by dots (three words)
- ▶ a model of a molecule showing the relative sizes of the atoms and their relative orientations (two words)
- ▶ a covalent bond in which the electrons involved in bonding are from one atom (three words)
- ▶ the three-dimensional arrangement of ions or atoms making up a pure substance (two words)
- ▶ a molecule that has only non-polar bonds, or a bond dipole sum of zero (two words)
- ▶ the strong dipole-dipole force that occurs when a hydrogen atom bonded to a highly electronegative atom (oxygen, nitrogen, or fluorine) is attracted to a partially negative atom in a nearby molecule (two words)
- ▶ a theory stating that atomic orbitals overlap to form a new orbital with a pair of opposite-spin electrons (three words)
- ▶ a method to determine the geometry of a molecule based on the idea that electron pairs are as far apart as possible (five words)
- ▶ the repulsive force that occurs between electron pairs, causing them to be positioned as far apart as possible in a molecule (two words)
- ▶ a covalent bond in which the electrons are shared equally between atoms (three words)
- ▶ a covalent bond in which the electrons are not shared equally because one atom attracts them more strongly than the other atom (three words)
- ▶ the ability of an atom in a molecule to attract shared electrons to itself
- ▶ a separation of positive and negative charges in a region in space
- ▶ a molecule that has a net dipole (two words)
- ▶ an orbital that forms from the combination of at least 2 different orbitals (two words)
- ▶ the process of forming hybrid orbitals from the combination of at least 2 different orbitals
- ▶ a bond that is formed when the lobes of 2 orbitals directly overlap end to end (two words)
- ▶ a bond that is formed when the sides of the lobes of 2 orbitals overlap (two words)
- ▶ the chemical bond within a molecule (two words)
- ▶ the intermolecular force that is caused when the dipoles of polar molecules position their positive and negative ends near each other (two words)
- ▶ the ability of a substance to form a dipolar charge distribution
- ▶ a force that causes one molecule to interact with another molecule; occurs between molecules (two words)
- ▶ many types of intermolecular forces, including dipole-dipole forces, London dispersion forces, and hydrogen bonding (four words)
- ▶ the intermolecular forces that exist in non-polar molecules; they increase as the molecular mass increases (three words)
- ▶ the resistance of a liquid to increase its surface area (two words)
- ▶ the spontaneous rising of a liquid in a narrow tube (two words)
- ▶ the measure of a liquid's resistance to flow
- ▶ a material composed of two or more distinct materials that remain separate from each other in the solid phase (two words)
- ▶ a solid with closely packed atoms held together by electrostatic interactions and free-moving electrons (two words)
- ▶ a theory that states that the electrons in a metallic crystal move freely around the positively charged nuclei (three words)
- ▶ the bonding that holds the nuclei and electrons of metals together (two words)
- ▶ a solid composed of individual molecules held together by intermolecular forces of attraction (two words)
- ▶ a solid in which the atoms form covalent bonds in an interwoven network (three words)
- ▶ a spherical arrangement of carbon atoms that forms a hollow, cage-like structure
- ▶ a solid made of carbon atoms similar to graphite rolled into a cylinder (two words)
- ▶ a substance that conducts a slight electric current at room temperature but has increasing conductivity at higher temperatures

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

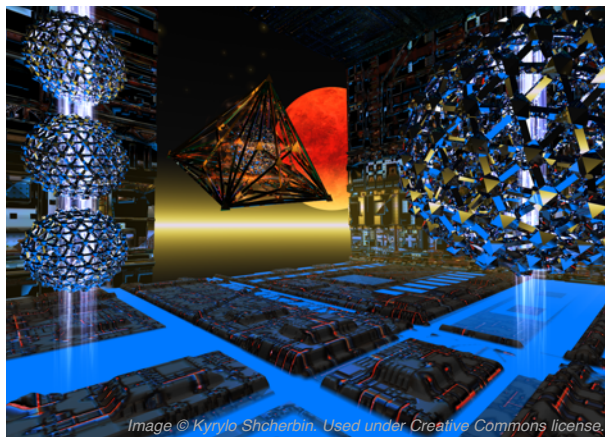


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Unit 2

Chemical Structure and Properties of Matter

- ▶ a negatively charged subatomic particle
- ▶ the spontaneous decay or disintegration of the nucleus of an atom
- ▶ the dense centre of an atom with a positive charge
- ▶ a positively charged subatomic particle
- ▶ an electrically neutral subatomic particle
- ▶ atoms with the same number of protons but different numbers of neutrons
- ▶ the number of protons in a nucleus (two words)
- ▶ the total number of protons and neutrons in a nucleus (two words)
- ▶ an isotope that emits radioactive gamma rays and/or subatomic particles (for example, alpha and/or beta particles)
- ▶ electrons are emitted by matter that absorbs energy from shortwave electromagnetic radiation (for example, visible or UV light) (two words)
- ▶ unit or packet of energy
- ▶ a unit of light energy
- ▶ the analysis of spectra to determine properties of their source
- ▶ the spectrum of electromagnetic radiation emitted by an atom; results when an atom is returned to a lower energy state from a higher energy state (two words)
- ▶ an emission spectrum that contains all the wavelengths in a specific region of the electromagnetic spectrum (two words)
- ▶ an emission spectrum that contains only those wavelengths characteristic of the element being studied (two words)
- ▶ the movement of an electron from one energy level to another
- ▶ the lowest energy state for an atom (two words)
- ▶ the application of quantum theory to explain the properties of matter, particularly electrons in atoms (two words)
- ▶ the region around a nucleus where an electron has a high probability of being found
- ▶ the idea that it is impossible to know the exact position and speed of an electron at a given time (three words)
- ▶ the mathematical probability of finding an electron in a certain region of space (two words)
- ▶ the probability of finding an electron at a given location, derived from wave equations and used to determine the shapes of orbitals; also called electron probability distribution (three words)
- ▶ a model for the atom based on quantum theory and the calculation of probabilities for the location of electrons (three words)
- ▶ numbers that describe the quantum mechanical properties of orbitals, from the solutions to Schrödinger's wave equation (two words)
- ▶ an atom's main energy level, where the shell number is given by the principal quantum number, $n = 1, 2, 3, \dots$
- ▶ the quantum number that describes the size and energy of an atomic orbital (three words)
- ▶ orbitals of different shapes and energies, as given by the secondary quantum number; often referred to as s, p, d , and f
- ▶ the quantum number that describes the shape and energy of an atomic orbital, with whole-number values from 0 to $n - 1$ for each value of n (three words)
- ▶ the quantum number that describes the orientation of an atomic orbital in space relative to the other orbitals in the atom, with whole-number values between +1 and -1, including 0 (three words)
- ▶ the quantum number that relates to the spin of the electron; limited to +1/2 or -1/2 (three words)
- ▶ that no two electrons in the same atom can be in the same quantum state (three words)
- ▶ the location and number of electrons in the electron energy levels of an atom (two words)
- ▶ the theory that an atom is "built up" by the addition of electrons, which fill orbitals starting at the lowest available energy orbital before filling higher energy orbitals (for example, 1s before 2s) (two words)
- ▶ a diagram that represents the relative energies of the electrons in an atom (two words)
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- ▶ a rule stating that in a particular set of orbitals of the same energy, the lowest energy configuration for an atom is the one with the maximum number of unpaired electrons allowed by the Pauli exclusion principle; unpaired electrons represented as having parallel spins (two words)
- ▶ an electron in the outermost principal quantum level of an atom (two words)
- ▶ an element whose highest-energy electrons are in d orbitals (two words)
- ▶ those elements in the main blocks of the periodic table, which are Groups 1 to 18 (the s and p blocks) (two words)
- ▶ the very strong magnetism commonly exhibited by materials that contain nickel, iron, and cobalt; applies to a collection of atoms
- ▶ the weak attraction of a substance to a magnet; applies to individual atoms
- ▶ a device that produces light of a single colour with all waves travelling parallel to each other
- ▶ a state of matter that consists of a collection of atoms near absolute zero; all the atoms have the lowest possible quantum energy state (two words)
- ▶ a medical tool in which magnetic fields interact with atoms in the human body, producing images that doctors can use to diagnose injuries and diseases (three words)
- ▶ the electrostatic attraction between oppositely charged ions (two words)
- ▶ having the same number of electrons per atom, ion, or molecule
- ▶ a chemical bond in which atoms share the bonding electrons (two words)
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- ▶ a substance that conducts a slight electric current at room temperature but has increasing conductivity at higher temperatures

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



Chapter 5

Thermochemistry

Across

6. a device that is used to measure thermal energy changes in a chemical or physical change
7. the process of combining two or more nuclei of low atomic mass to form a heavier, more stable nucleus
9. the ability to do work
11. the quantity of thermal energy required to raise the temperature of 1 g of a substance by 1 °C (three words)
14. the total amount of thermal energy in a substance
20. the energy required to break a given chemical bond (three words)
23. the total quantity of kinetic and potential energy in a substance (two words)
24. the energy released to or absorbed from the surroundings during a chemical or physical change (two words)
27. a system in which energy can enter and leave the system, but matter cannot (two words)
29. all the matter that is not part of the system
30. a system in which both matter and energy are free to enter and leave the system (two words)

Down

1. the study of the energy changes that accompany physical or chemical changes in matter
2. the energy of an object due to its motion (two words)
3. the change in enthalpy that accompanies the formation of 1 mol of a compound from its elements in their standard states (four words)
4. the most stable form of a substance under standard conditions, 25 °C and 100 kPa (two words)
5. the process of using a neutron to split a nucleus of high atomic mass into two nuclei with smaller masses
6. the experimental process of measuring the thermal energy change in a chemical or physical change
8. the transfer of thermal energy from a warm object to a cooler object
10. the enthalpy change associated with a physical, chemical, or nuclear change involving 1 mol of a substance (three words)
12. a group of reactants and products being studied (two words)
13. a graphical representation of the energy transferred during a physical or a chemical change (three words)
15. the ratio of the energy output to the energy input of any system
16. the amount of energy transferred by a force over a distance
17. the energy of a body or system due to its position or composition (two words)
18. a measure of the average kinetic energy of entities in a substance
19. absorbing energy from the surroundings
21. releasing energy to the surroundings
22. an ideal system in which neither matter nor energy can move in or out (two words)
25. the enthalpy change for the conversion of reactants to products is the same whether the conversion occurs in one step or several steps (two words)
26. a suspension of pulverized coal in water (two words)
28. a synthetic fuel produced from the gasification of coal

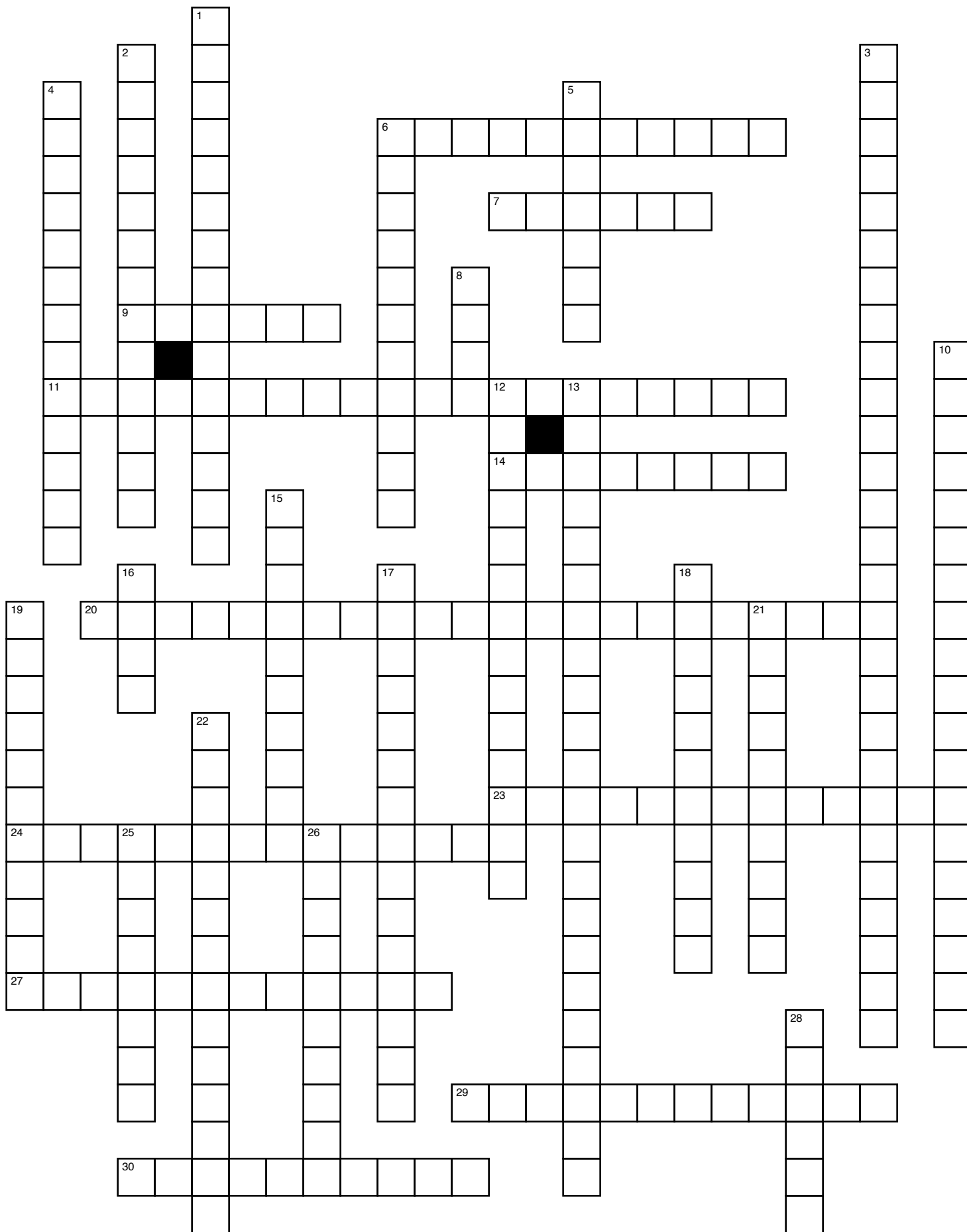




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Chapter 6

Chemical Kinetics

Across

1. change in reactant or product concentration over a given time interval (three words)
3. the theory that chemical reactions can occur only if reactants collide with proper orientation and with enough kinetic energy to break reactant bonds and form product bonds (two words)
6. the area of chemistry that deals with rates of reactions (two words)
10. a catalyst made by a living system (two words)
15. determined empirically and is unique for a single reaction at a specified temperature (two words)
16. a species that is neither a reactant nor a product but is formed and consumed during the reaction series (two words)
18. the rate determined just after the reaction begins (just after $t = 0$ s) (two words)
19. a step involving a one-, two-, or three-entity collision that cannot be explained by simpler reactions (two words)
20. the exponent used to describe the relationship between the initial concentration of a particular reactant and the rate of reaction (three words)

Down

2. the mathematical expression that allows calculation of reaction rate as a function of reactant concentration (two words)
4. an unstable arrangement of atoms containing partially formed and unformed bonds that represents the maximum potential energy point in a change; also called the transition state (two words)
5. the rate of a chemical reaction at a single point in time (three words)
7. the relationship among rate, the rate constant, the initial concentrations of reactants, and the orders of reaction with respect to the reactants (three words)
8. a catalyst in a reaction in which the reactants and the catalyst are in the same physical state (two words)
9. the step in a reaction mechanism that determines the rate of the overall reaction; the slowest step in a reaction mechanism (two words)
11. the minimum energy that reactant molecules must possess for a reaction to be successful (two words)
12. a catalyst in a reaction in which the reactants and the catalyst are in different physical states (two words)
13. the sum of the exponents in the rate law equation (four words)
14. a series of elementary steps by which a chemical reaction occurs (two words)
16. the change in concentration of a reactant or a product of a chemical reaction per unit time (two words)
17. a substance that alters the rate of a chemical reaction without itself being permanently changed

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Unit 3

Energy Changes and Rates of Reaction

Across

5. a catalyst made by a living system (two words)
10. a series of elementary steps by which a chemical reaction occurs (two words)
13. the minimum energy that reactant molecules must possess for a reaction to be successful (two words)
15. the change in concentration of a reactant or a product of a chemical reaction per unit time (two words)
16. a system in which both matter and energy are free to enter and leave the system (two words)
19. the energy of a body or system due to its position or composition (two words)
20. the total amount of thermal energy in a substance
23. the energy released to or absorbed from the surroundings during a chemical or physical change (two words)
25. the theory that chemical reactions can occur only if reactants collide with proper orientation and with enough kinetic energy to break reactant bonds and form product bonds (two words)
34. a catalyst in a reaction in which the reactants and the catalyst are in different physical states (two words)
35. change in reactant or product concentration over a given time interval (three words)
37. the enthalpy change for the conversion of reactants to products is the same whether the conversion occurs in one step or several steps (two words)
39. the ability to do work
41. releasing energy to the surroundings
43. the sum of the exponents in the rate law equation (four words)
45. a device that is used to measure thermal energy changes in a chemical or physical change
47. determined empirically and is unique for a single reaction at a specified temperature (two words)
48. the transfer of thermal energy from a warm object to a cooler object

49. a measure of the average kinetic energy of entities in a substance
50. the rate determined just after the reaction begins (just after $t = 0$ s) (two words)
51. the total quantity of kinetic and potential energy in a substance (two words)

Down

1. a catalyst in a reaction in which the reactants and the catalyst are in the same physical state (two words)
2. the process of using a neutron to split a nucleus of high atomic mass into two nuclei with smaller masses
3. the energy of an object due to its motion (two words)
4. a step involving a one-, two-, or three-entity collision that cannot be explained by simpler reactions (two words)
6. a group of reactants and products being studied (two words)
7. a system in which energy can enter and leave the system, but matter cannot (two words)
8. a suspension of pulverized coal in water (two words)
9. a substance that alters the rate of a chemical reaction without itself being permanently changed
11. the ratio of the energy output to the energy input of any system
12. the area of chemistry that deals with rates of reactions (two words)
14. the rate of a chemical reaction at a single point in time (three words)
17. the change in enthalpy that accompanies the formation of 1 mol of a compound from its elements in their standard states (four words)
18. the enthalpy change associated with a physical, chemical, or nuclear change involving 1 mol of a substance (three words)
21. the quantity of thermal energy required to raise the temperature of 1 g of a substance by 1 °C (three words)
22. the process of combining two or more nuclei of low atomic mass to form a heavier, more stable nucleus
24. a graphical representation of the energy transferred during a physical or a chemical change (three words)
26. an ideal system in which neither matter nor energy can move in or out (two words)
27. the relationship among rate, the rate constant, the initial concentrations of reactants, and the orders of reaction with respect to the reactants (three words)
28. an unstable arrangement of atoms containing partially formed and unformed bonds that represents the maximum potential energy point in a change; also called the transition state (two words)
29. absorbing energy from the surroundings
30. all the matter that is not part of the system
31. the energy required to break a given chemical bond (three words)
32. a species that is neither a reactant nor a product but is formed and consumed during the reaction series (two words)
33. the study of the energy changes that accompany physical or chemical changes in matter
36. the step in a reaction mechanism that determines the rate of the overall reaction; the slowest step in a reaction mechanism (two words)
38. the most stable form of a substance under standard conditions, 25 °C and 100 kPa (two words)
40. the amount of energy transferred by a force over a distance
42. the experimental process of measuring the thermal energy change in a chemical or physical change
44. the exponent used to describe the relationship between the initial concentration of a particular reactant and the rate of reaction (three words)
46. a synthetic fuel produced from the gasification of coal
47. the mathematical expression that allows calculation of reaction rate as a function of reactant concentration (two words)

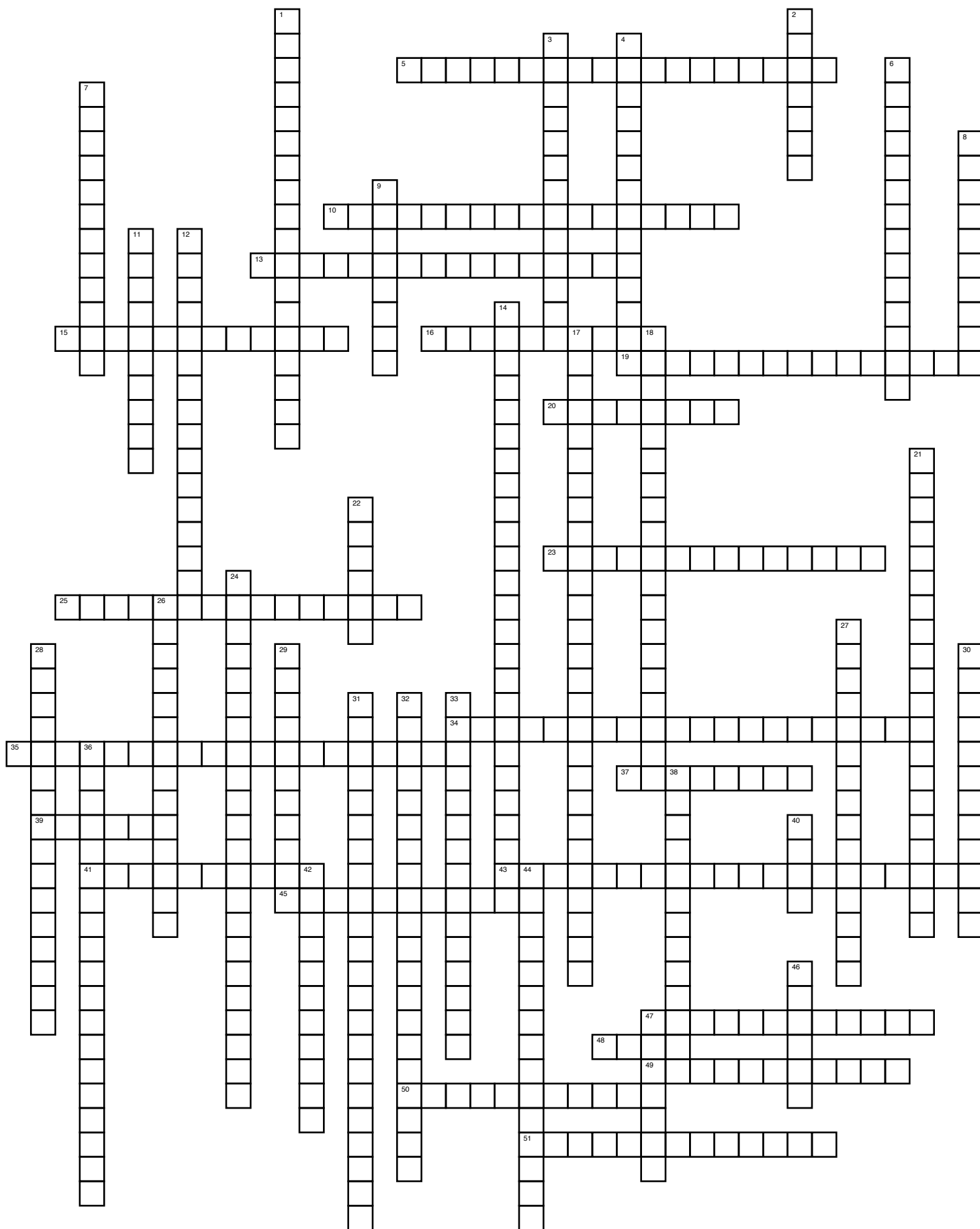




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Chapter 5

Thermochemistry

- ▶ the study of the energy changes that accompany physical or chemical changes in matter
- ▶ the ability to do work
- ▶ the amount of energy transferred by a force over a distance
- ▶ the energy of a body or system due to its position or composition (two words)
- ▶ the energy of an object due to its motion (two words)
- ▶ the total quantity of kinetic and potential energy in a substance (two words)
- ▶ the transfer of thermal energy from a warm object to a cooler object
- ▶ a measure of the average kinetic energy of entities in a substance
- ▶ a group of reactants and products being studied (two words)
- ▶ all the matter that is not part of the system
- ▶ a system in which both matter and energy are free to enter and leave the system (two words)
- ▶ a system in which energy can enter and leave the system, but matter cannot (two words)
- ▶ an ideal system in which neither matter nor energy can move in or out (two words)
- ▶ releasing energy to the surroundings
- ▶ absorbing energy from the surroundings
- ▶ the process of combining two or more nuclei of low atomic mass to form a heavier, more stable nucleus
- ▶ the process of using a neutron to split a nucleus of high atomic mass into two nuclei with smaller masses
- ▶ the quantity of thermal energy required to raise the temperature of 1 g of a substance by 1 °C (three words)
- ▶ the experimental process of measuring the thermal energy change in a chemical or physical change
- ▶ a device that is used to measure thermal energy changes in a chemical or physical change
- ▶ the total amount of thermal energy in a substance
- ▶ the energy released to or absorbed from the surroundings during a chemical or physical change (two words)
- ▶ the enthalpy change associated with a physical, chemical, or nuclear change involving 1 mol of a substance (three words)
- ▶ a graphical representation of the energy transferred during a physical or a chemical change (three words)
- ▶ the energy required to break a given chemical bond (three words)
- ▶ the enthalpy change for the conversion of reactants to products is the same whether the conversion occurs in one step or several steps (two words)
- ▶ the change in enthalpy that accompanies the formation of 1 mol of a compound from its elements in their standard states (four words)
- ▶ the most stable form of a substance under standard conditions, 25 °C and 100 kPa (two words)
- ▶ a suspension of pulverized coal in water (two words)
- ▶ a synthetic fuel produced from the gasification of coal
- ▶ the ratio of the energy output to the energy input of any system

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



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Chapter 6

Chemical Kinetics

- ▶ the area of chemistry that deals with rates of reactions (two words)
- ▶ the change in concentration of a reactant or a product of a chemical reaction per unit time (two words)
- ▶ change in reactant or product concentration over a given time interval (three words)
- ▶ the rate of a chemical reaction at a single point in time (three words)
- ▶ a substance that alters the rate of a chemical reaction without itself being permanently changed
- ▶ a catalyst made by a living system (two words)
- ▶ a catalyst in a reaction in which the reactants and the catalyst are in different physical states (two words)
- ▶ a catalyst in a reaction in which the reactants and the catalyst are in the same physical state (two words)
- ▶ the theory that chemical reactions can occur only if reactants collide with proper orientation and with enough kinetic energy to break reactant bonds and form product bonds (two words)
- ▶ the minimum energy that reactant molecules must possess for a reaction to be successful (two words)
- ▶ an unstable arrangement of atoms containing partially formed and unformed bonds that represents the maximum potential energy point in a change; also called the transition state (two words)
- ▶ the mathematical expression that allows calculation of reaction rate as a function of reactant concentration (two words)
- ▶ the relationship among rate, the rate constant, the initial concentrations of reactants, and the orders of reaction with respect to the reactants (three words)
- ▶ determined empirically and is unique for a single reaction at a specified temperature (two words)
- ▶ the exponent used to describe the relationship between the initial concentration of a particular reactant and the rate of reaction (three words)
- ▶ the sum of the exponents in the rate law equation (four words)
- ▶ the rate determined just after the reaction begins (just after $t = 0$ s) (two words)
- ▶ a step involving a one-, two-, or three-entity collision that cannot be explained by simpler reactions (two words)
- ▶ a series of elementary steps by which a chemical reaction occurs (two words)
- ▶ the step in a reaction mechanism that determines the rate of the overall reaction; the slowest step in a reaction mechanism (two words)
- ▶ s species that is neither a reactant nor a product but is formed and consumed during the reaction series (two words)

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



Unit 3

Energy Changes and Rates of Reaction

- ▶ the study of the energy changes that accompany physical or chemical changes in matter
- ▶ the ability to do work
- ▶ the amount of energy transferred by a force over a distance
- ▶ the energy of a body or system due to its position or composition (two words)
- ▶ the energy of an object due to its motion (two words)
- ▶ the total quantity of kinetic and potential energy in a substance (two words)
- ▶ the transfer of thermal energy from a warm object to a cooler object
- ▶ a measure of the average kinetic energy of entities in a substance
- ▶ a group of reactants and products being studied (two words)
- ▶ all the matter that is not part of the system
- ▶ a system in which both matter and energy are free to enter and leave the system (two words)
- ▶ a system in which energy can enter and leave the system, but matter cannot (two words)
- ▶ an ideal system in which neither matter nor energy can move in or out (two words)
- ▶ releasing energy to the surroundings
- ▶ absorbing energy from the surroundings
- ▶ the process of combining two or more nuclei of low atomic mass to form a heavier, more stable nucleus
- ▶ the process of using a neutron to split a nucleus of high atomic mass into two nuclei with smaller masses
- ▶ the quantity of thermal energy required to raise the temperature of 1 g of a substance by 1 °C (three words)
- ▶ the experimental process of measuring the thermal energy change in a chemical or physical change
- ▶ a device that is used to measure thermal energy changes in a chemical or physical change
- ▶ the total amount of thermal energy in a substance
- ▶ the energy released to or absorbed from the surroundings during a chemical or physical change (two words)
- ▶ the enthalpy change associated with a physical, chemical, or nuclear change involving 1 mol of a substance (three words)
- ▶ a graphical representation of the energy transferred during a physical or a chemical change (three words)
- ▶ the energy required to break a given chemical bond (three words)
- ▶ the enthalpy change for the conversion of reactants to products is the same whether the conversion occurs in one step or several steps (two words)
- ▶ the change in enthalpy that accompanies the formation of 1 mol of a compound from its elements in their standard states (four words)
- ▶ the most stable form of a substance under standard conditions, 25 °C and 100 kPa (two words)
- ▶ a suspension of pulverized coal in water (two words)
- ▶ a synthetic fuel produced from the gasification of coal
- ▶ the ratio of the energy output to the energy input of any system
- ▶ the area of chemistry that deals with rates of reactions (two words)
- ▶ the change in concentration of a reactant or a product of a chemical reaction per unit time (two words)
- ▶ change in reactant or product concentration over a given time interval (three words)
- ▶ the rate of a chemical reaction at a single point in time (three words)
- ▶ a substance that alters the rate of a chemical reaction without itself being permanently changed
- ▶ a catalyst made by a living system (two words)
- ▶ a catalyst in a reaction in which the reactants and the catalyst are in different physical states (two words)
- ▶ a catalyst in a reaction in which the reactants and the catalyst are in the same physical state (two words)
- ▶ the theory that chemical reactions can occur only if reactants collide with proper orientation and with enough kinetic energy to break reactant bonds and form product bonds (two words)
- ▶ the minimum energy that reactant molecules must possess for a reaction to be successful (two words)
- ▶ an unstable arrangement of atoms containing partially formed and unformed bonds that represents the maximum potential energy point in a change; also called the transition state (two words)
- ▶ the mathematical expression that allows calculation of reaction rate as a function of reactant concentration (two words)
- ▶ the relationship among rate, the rate constant, the initial concentrations of reactants, and the orders of reaction with respect to the reactants (three words)
- ▶ determined empirically and is unique for a single reaction at a specified temperature (two words)
- ▶ the exponent used to describe the relationship between the initial concentration of a particular reactant and the rate of reaction (three words)
- ▶ the sum of the exponents in the rate law equation (four words)
- ▶ the rate determined just after the reaction begins (just after $t = 0$ s) (two words)
- ▶ a step involving a one-, two-, or three-entity collision that cannot be explained by simpler reactions (two words)
- ▶ a series of elementary steps by which a chemical reaction occurs (two words)
- ▶ the step in a reaction mechanism that determines the rate of the overall reaction; the slowest step in a reaction mechanism (two words)
- ▶ a species that is neither a reactant nor a product but is formed and consumed during the reaction series (two words)

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



Chapter 7

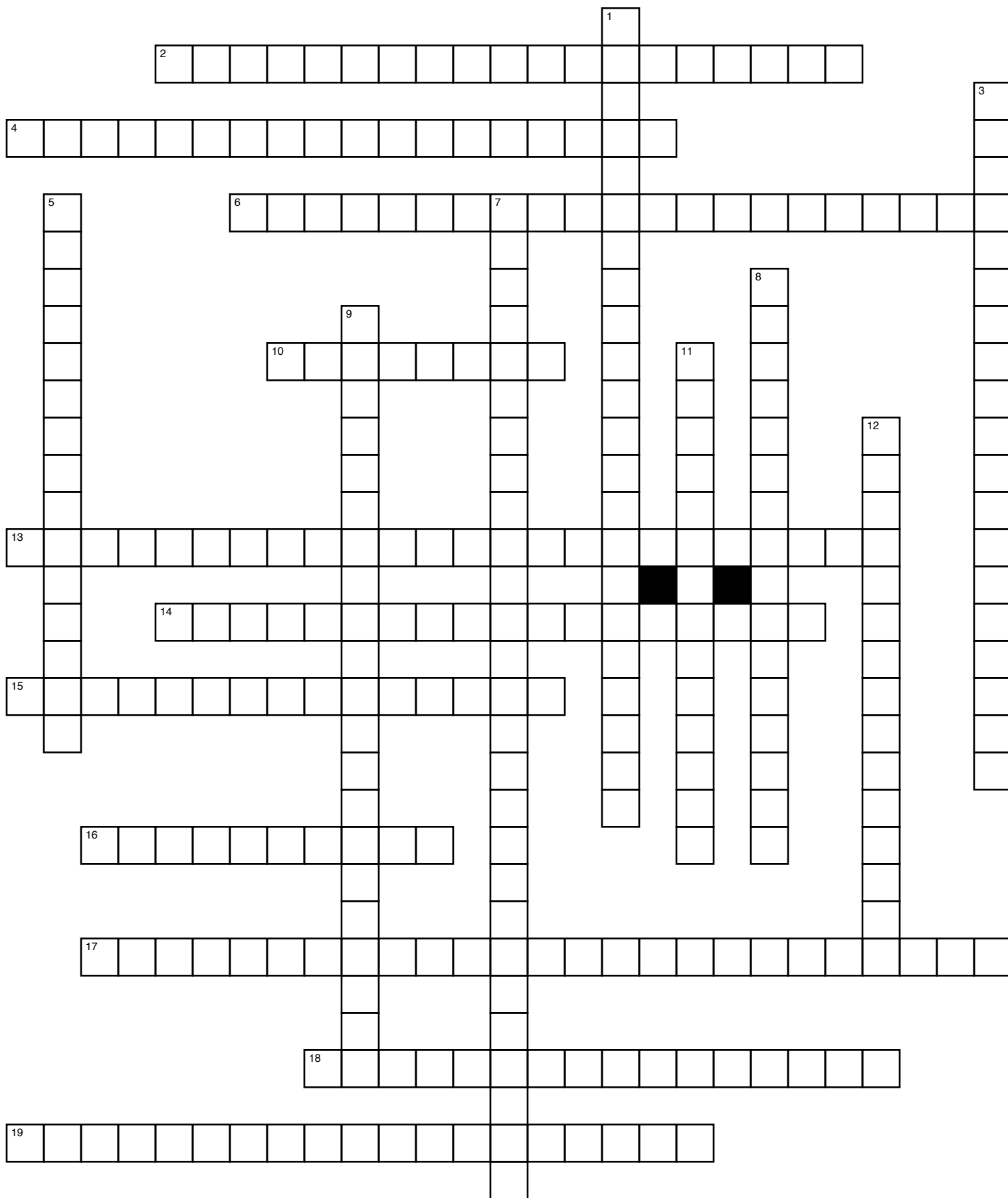
Chemical Equilibrium

Across

2. the relative concentrations of reactants and products in a system in dynamic equilibrium (two words)
4. a chemical reaction that proceeds in both the forward and reverse directions, setting up an equilibrium in a closed system (two words)
6. a dynamic equilibrium between a solute and a solvent in a saturated solution in a closed system (two words)
10. a hypothetical gas composed of entities that have no size, travel in straight lines, and have no attraction to each other (no intermolecular forces); a gas that obeys all gas laws (two words)
13. a chemical equilibrium system in which all reactants and products are present in at least two different states, such as gases and solids (two words)
14. a balance between forward and reverse processes that are occurring simultaneously (two words)
15. the product of the concentrations of ions in a specific solution raised to powers equal to their coefficients in the balance chemical equation; can be used to predict the formation of a precipitate (three words)
16. the quantity of solute that dissolves in a given quantity of solvent at a particular temperature; the concentration of a saturated solution at a particular temperature
17. the value obtained from the equilibrium law applied to a saturated solution (three words)
18. the product of the concentrations of the products, divided by the product of the concentrations of the reactants, for a chemical reaction that is not necessarily at equilibrium (two words)
19. the numerical value defining the equilibrium law for a given system (two words)
7. concentrations that occur together at a particular instant in time in the progress of a chemical reaction (two words)
8. a change in concentrations of reactants and products in order to restore an equilibrium state (two words)
9. a generalization that states that chemical systems at equilibrium shift to restore equilibrium when a change occurs that disturbs the equilibrium (three words)
11. the mathematical description of a chemical system at equilibrium (two words)
12. a reduction in the solubility of an ionic compound due to the presence of a common ion in solution (three words)

Down

1. a chemical equilibrium system in which all reactants and products are in the same state of matter, such as the gas state (two words)
3. the state of a reaction in which all reactants and products have reached constant concentrations in a closed system (two words)
5. the pressure that a gas, in a mixture of gases, would exert if it alone occupied the whole volume occupied by the mixture (two words)





Chapter 8

Acid-Base Equilibrium

Across

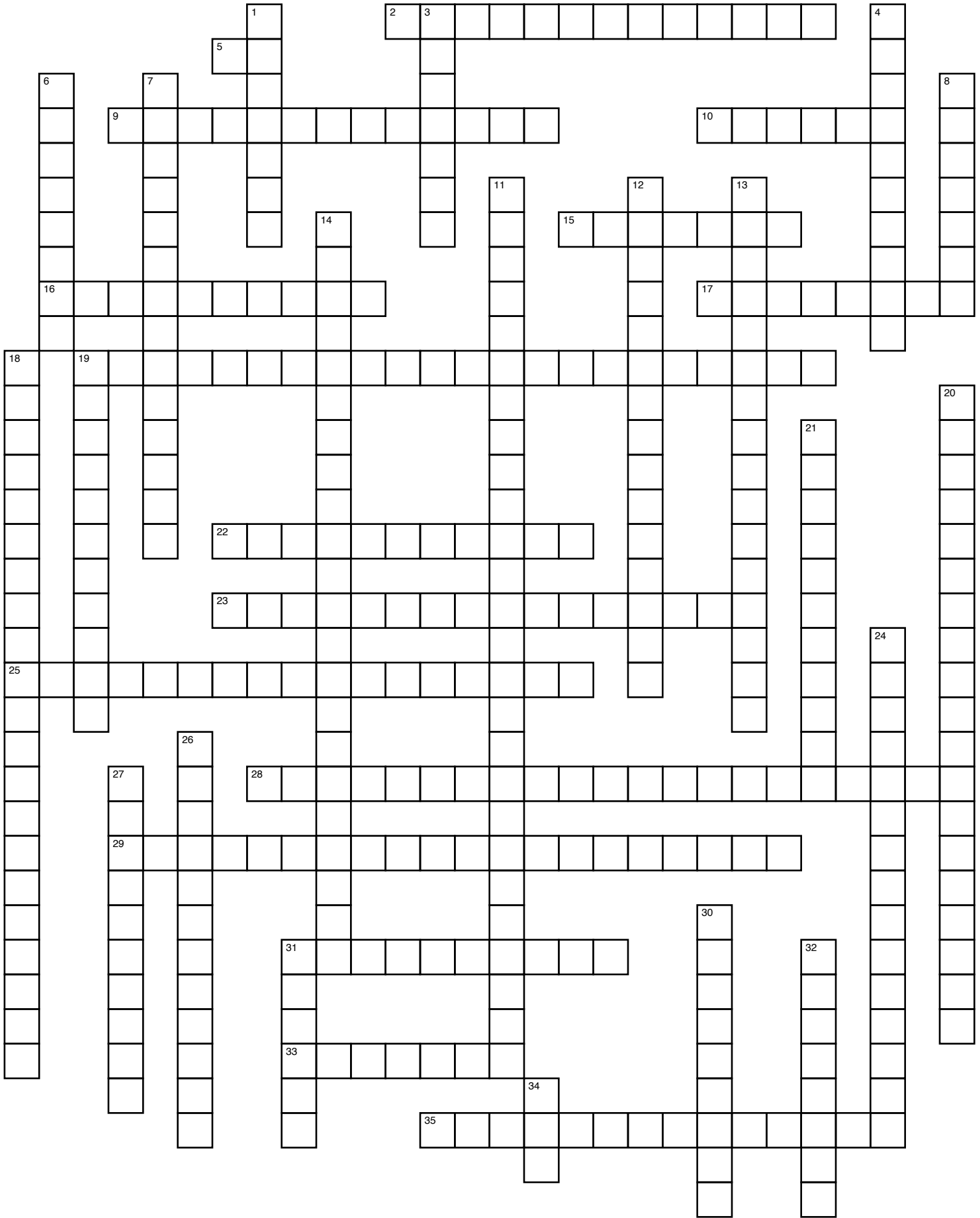
2. the substance that forms when an acid loses a hydrogen ion (proton) (two words)
5. the negative logarithm of the concentration of hydrogen ions in an aqueous solution
9. the substance that forms when a base, according to the Brønsted-Lowry theory, accepts a hydrogen ion (proton) (two words)
10. an aqueous solution containing a conjugate acid-base pair that maintains a nearly constant pH when an acid or base is added
15. a calibrated tube used to deliver variable known volumes of a liquid during a titration
16. a compound that dissociates completely in water, producing hydroxide ions (two words)
17. the point in a titration at which a sharp change in a measurable and characteristic property occurs (for example, a colour change in an acid-base indicator)
19. the equilibrium constant for the ionization of an acid; also called the acid dissociation constant (three words)
22. an acid (except carbonic acid) containing carbon, oxygen, and hydrogen atoms; also called carboxylic acids (two words)
23. the point in a titration when neutralization is complete (two words)
25. a substance that changes colour within a specific pH range (two words)
28. two substances related to each other by the donating and accepting of a single hydrogen ion (three words)

29. the percentage of a solute that ionizes when it dissolves in a solvent (two words)
31. an acid that ionizes almost 100% in water, producing hydrogen ions (two words)
33. a device that measures the acidity or alkalinity of a solution electronically and displays the result as a pH value (two words)
35. an acid that possesses only one ionizable (acidic) hydrogen atom (two words)

Down

1. a graph of pH against volume of titrant added in an acid-base titration; titration curve (two words)
3. an acid in which the acidic hydrogen atom is attached to an oxygen molecule
4. a chemical reaction of an ion with water to produce an acidic or basic solution by the production of hydronium or hydroxide ions
6. a base that undergoes an equilibrium reaction with water to produce hydroxide ions (two words)
7. an acid that possesses more than one ionizable (acidic) hydrogen atom (two words)
8. the solution in a burette during a titration
11. the equilibrium constant for the autoionization of water (four words)
12. a theory stating that, in an aqueous solution, an acid is a substance that produces hydrogen ions and a base is a substance that produces hydroxide ions (two words)

13. a solution whose concentration is accurately and precisely known (two words)
14. equilibrium constant for the ionization of a base; also called the base dissociation constant (three words)
18. the transfer of a hydrogen ion from one water molecule to another (three words)
19. able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
20. a theory stating that an acid is a hydrogen ion (proton) donor and a base is a hydrogen ion (proton) acceptor (two words)
21. an organic compound that increases the concentration of hydroxide ions in aqueous solution (two words)
24. a highly pure and stable chemical used to determine the precise concentration of acids or bases (two words)
26. a water molecule that has accepted a hydrogen ion, H_3O^+ (two words)
27. able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
30. the addition or precise volumes of a solution in a burette to a measured volume of a sample solution; often used to determine the concentration of a substance in a sample
31. the solution being analyzed in a titration
32. an acid that only partly ionizes in water, producing hydrogen ions (two words)
34. the negative logarithm of the concentration of hydroxide ions in an aqueous solution





Unit 4

Chemical Systems and Equilibrium

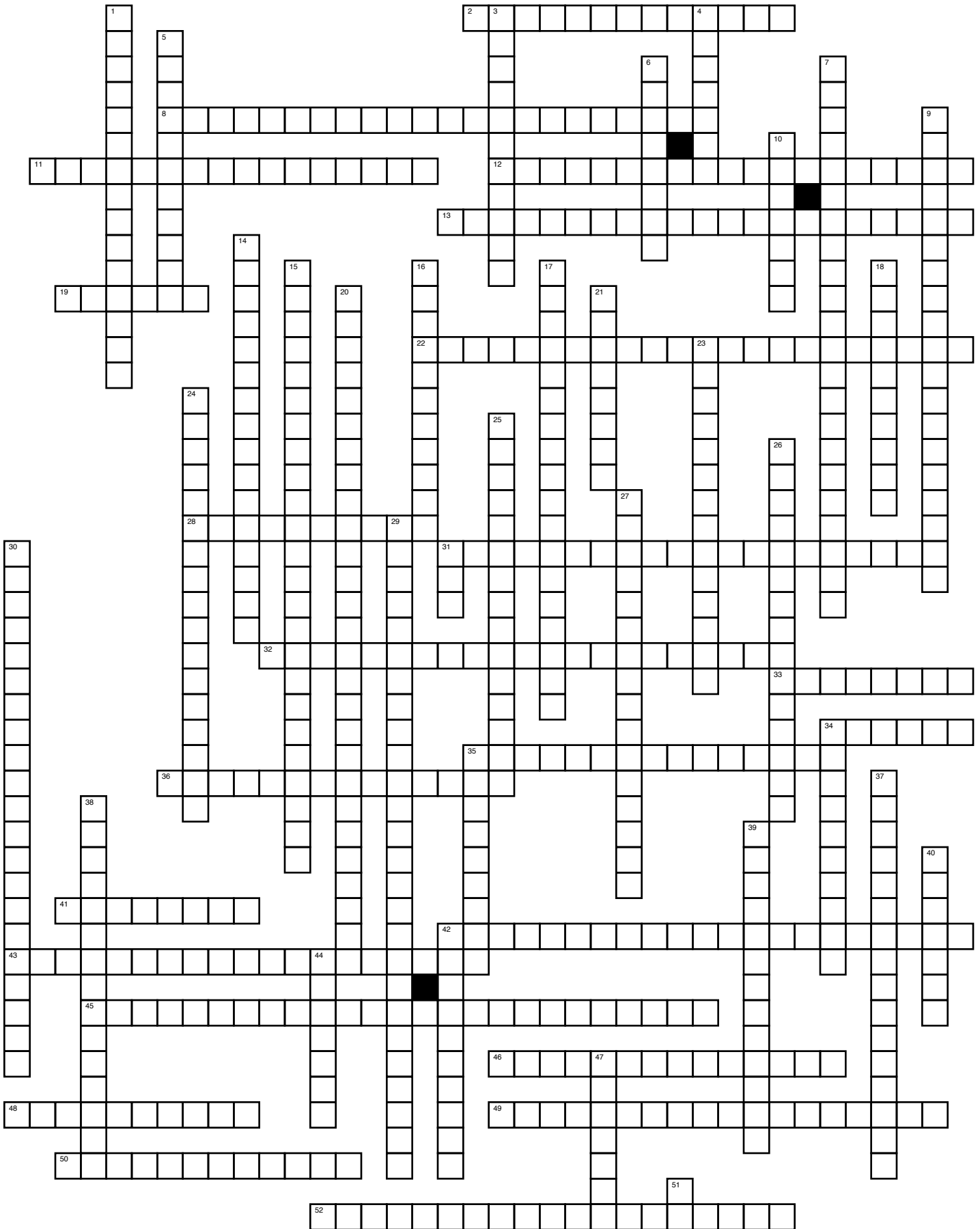
Across

2. the substance that forms when an acid loses a hydrogen ion (proton) (two words)
8. the equilibrium constant for the ionization of an acid; also called the acid dissociation constant (three words)
11. a change in concentrations of reactants and products in order to restore an equilibrium state (two words)
12. the state of a reaction in which all reactants and products have reached constant concentrations in a closed system (two words)
13. a generalization that states that chemical systems at equilibrium shift to restore equilibrium when a change occurs that disturbs the equilibrium (three words)
19. an aqueous solution containing a conjugate acid-base pair that maintains a nearly constant pH when an acid or base is added
22. a chemical equilibrium system in which all reactants and products are in the same state of matter, such as the gas state (two words)
28. able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
31. the percentage of a solute that ionizes when it dissolves in a solvent (two words)
32. the transfer of a hydrogen ion from one water molecule to another (three words)
33. the point in a titration at which a sharp change in a measurable and characteristic property occurs (for example, a colour change in an acid-base indicator)
34. the solution being analyzed in a titration
35. the product of the concentrations of ions in a specific solution raised to powers equal to their coefficients in the balance chemical equation; can be used to predict the formation of a precipitate (three words)
36. an acid that possesses more than one ionizable (acidic) hydrogen atom (two words)
41. a base that undergoes an equilibrium reaction with water to produce hydroxide ions (two words)
42. a dynamic equilibrium between a solute and a solvent in a saturated solution in a closed system (two words)
43. the relative concentrations of reactants and products in a system in dynamic equilibrium (two words)
45. the value obtained from the equilibrium law applied to a saturated solution (three words)

46. an acid that possesses only one ionizable (acidic) hydrogen atom (two words)
48. a compound that dissociates completely in water, producing hydroxide ions (two words)
49. a balance between forward and reverse processes that are occurring simultaneously (two words)
50. a water molecule that has accepted a hydrogen ion, H_3O^+ (two words)
52. a theory stating that an acid is a hydrogen ion (proton) donor and a base is a hydrogen ion (proton) acceptor (two words)

Down

1. a reduction in the solubility of an ionic compound due to the presence of a common ion in solution (three words)
3. an acid (except carbonic acid) containing carbon, oxygen, and hydrogen atoms; also called carboxylic acids (two words)
4. a calibrated tube used to deliver variable known volumes of a liquid during a titration
5. an organic compound that increases the concentration of hydroxide ions in aqueous solution (two words)
6. an acid that only partly ionizes in water, producing hydrogen ions (two words)
7. equilibrium constant for the ionization of a base; also called the base dissociation constant (three words)
9. the numerical value defining the equilibrium law for a given system (two words)
10. the solution in a burette during a titration
14. the point in a titration when neutralization is complete (two words)
15. a chemical equilibrium system in which all reactants and products are present in at least two different states, such as gases and solids (two words)
16. able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
17. a chemical reaction that proceeds in both the forward and reverse directions, setting up an equilibrium in a closed system (two words)
18. a chemical reaction of an ion with water to produce an acidic or basic solution by the production of hydronium or hydroxide ions
20. concentrations that occur together at a particular instant in time in the progress of a chemical reaction (two words)
21. a hypothetical gas composed of entities that have no size, travel in straight lines, and have no attraction to each other (no intermolecular forces); a gas that obeys all gas laws (two words)
23. the mathematical description of a chemical system at equilibrium (two words)
24. a substance that changes colour within a specific pH range (two words)
25. a highly pure and stable chemical used to determine the precise concentration of acids or bases (two words)
26. the pressure that a gas, in a mixture of gases, would exert if it alone occupied the whole volume occupied by the mixture (two words)
27. the product of the concentrations of the products, divided by the product of the concentrations of the reactants, for a chemical reaction that is not necessarily at equilibrium (two words)
29. the equilibrium constant for the autoionization of water (four words)
30. two substances related to each other by the donating and accepting of a single hydrogen ion (three words)
31. the negative logarithm of the concentration of hydroxide ions in an aqueous solution
34. an acid that ionizes almost 100% in water, producing hydrogen ions (two words)
35. the addition or precise volumes of a solution in a burette to a measured volume of a sample solution; often used to determine the concentration of a substance in a sample
37. a solution whose concentration is accurately and precisely known (two words)
38. a theory stating that, in an aqueous solution, an acid is a substance that produces hydrogen ions and a base is a substance that produces hydroxide ions (two words)
39. the substance that forms when a base, according to the Brønsted-Lowry theory, accepts a hydrogen ion (proton) (two words)
40. a graph of pH against volume of titrant added in an acid-base titration; titration curve (two words)
42. the quantity of solute that dissolves in a given quantity of solvent at a particular temperature; the concentration of a saturated solution at a particular temperature
44. an acid in which the acidic hydrogen atom is attached to an oxygen molecule
47. a device that measures the acidity or alkalinity of a solution electronically and displays the result as a pH value (two words)
51. the negative logarithm of the concentration of hydrogen ions in an aqueous solution





Chapter 7

Chemical Equilibrium

- ▶ the state of a reaction in which all reactants and products have reached constant concentrations in a closed system (two words)
- ▶ a balance between forward and reverse processes that are occurring simultaneously (two words)
- ▶ the relative concentrations of reactants and products in a system in dynamic equilibrium (two words)
- ▶ a chemical reaction that proceeds in both the forward and reverse directions, setting up an equilibrium in a closed system (two words)
- ▶ the mathematical description of a chemical system at equilibrium (two words)
- ▶ the numerical value defining the equilibrium law for a given system (two words)
- ▶ a chemical equilibrium system in which all reactants and products are in the same state of matter, such as the gas state (two words)
- ▶ a chemical equilibrium system in which all reactants and products are present in at least two different states, such as gases and solids (two words)
- ▶ a generalization that states that chemical systems at equilibrium shift to restore equilibrium when a change occurs that disturbs the equilibrium (three words)
- ▶ a change in concentrations of reactants and products in order to restore an equilibrium state (two words)
- ▶ a hypothetical gas composed of entities that have no size, travel in straight lines, and have no attraction to each other (no intermolecular forces); a gas that obeys all gas laws (two words)
- ▶ the pressure that a gas, in a mixture of gases, would exert if it alone occupied the whole volume occupied by the mixture (two words)
- ▶ the product of the concentrations of the products, divided by the product of the concentrations of the reactants, for a chemical reaction that is not necessarily at equilibrium (two words)
- ▶ concentrations that occur together at a particular instant in time in the progress of a chemical reaction (two words)
- ▶ the quantity of solute that dissolves in a given quantity of solvent at a particular temperature; the concentration of a saturated solution at a particular temperature
- ▶ a dynamic equilibrium between a solute and a solvent in a saturated solution in a closed system (two words)
- ▶ the value obtained from the equilibrium law applied to a saturated solution (three words)
- ▶ the product of the concentrations of ions in a specific solution raised to powers equal to their coefficients in the balance chemical equation; can be used to predict the formation of a precipitate (three words)
- ▶ a reduction in the solubility of an ionic compound due to the presence of a common ion in solution (three words)

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



Chapter 8

Acid-Base Equilibrium

- ▶ a theory stating that, in an aqueous solution, an acid is a substance that produces hydrogen ions and a base is a substance that produces hydroxide ions (two words)
- ▶ a theory stating that an acid is a hydrogen ion (proton) donor and a base is a hydrogen ion (proton) acceptor (two words)
- ▶ a water molecule that has accepted a hydrogen ion, H_3O^+ (two words)
- ▶ the substance that forms when a base, according to the Brønsted-Lowry theory, accepts a hydrogen ion (proton) (two words)
- ▶ the substance that forms when an acid loses a hydrogen ion (proton) (two words)
- ▶ two substances related to each other by the donating and accepting of a single hydrogen ion (three words)
- ▶ able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
- ▶ able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
- ▶ the equilibrium constant for the ionization of an acid; also called the acid dissociation constant (three words)
- ▶ an acid that ionizes almost 100% in water, producing hydrogen ions (two words)
- ▶ an acid that only partly ionizes in water, producing hydrogen ions (two words)
- ▶ an acid in which the acidic hydrogen atom is attached to an oxygen molecule
- ▶ an acid (except carbonic acid) containing carbon, oxygen, and hydrogen atoms; also called carboxylic acids (two words)
- ▶ a compound that dissociates completely in water, producing hydroxide ions (two words)
- ▶ a base that undergoes an equilibrium reaction with water to produce hydroxide ions (two words)
- ▶ equilibrium constant for the ionization of a base; also called the base dissociation constant (three words)
- ▶ an organic compound that increases the concentration of hydroxide ions in aqueous solution (two words)
- ▶ the transfer of a hydrogen ion from one water molecule to another (three words)
- ▶ the equilibrium constant for the autoionization of water (four words)
- ▶ the negative logarithm of the concentration of hydrogen ions in an aqueous solution
- ▶ the negative logarithm of the concentration of hydroxide ions in an aqueous solution
- ▶ a device that measures the acidity or alkalinity of a solution electronically and displays the result as a pH value (two words)
- ▶ a substance that changes colour within a specific pH range (two words)
- ▶ the percentage of a solute that ionizes when it dissolves in a solvent (two words)
- ▶ an acid that possesses only one ionizable (acidic) hydrogen atom (two words)
- ▶ an acid that possesses more than one ionizable (acidic) hydrogen atom (two words)
- ▶ a chemical reaction of an ion with water to produce an acidic or basic solution by the production of hydronium or hydroxide ions
- ▶ the addition of precise volumes of a solution in a burette to a measured volume of a sample solution; often used to determine the concentration of a substance in a sample
- ▶ the solution being analyzed in a titration
- ▶ the solution in a burette during a titration
- ▶ a calibrated tube used to deliver variable known volumes of a liquid during a titration
- ▶ a solution whose concentration is accurately and precisely known (two words)
- ▶ a highly pure and stable chemical used to determine the precise concentration of acids or bases (two words)
- ▶ the point in a titration when neutralization is complete (two words)
- ▶ the point in a titration at which a sharp change in a measurable and characteristic property occurs (for example, a colour change in an acid-base indicator)
- ▶ a graph of pH against volume of titrant added in an acid-base titration; titration curve (two words)
- ▶ an aqueous solution containing a conjugate acid-base pair that maintains a nearly constant pH when an acid or base is added

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



Unit 4

Chemical Systems and Equilibrium

- ▶ the state of a reaction in which all reactants and products have reached constant concentrations in a closed system (two words)
- ▶ a balance between forward and reverse processes that are occurring simultaneously (two words)
- ▶ the relative concentrations of reactants and products in a system in dynamic equilibrium (two words)
- ▶ a chemical reaction that proceeds in both the forward and reverse directions, setting up an equilibrium in a closed system (two words)
- ▶ the mathematical description of a chemical system at equilibrium (two words)
- ▶ the numerical value defining the equilibrium law for a given system (two words)
- ▶ a chemical equilibrium system in which all reactants and products are in the same state of matter, such as the gas state (two words)
- ▶ a chemical equilibrium system in which all reactants and products are present in at least two different states, such as gases and solids (two words)
- ▶ a generalization that states that chemical systems at equilibrium shift to restore equilibrium when a change occurs that disturbs the equilibrium (three words)
- ▶ a change in concentrations of reactants and products in order to restore an equilibrium state (two words)
- ▶ a hypothetical gas composed of entities that have no size, travel in straight lines, and have no attraction to each other (no intermolecular forces); a gas that obeys all gas laws (two words)
- ▶ the pressure that a gas, in a mixture of gases, would exert if it alone occupied the whole volume occupied by the mixture (two words)
- ▶ the product of the concentrations of the products, divided by the product of the concentrations of the reactants, for a chemical reaction that is not necessarily at equilibrium (two words)
- ▶ concentrations that occur together at a particular instant in time in the progress of a chemical reaction (two words)
- ▶ a dynamic equilibrium between a solute and a solvent in a saturated solution in a closed system (two words)
- ▶ the quantity of solute that dissolves in a given quantity of solvent at a particular temperature; the concentration of a saturated solution at a particular temperature
- ▶ the value obtained from the equilibrium law applied to a saturated solution (three words)
- ▶ the product of the concentrations of ions in a specific solution raised to powers equal to their coefficients in the balance chemical equation; can be used to predict the formation of a precipitate (three words)
- ▶ a reduction in the solubility of an ionic compound due to the presence of a common ion in solution (three words)
- ▶ a theory stating that, in an aqueous solution, an acid is a substance that produces hydrogen ions and a base is a substance that produces hydroxide ions (two words)
- ▶ a theory stating that an acid is a hydrogen ion (proton) donor and a base is a hydrogen ion (proton) acceptor (two words)
- ▶ a water molecule that has accepted a hydrogen ion, H_3O^+ (two words)
- ▶ the substance that forms when a base, according to the Brønsted-Lowry theory, accepts a hydrogen ion (proton) (two words)
- ▶ the substance that forms when an acid loses a hydrogen ion (proton) (two words)
- ▶ two substances related to each other by the donating and accepting of a single hydrogen ion (three words)
- ▶ able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
- ▶ able to donate or accept a hydrogen ion (proton) and thus act as both a Brønsted-Lowry acid and a Brønsted-Lowry base
- ▶ the equilibrium constant for the ionization of an acid; also called the acid dissociation constant (three words)
- ▶ an acid that ionizes almost 100% in water, producing hydrogen ions (two words)
- ▶ an acid that only partly ionizes in water, producing hydrogen ions (two words)
- ▶ an acid in which the acidic hydrogen atom is attached to an oxygen molecule
- ▶ a compound that dissociates completely in water, producing hydroxide ions (two words)
- ▶ an acid (except carbonic acid) containing carbon, oxygen, and hydrogen atoms; also called carboxylic acids (two words)
- ▶ a base that undergoes an equilibrium reaction with water to produce hydroxide ions (two words)
- ▶ equilibrium constant for the ionization of a base; also called the base dissociation constant (three words)
- ▶ an organic compound that increases the concentration of hydroxide ions in aqueous solution (two words)
- ▶ the transfer of a hydrogen ion from one water molecule to another (three words)
- ▶ the equilibrium constant for the autoionization of water (four words)
- ▶ the negative logarithm of the concentration of hydrogen ions in an aqueous solution
- ▶ the negative logarithm of the concentration of hydroxide ions in an aqueous solution
- ▶ a device that measures the acidity or alkalinity of a solution electronically and displays the result as a pH value (two words)
- ▶ a substance that changes colour within a specific pH range (two words)
- ▶ the percentage of a solute that ionizes when it dissolves in a solvent (two words)
- ▶ an acid that possesses only one ionizable (acidic) hydrogen atom (two words)
- ▶ an acid that possesses more than one ionizable (acidic) hydrogen atom (two words)
- ▶ a chemical reaction of an ion with water to produce an acidic or basic solution by the production of hydronium or hydroxide ions
- ▶ the addition or precise volumes of a solution in a burette to a measured volume of a sample solution; often used to determine the concentration of a substance in a sample
- ▶ the solution being analyzed in a titration
- ▶ the solution in a burette during a titration
- ▶ a calibrated tube used to deliver variable known volumes of a liquid during a titration
- ▶ a solution whose concentration is accurately and precisely known (two words)
- ▶ a highly pure and stable chemical used to determine the precise concentration of acids or bases (two words)
- ▶ the point in a titration when neutralization is complete (two words)
- ▶ the point in a titration at which a sharp change in a measurable and characteristic property occurs (for example, a colour change in an acid-base indicator)
- ▶ a graph of pH against volume of titrant added in an acid-base titration; titration curve (two words)
- ▶ an aqueous solution containing a conjugate acid-base pair that maintains a nearly constant pH when an acid or base is added

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



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Chapter 9

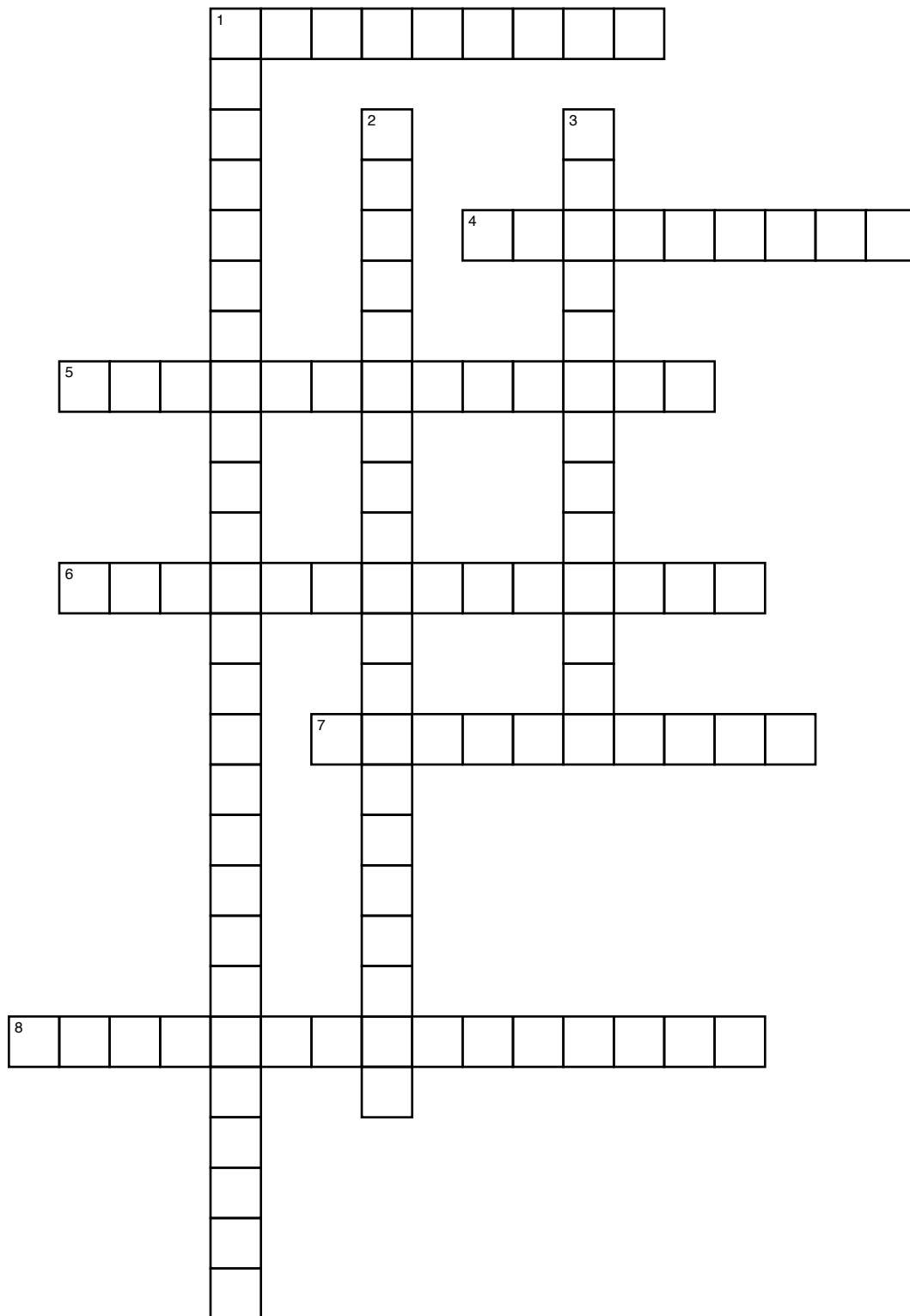
Oxidation-Reduction Reactions

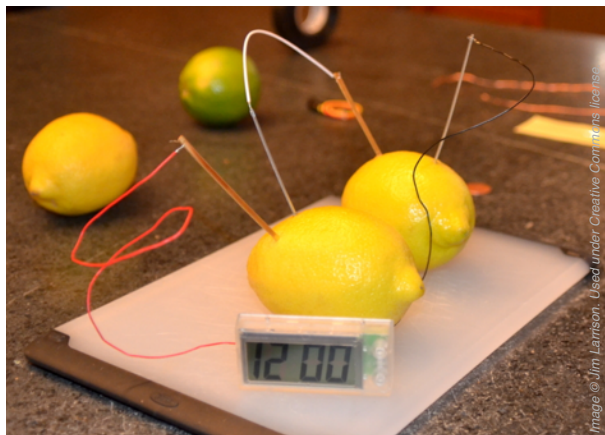
Across

- the process in which one or more electrons is gained by a chemical entity
- the reaction in which one or more electrons is transferred between chemical entities (two words)
- the reactant that is reduced (gains electrons from another substance) during an oxidation-reduction reaction (two words)
- a table listing standard reduction potentials of common oxidizing agents and reducing agents in order from strongest to weakest; standard reduction potentials table (two words)
- a number used to keep track of electrons in oxidation-reduction reactions according to certain rules; also known as oxidation state (two words)

Down

- the reaction in which one or more electrons is transferred between chemical entities (two words)
- the part of an oxidation-reduction reaction equation representing either the oxidation reaction or the reduction reaction (two words)
- the reactant that is oxidized (loses electrons from another substance) during an oxidation-reduction reaction (two words)





Chapter 10

Electrochemical Cells

Across

3. a galvanic cell in which all the entities involved in the half-cell reactions are at SATP and the solutions have a concentration of 1.0 mol/L (two words)
8. a solid electrical conductor
10. the application of current through a cell to produce a chemical change
17. a tube that contains an electrolyte solution and connects the two half-cells in a galvanic cell (two words)
18. a form of cathodic protection in which the oxidation of a more active metal that is attached to the steel prevents the iron in the steel from being oxidized (two words)
21. a cell that can be recharged by being attached to an external source of electrical energy; recharging reverses the chemical reaction that generates the electrical energy (two words)
22. a system in which two connected electrodes are in contact with an electrolyte
23. a group of two or more galvanic cells

24. an arrangement of two connected half-cells that spontaneously produces an electric current (two words)

Down

1. a cell that uses electrical energy to produce a chemical change that would not occur spontaneously (two words)
2. the deterioration of a metal by a redox reaction
4. the electrode where oxidation occurs
5. an electrode and an electrolyte that form half of a complete cell
6. a galvanic cell for which the reactants are continuously supplied (two words)
7. the ability of a half-cell to attract electrons in a cell that is operating under standard conditions (three words)
9. a general term that is used to refer to both a galvanic cell and an electrolytic cell (two words)
11. the electric potential difference (voltage) between the two half-cells in a galvanic cell (two words)

12. the galvanic cell from which all the half-cell potentials are determined (three words)

13. the electrode where reduction occurs

14. the electric potential difference of a galvanic cell that is operating under standard conditions (three words)

15. a form of cathodic protection in which electrons from a DC power source are pumped into the metal that is being protected (two words)

16. a form of corrosion prevention in which electrons are continuously supplied to the metal that is being protected, making the metal a cathode (two words)

19. the process in which steel is coated with a thin layer of zinc to protect the steel from corrosion

20. a cell that cannot be recharged (two words)

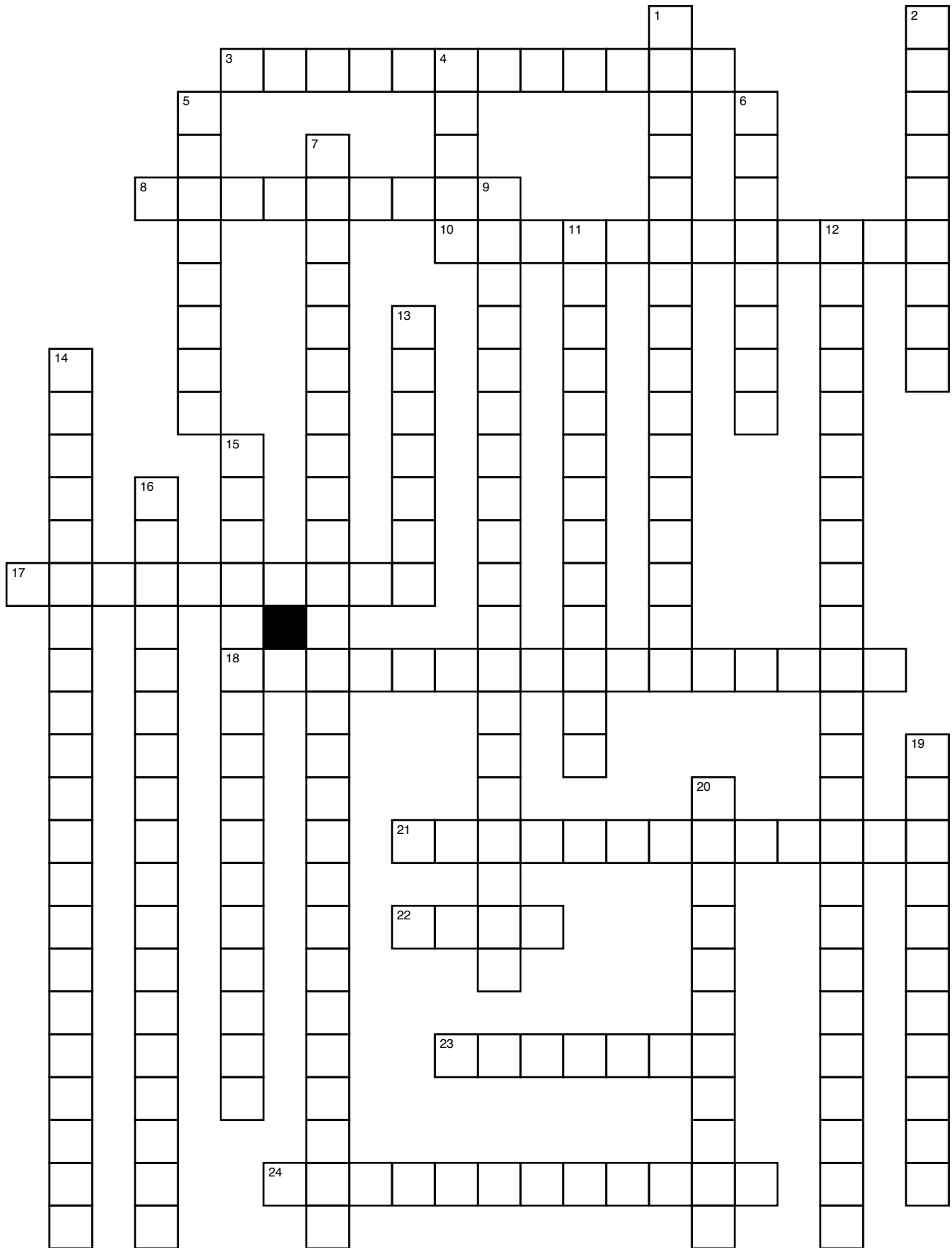




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Unit 5

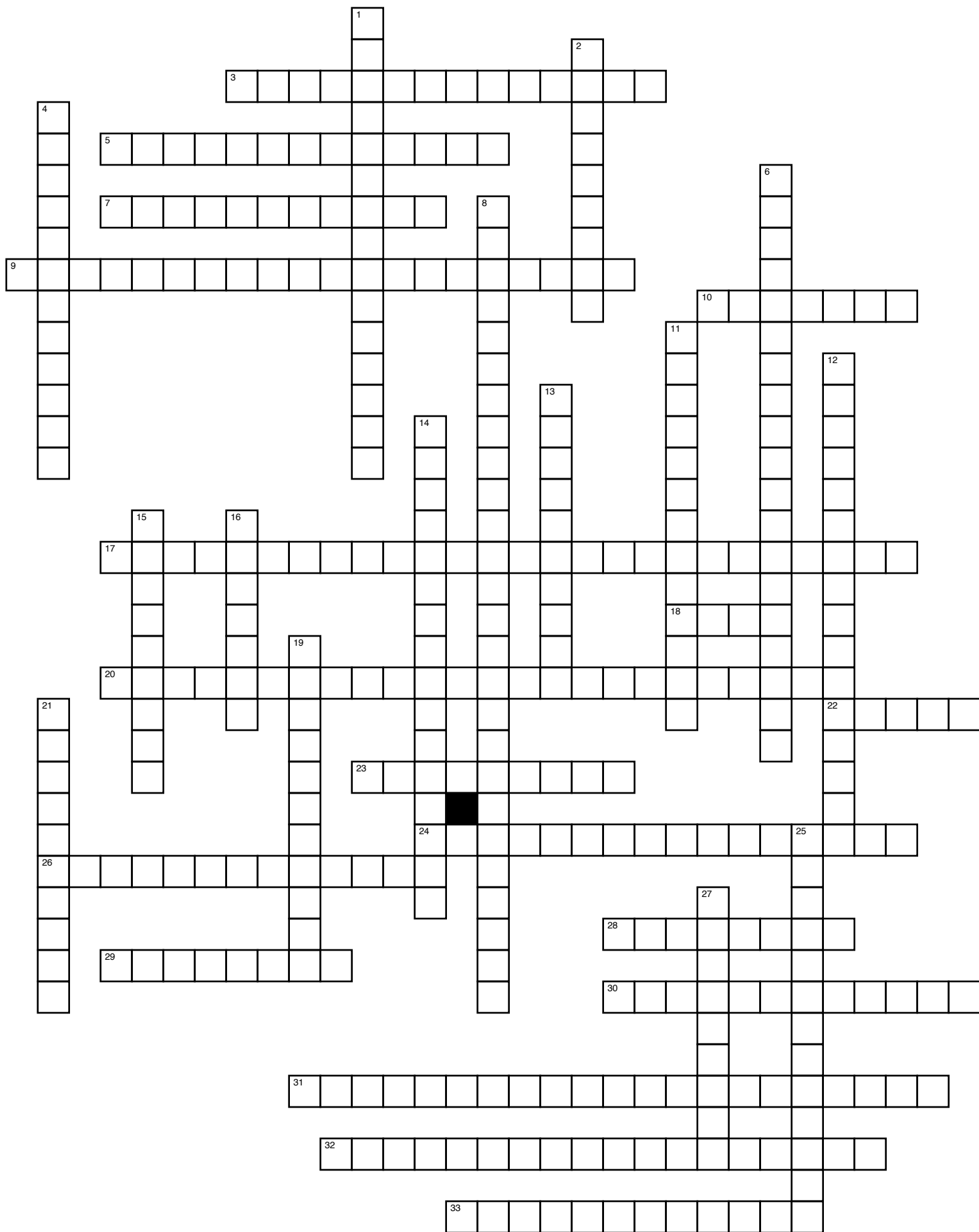
Electrochemistry

Across

3. the reactant that is reduced (gains electrons from another substance) during an oxidation-reduction reaction (two words)
5. the reactant that is oxidized (loses electrons from another substance) during an oxidation-reduction reaction (two words)
7. the process in which steel is coated with a thin layer of zinc to protect the steel from corrosion
9. the part of an oxidation-reduction reaction equation representing either the oxidation reaction or the reduction reaction (two words)
10. a group of two or more galvanic cells
17. the reaction in which one or more electrons is transferred between chemical entities (two words)
18. a system in which two connected electrodes are in contact with an electrolyte
20. the galvanic cell from which all the half-cell potentials are determined (three words)
22. the electrode where oxidation occurs
23. the deterioration of a metal by a redox reaction
24. a cell that uses electrical energy to produce a chemical change that would not occur spontaneously (two words)
26. the reaction in which one or more electrons is transferred between chemical entities (two words)
28. a galvanic cell for which the reactants are continuously supplied (two words)
29. an electrode and an electrolyte that form half of a complete cell
30. the application of current through a cell to produce a chemical change
31. the electric potential difference of a galvanic cell that is operating under standard conditions (three words)
32. a form of corrosion prevention in which electrons are continuously supplied to the metal that is being protected, making the metal a cathode (two words)
33. an arrangement of two connected half-cells that spontaneously produces an electric current (two words)
8. the ability of a half-cell to attract electrons in a cell that is operating under standard conditions (three words)
11. a cell that can be recharged by being attached to an external source of electrical energy; recharging reverses the chemical reaction that generates the electrical energy (two words)
12. a form of cathodic protection in which the oxidation of a more active metal that is attached to the steel prevents the iron in the steel from being oxidized (two words)
13. a table listing standard reduction potentials of common oxidizing agents and reducing agents in order from strongest to weakest; standard reduction potentials table (two words)
14. a form of cathodic protection in which electrons from a DC power source are pumped into the metal that is being protected (two words)
15. the process in which one or more electrons is lost by a chemical entity
16. the electrode where reduction occurs
19. a cell that cannot be recharged (two words)
21. a tube that contains an electrolyte solution and connects the two half-cells in a galvanic cell (two words)
25. the electric potential difference (voltage) between the two half-cells in a galvanic cell (two words)
27. a solid electrical conductor

Down

1. a number used to keep track of electrons in oxidation-reduction reactions according to certain rules; also known as oxidation state (two words)
2. the process in which one or more electrons is gained by a chemical entity
4. a galvanic cell in which all the entities involved in the half-cell reactions are at SATP and the solutions have a concentration of 1.0 mol/L (two words)
6. a general term that is used to refer to both a galvanic cell and an electrolytic cell (two words)



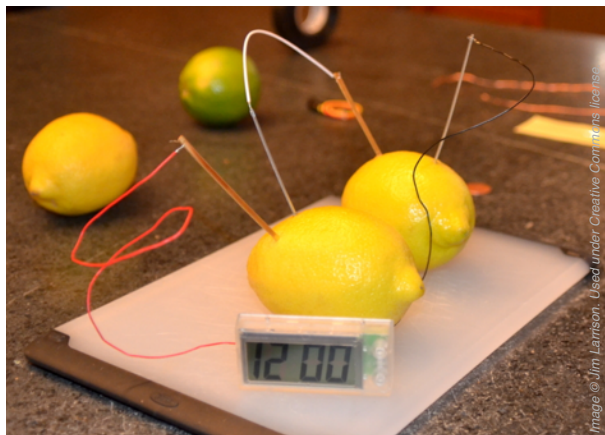


Chapter 9

Oxidation-Reduction Reactions

- ▶ the process in which one or more electrons is lost by a chemical entity
- ▶ the process in which one or more electrons is gained by a chemical entity
- ▶ the reaction in which one or more electrons is transferred between chemical entities (two words)
- ▶ the reaction in which one or more electrons is transferred between chemical entities (two words)
- ▶ the part of an oxidation-reduction reaction equation representing either the oxidation reaction or the reduction reaction (two words)
- ▶ a number used to keep track of electrons in oxidation-reduction reactions according to certain rules; also known as oxidation state (two words)
- ▶ the reactant that is reduced (gains electrons from another substance) during an oxidation-reduction reaction (two words)
- ▶ the reactant that is oxidized (loses electrons from another substance) during an oxidation-reduction reaction (two words)
- ▶ a table listing standard reduction potentials of common oxidizing agents and reducing agents in order from strongest to weakest; standard reduction potentials table (two words)

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



Chapter 10

Electrochemical Cells

- ▶ an electrode and an electrolyte that form half of a complete cell
- ▶ a solid electrical conductor
- ▶ a system in which two connected electrodes are in contact with an electrolyte
- ▶ a tube that contains an electrolyte solution and connects the two half-cells in a galvanic cell (two words)
- ▶ an arrangement of two connected half-cells that spontaneously produces an electric current (two words)
- ▶ the electrode where oxidation occurs
- ▶ the electrode where reduction occurs
- ▶ the electric potential difference (voltage) between the two half-cells in a galvanic cell (two words)
- ▶ a galvanic cell in which all the entities involved in the half-cell reactions are at SATP and the solutions have a concentration of 1.0 mol/L (two words)
- ▶ the electric potential difference of a galvanic cell that is operating under standard conditions (three words)
- ▶ the ability of a half-cell to attract electrons in a cell that is operating under standard conditions (three words)
- ▶ the galvanic cell from which all the half-cell potentials are determined (three words)
- ▶ a group of two or more galvanic cells
- ▶ a cell that cannot be recharged (two words)
- ▶ a cell that can be recharged by being attached to an external source of electrical energy; recharging reverses the chemical reaction that generates the electrical energy (two words)
- ▶ a galvanic cell for which the reactants are continuously supplied (two words)
- ▶ the deterioration of a metal by a redox reaction
- ▶ the process in which steel is coated with a thin layer of zinc to protect the steel from corrosion
- ▶ a form of corrosion prevention in which electrons are continuously supplied to the metal that is being protected, making the metal a cathode (two words)
- ▶ a form of cathodic protection in which the oxidation of a more active metal that is attached to the steel prevents the iron in the steel from being oxidized (two words)
- ▶ a form of cathodic protection in which electrons from a DC power source are pumped into the metal that is being protected (two words)
- ▶ a cell that uses electrical energy to produce a chemical change that would not occur spontaneously (two words)
- ▶ the application of current through a cell to produce a chemical change
- ▶ a general term that is used to refer to both a galvanic cell and an electrolytic cell (two words)

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



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Unit 5

Electrochemistry

- ▶ the process in which one or more electrons is lost by a chemical entity
- ▶ the process in which one or more electrons is gained by a chemical entity
- ▶ the reaction in which one or more electrons is transferred between chemical entities (two words)
- ▶ the reaction in which one or more electrons is transferred between chemical entities (two words)
- ▶ the part of an oxidation-reduction reaction equation representing either the oxidation reaction or the reduction reaction (two words)
- ▶ a number used to keep track of electrons in oxidation-reduction reactions according to certain rules; also known as oxidation state (two words)
- ▶ the reactant that is reduced (gains electrons from another substance) during an oxidation-reduction reaction (two words)
- ▶ the reactant that is oxidized (loses electrons from another substance) during an oxidation-reduction reaction (two words)
- ▶ a table listing standard reduction potentials of common oxidizing agents and reducing agents in order from strongest to weakest; standard reduction potentials table (two words)
- ▶ an electrode and an electrolyte that form half of a complete cell
- ▶ a solid electrical conductor
- ▶ the electrode where oxidation occurs
- ▶ the electrode where reduction occurs
- ▶ a system in which two connected electrodes are in contact with an electrolyte
- ▶ a tube that contains an electrolyte solution and connects the two half-cells in a galvanic cell (two words)
- ▶ an arrangement of two connected half-cells that spontaneously produces an electric current (two words)
- ▶ the electric potential difference (voltage) between the two half-cells in a galvanic cell (two words)
- ▶ a galvanic cell in which all the entities involved in the half-cell reactions are at SATP and the solutions have a concentration of 1.0 mol/L (two words)
- ▶ the electric potential difference of a galvanic cell that is operating under standard conditions (three words)
- ▶ a group of two or more galvanic cells
- ▶ the ability of a half-cell to attract electrons in a cell that is operating under standard conditions (three words)
- ▶ the galvanic cell from which all the half-cell potentials are determined (three words)
- ▶ a cell that cannot be recharged (two words)
- ▶ a cell that can be recharged by being attached to an external source of electrical energy; recharging reverses the chemical reaction that generates the electrical energy (two words)
- ▶ a galvanic cell for which the reactants are continuously supplied (two words)
- ▶ the deterioration of a metal by a redox reaction
- ▶ the process in which steel is coated with a thin layer of zinc to protect the steel from corrosion
- ▶ a form of corrosion prevention in which electrons are continuously supplied to the metal that is being protected, making the metal a cathode (two words)
- ▶ a form of cathodic protection in which the oxidation of a more active metal that is attached to the steel prevents the iron in the steel from being oxidized (two words)
- ▶ a form of cathodic protection in which electrons from a DC power source are pumped into the metal that is being protected (two words)
- ▶ a cell that uses electrical energy to produce a chemical change that would not occur spontaneously (two words)
- ▶ the application of current through a cell to produce a chemical change
- ▶ a general term that is used to refer to both a galvanic cell and an electrolytic cell (two words)

E	X	U	M	E	L	E	C	T	R	O	C	H	E	M	I	C	A	L	C	E	L	L	C	T	N	M	L	F	Z	I
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R	K	Y	H	A	L	F	R	E	A	C	T	I	O	N	E	Q	U	A	T	I	O	N	P	O	Y	C	Q	C	P	W

[illegible]

A crossword puzzle grid with 15 across and 1 down highlighted in black. The grid contains various chemistry-related terms.

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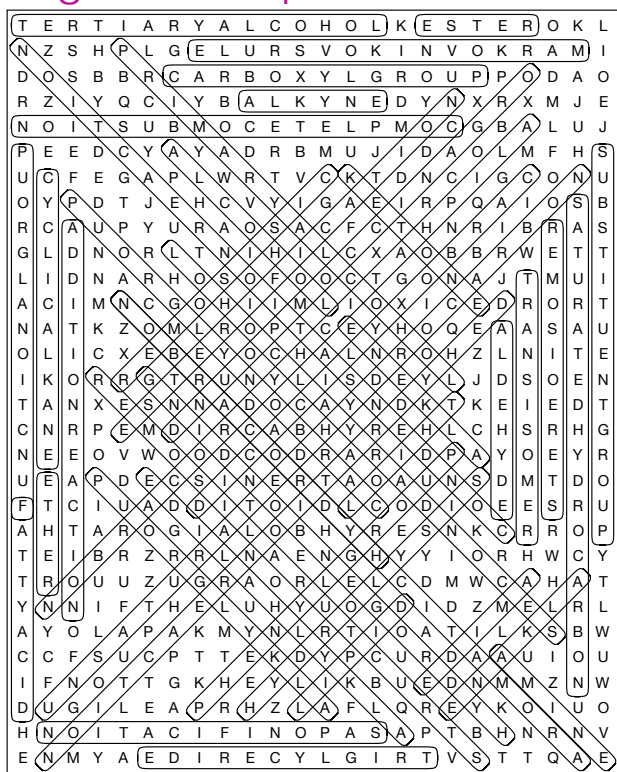
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- 17: FATTYACID
- 18: CARBONYLGROUP
- 19: FUNCTIONALGROUP
- 20: SATURATEDHYDROCARBON
- 21: UNSATURATEDHYDROCARBON
- 22: AMINOACID
- 23: CONDENSATIONPOLYMER
- 24: SUBSTITUENTGROUP

Down:

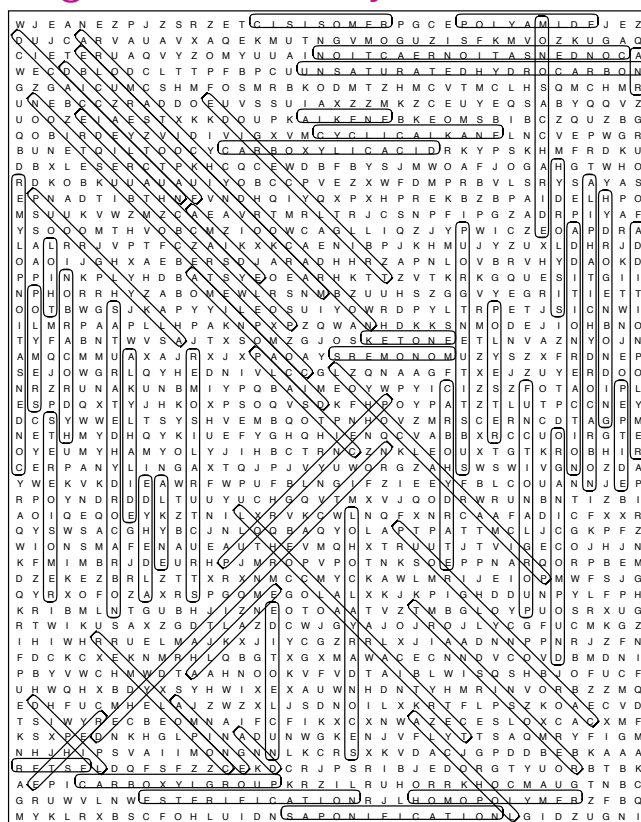
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- 3: ALCOHOL
- 4: FATTYACID
- 5: CARBONYLGROUP
- 6: FUNCTIONALGROUP
- 7: SATURATEDHYDROCARBON
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- 9: AMINOACID
- 10: CONDENSATIONPOLYMER
- 11: SUBSTITUENTGROUP

[illegible]

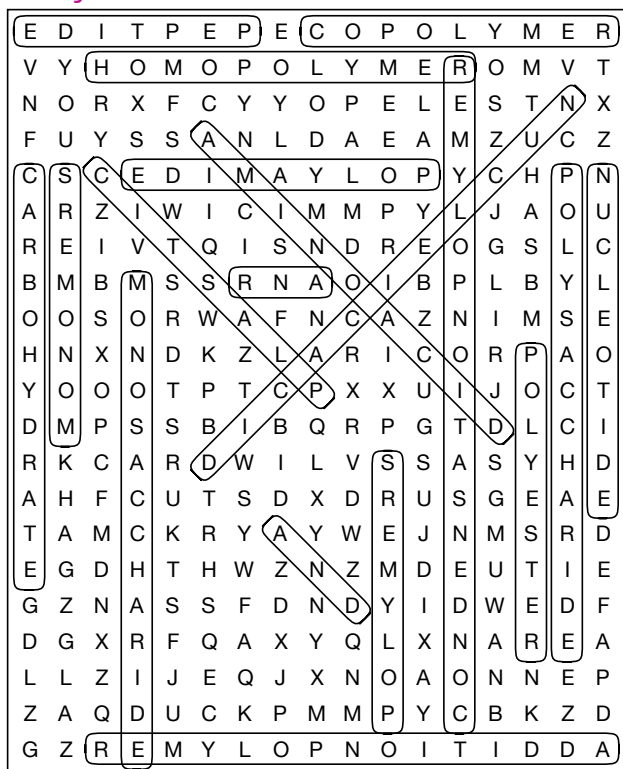
Organic Compounds



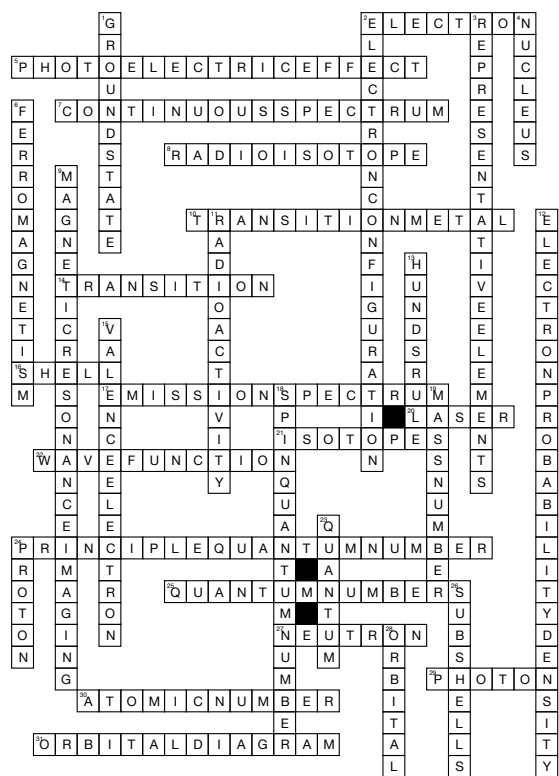
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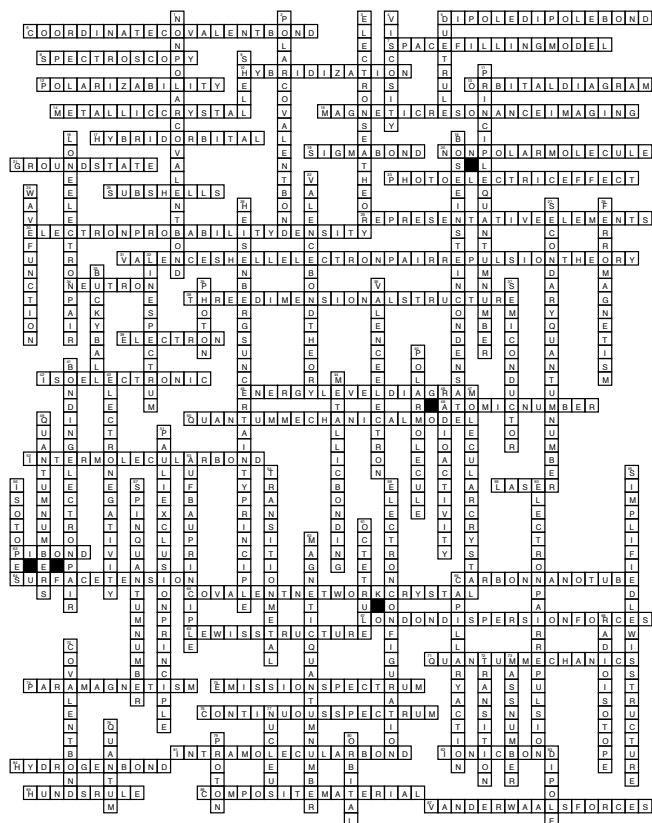
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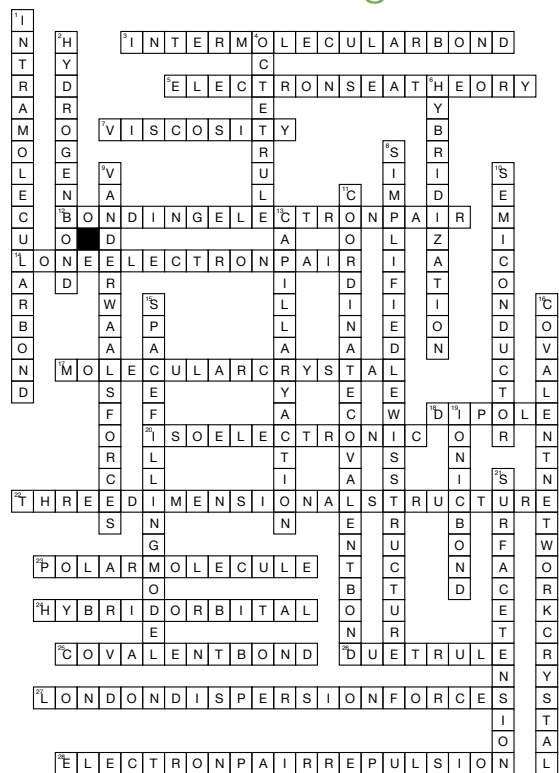
Atoms



Structure and Properties of Matter



Chemical Bonding

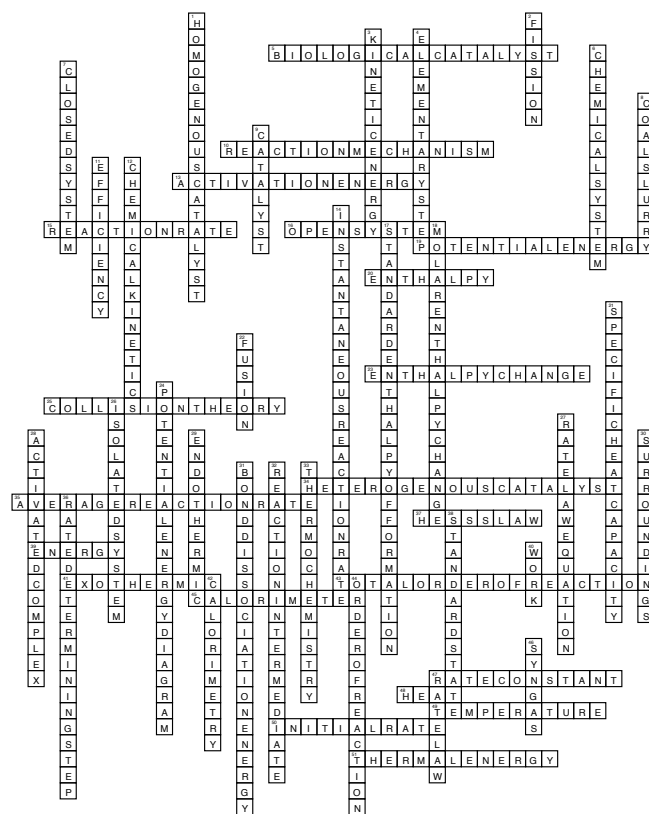


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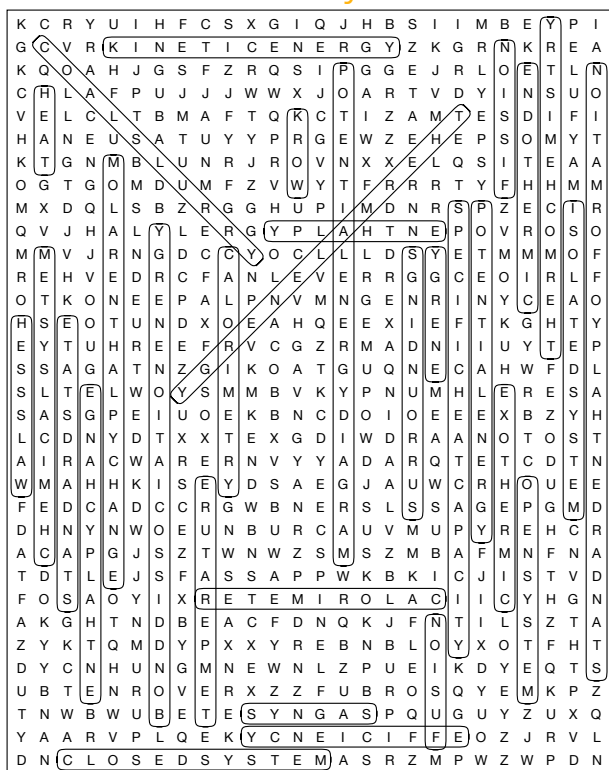
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E	P	L	T	E	O	E	S	Z	K	N	F	K	M	V	A	D	G	C	N	A	Q	C	Z	A
U	O	R	M	A	T	A	N	N	F	C	A	U	W	I	Q	R	B	L	D	C	L	T	T	E
L	S	R	M	O	E	I	R	O	V	B	U	N	Y	L	V	D	O	A	E	J	F	D	S	Y
I	O	N	E	I	R	C	S	O	J	B	H	R	R	E	W	A	O	K	K	M	C	O	M	L
N	Y	I	C	A	E	I	R	C	S	O	J	B	H	R	R	E	W	A	O	K	K	M	C	O
H	C	U	L	P	L	E	O	E	A	T	I	B	L	Z	N	U	Z	B	E	L	S	I	N	G
Y	Q	L	Z	S	E	D	O	L	E	G	X	V	M	X	P	A	Z	N	D	L	E	S	G	U
B	L	A	U	I	E	R	O	U	R	B	U	N	E	L	A	O	N	K	N	O	S			
R	R	R	E	D	Y	P	(D	N	O	B	C	I	N	O	I	S	K	F	M	I	E	M	K	S
I	B	W	A	O	B	L	N	E	A	D	N	P	O	Y	C	Q	R	P	W	D	R	P	L	O
D	W	O	A	J	O	G	E	P	E	G	T	W	H	O	Y	D	K	O	A	O				
O	U	N	D	B	S	E	M	I	C	O	N	D	U	C	T	O	R							
R	M	D	A	N	O	I	T	C	A	Y	R	A	L	L	I	P	A	O						
B	P	X	H	O	R	E	K	B	Z	B	P	A	N	A	E	U	P	P						
I	W	Z	C	L	V	N	(H	Y	B	R	I	D	I	Z	A	T	I	O	N					
T	Z	(D	N	O	B	T	N	E	L	A	V	O	C	R	A	L	O	P	O	N	N	I	K	U
A	E	L	E	C	T	R	O	N	E	G	A	T	I	V	I	T	Y	X	N					
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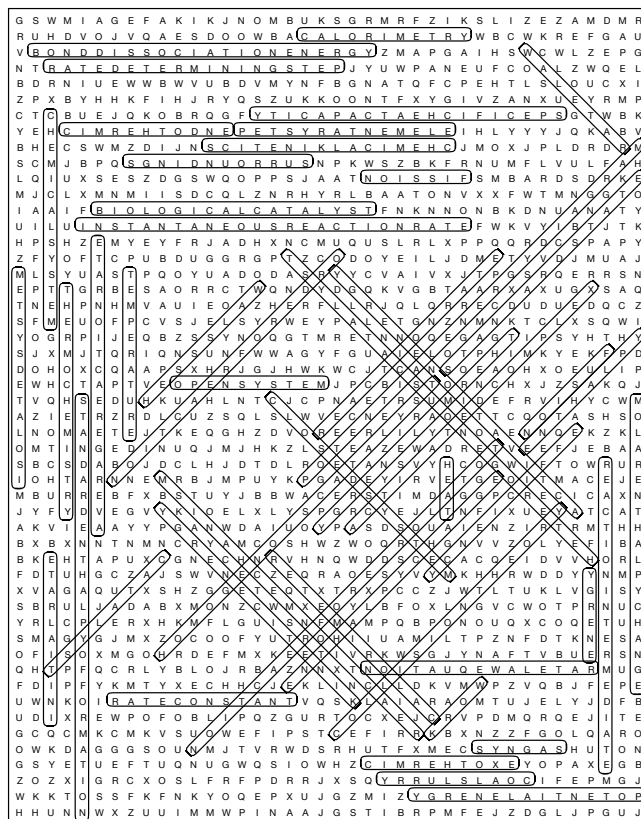
Energy Changes and Rates of Reaction

[illegible]

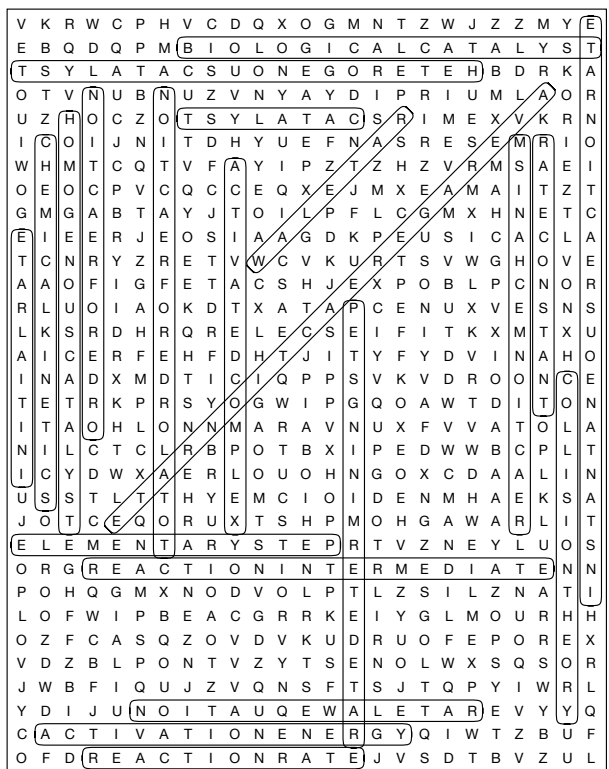
Thermochemistry



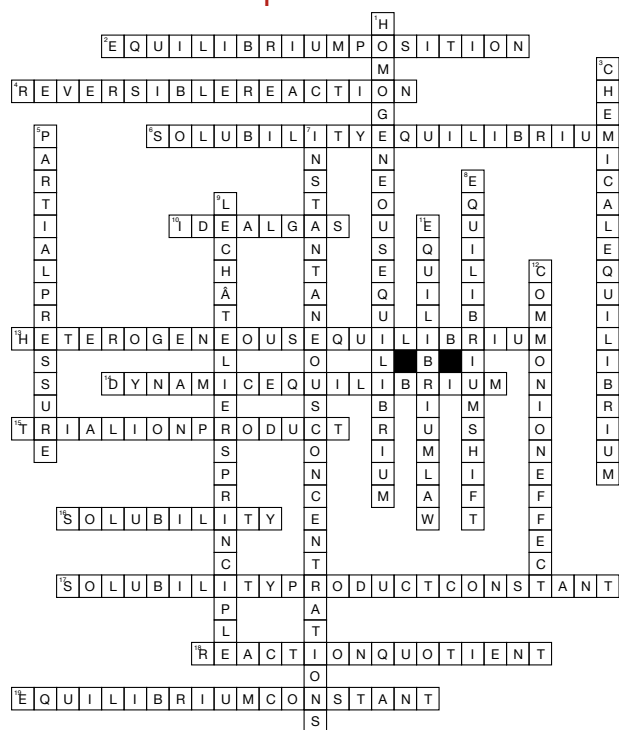
Energy Changes and Rates of Reaction



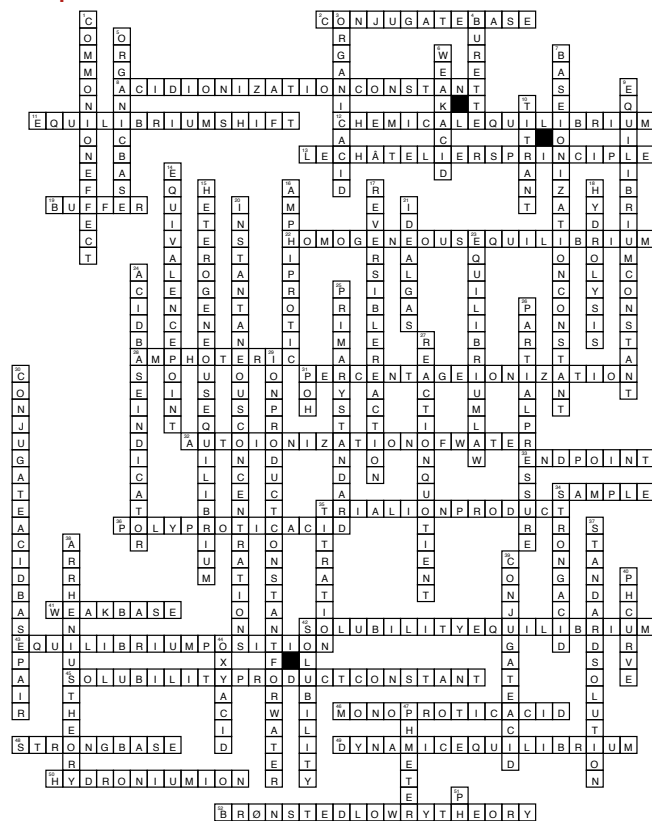
Chemical Kinetics



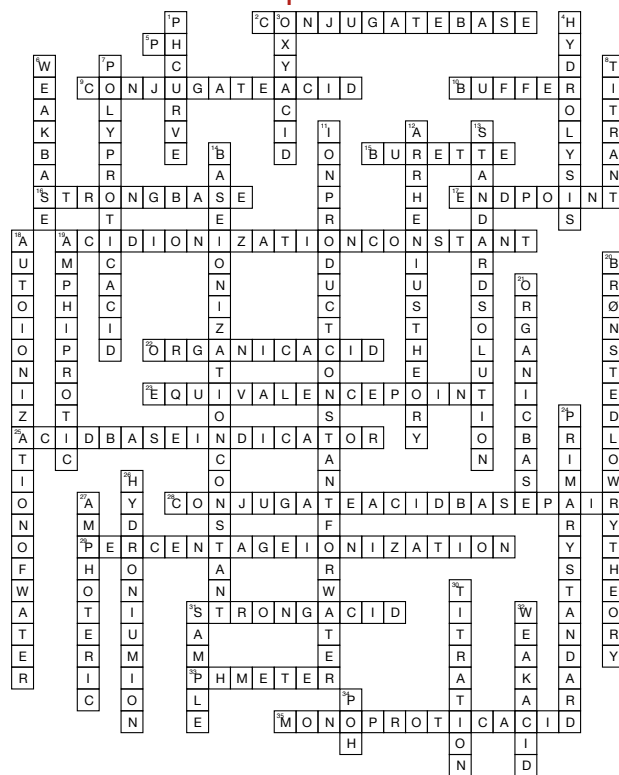
Chemical Equilibrium



Chemical Systems and Equilibrium



Acid-Base Equilibrium

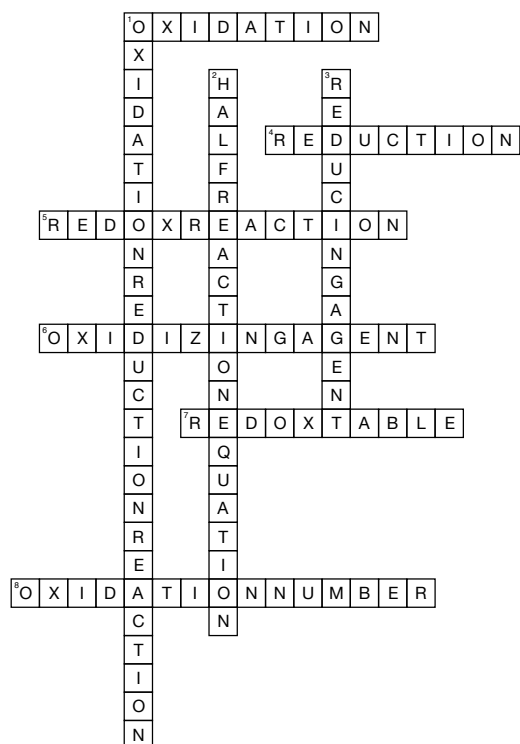


M	U	I	R	B	I	L	I	U	Q	E	Y	T	I	L	B	U	L	O	S	L	T	L	P	W	S	
K	Z	N	D	D	I	N	D	D	P	Q	U	E	S	C	M	F	B	E	K	T	E	L	V	R	R	I
D	X	L	V	T	C	Q	E	H	Z	T	O	B	R	A	N	G	W	G	B	Y	C	K	P	Y	A	G
C	W	B	K	M	Q	G	E	H	L	E	G	J	N	N	K	G	T	W	H	S	L	S	L	A	G	X
C	G	Q	D	I	U	X	E	T	X	C	W	W	V	O	R	X	F	T	A	I	I	A	L	S	R	J
M	S	T	H	B	V	I	E	K	T	L	E	F	Q	Y	K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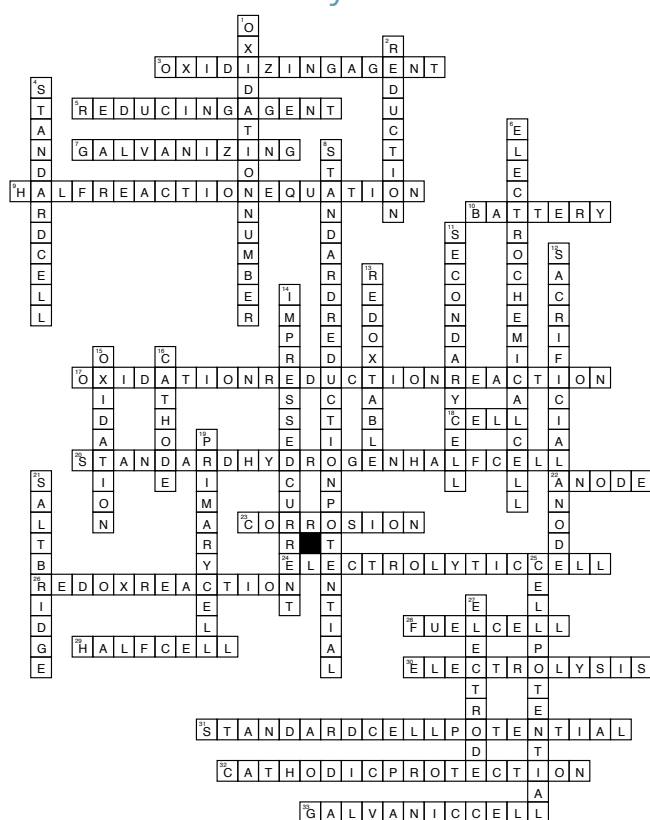
[illegible]

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B	X	(H	O	P)	A	G	G	D	F	P	M	(O	R	G	A	N	I	C	B	A	S	E)	J	T	K	V	R								
C	J	J	N	M	O	K	L	H	W	J	J	V	Z	T	Y	O	B	S	A	M	P	L	E	R	()	E	J	T	K	V	R							
A	W	X	(B	R	O	N	S	T	H	E	D	L	O	W	R	Y	T	H	E	O	R	Y)	X	F	O	P	K	()	V	R						
I	B	X	Z	(C	E	D)	O	J	Q	K	G	X	B	V	Q	S	I	C	O	M	C	A	T	()	B	P	M	Q	()						
X	B	C	N	N	O	H	I	F	U	N	T	Z	A	F	W	O	C	U	T	A	L	A	()	H	M	D	()	R	()	V	R					
I	F	U	X	O	J	N	S	C	N	E	X	R	T	B	N	I	E	W	U	T	()	C	C	()	C	B	E	A	()	V	R					
F	I	K	F	R	I	A	J	H	A	N	S	S	()	B	I	O	H	V	A	B	I	A	M	D	()	Y	H	()	A	()	V	R			
D	W	O	E	F	U	T	I	U	T	C	A	A	Z	()	U	R	L	J	G	D	B	O	R	()	H	()	D	()	A	()	V	R		
J	O	A	N	Z	E	D	A	N	G	L	I	A	B	C	R	D	()	F	N	U	I	R	()	H	()	O	()	I	D	()	V	R		
K	J	O	J	P	S	R	U	Z	J	I	T	O	X	K	K	I	E	I	E	R	V	J	C	N	C	R	()	O	()	I	D	()	V	R		
H	O	N	Z	O	R	B	H	I	I	T	O	Q	C	A	E	T	I	X	O	U	I	A	()	O	()	O	()	I	D	()	V	R			
A	S	K	D	B	I	O	F	I	O	N	E	A	R	S	E	H	T	L	X	U	R	U	E	L	()	O	()	I	D	()	V	R				
I	A	C	A	X	M	B	D	N	T	H	O	C	A	A	()	P	M	W	D	E	O	H	V	E	()	M	T	()	A	()	V	R			
Z	B	I	H	O	Z	D	C	U	F	L	I	B	C	R	()	E	R	E	L	W	()	E	()	I	O	()	A	()	S	()	V	R	
D	E	F	L	U	U	O	M	I	C	T	A	D	E	I	()	I	X	L	A	Q	P	J	F	()	E	()	G	()	I	()	V	R		
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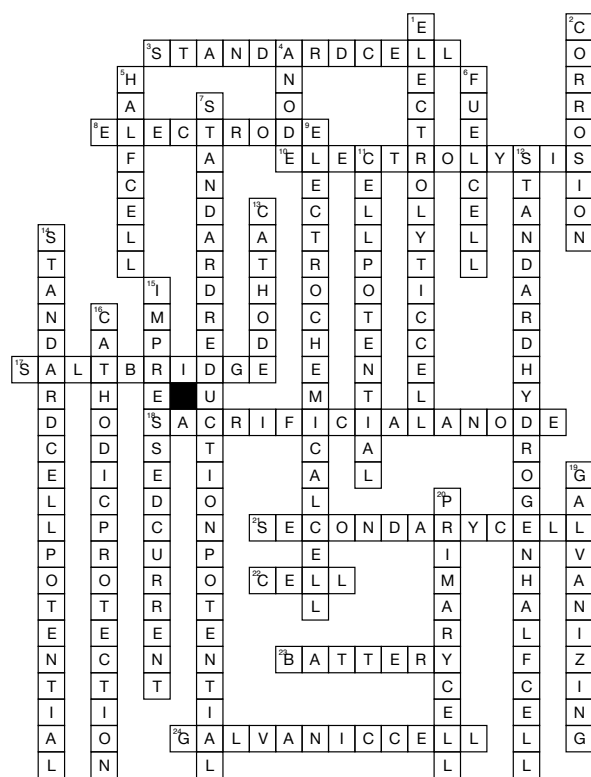
Oxidation-Reduction Reactions



Electrochemistry



Electrochemical Cells



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

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

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

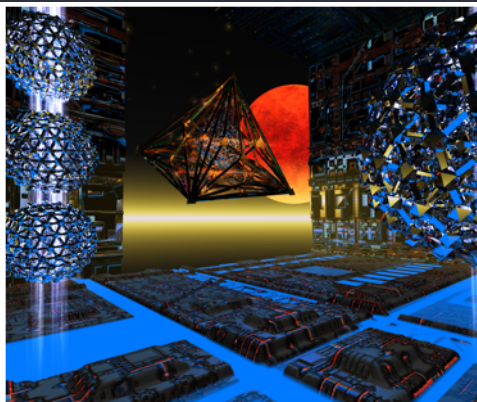
Word Puzzles

from *Nelson Chemistry 12*



Organic Chemistry

Contains puzzles for *Organic Compounds*, *Polymers*, and the whole unit.



Structure and Properties of Matter

Contains puzzles for *Atoms*, *Chemical Bonding*, and the whole unit.



Energy Changes and Rates of Reaction

Contains puzzles for *Thermochemistry*, *Chemical Kinetics*, and the whole unit.



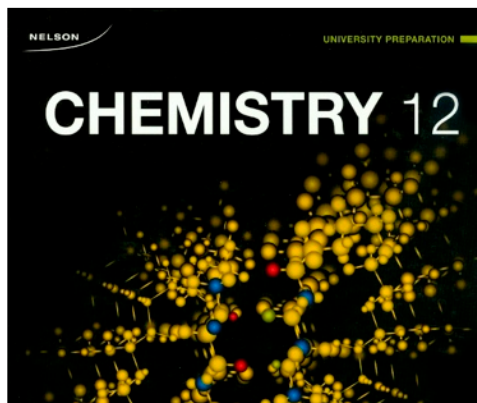
Chemical Systems & Equilibrium

Contains puzzles for *Chemical Equilibrium*, *Acid-Base Equilibrium*, and the whole unit.



Electrochemistry

Contains puzzles for *Oxidation-Reduction Reactions*, *Electrochemical Cells*, and the whole unit.



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Science is the great antidote to the poison of enthusiasm and superstition.

Adam Smith