

Grade 10	Grade 11	Grade 12	
TAXONOMY <ul style="list-style-type: none"> • History of taxonomy • Binomial nomenclature • Classification • Taxonomy 	INTRODUCTION TO CHEMISTRY <ul style="list-style-type: none"> • Metric units and instrumentation • Observation and hypothesizing • Scientific notation • Careers in chemistry 	KINEMATICS <ul style="list-style-type: none"> • Scalars and vectors • Length measurement • Acceleration • Fields and models 	LIFE PAC 1
BASIS OF LIFE <ul style="list-style-type: none"> • Elements and molecules • Properties of compounds • Chemical reactions • Organic compounds 	BASIC CHEMICAL UNITS <ul style="list-style-type: none"> • Alchemy • Elements • Compounds • Mixtures 	DYNAMICS <ul style="list-style-type: none"> • Newton's Laws of Motion • Gravity • Circular motion • Kepler's Laws of Motion 	LIFE PAC 2
MICROBIOLOGY <ul style="list-style-type: none"> • The microscope • Protozoan • Algae • Microorganisms 	GASES AND MOLES <ul style="list-style-type: none"> • Kinetic theory • Gas laws • Combined gas law • Moles 	WORK AND ENERGY <ul style="list-style-type: none"> • Mechanical energy • Conservation of energy • Power and efficiency • Heat energy 	LIFE PAC 3
CELLS <ul style="list-style-type: none"> • Cell theories • Examination of the cell • Cell design • Cells in organisms 	ATOMIC MODELS <ul style="list-style-type: none"> • Historical models • Modern atomic structure • Periodic Law • Nuclear reactions 	WAVES <ul style="list-style-type: none"> • Energy transfers • Reflection and refraction of waves • Diffraction and interference • Sound waves 	LIFE PAC 4
PLANTS: GREEN FACTORIES <ul style="list-style-type: none"> • The plant cell • Anatomy of the plant • Growth and function of plants • Plants and people 	CHEMICAL FORMULAS <ul style="list-style-type: none"> • Ionic charges • Electronegativity • Chemical bonds • Molecular shape 	LIGHT <ul style="list-style-type: none"> • Speed of light • Mirrors • Lenses • Models of light 	LIFE PAC 5
HUMAN ANATOMY AND PHYSIOLOGY <ul style="list-style-type: none"> • Digestive and excretory system • Respiratory and circulatory system • Skeletal and muscular system • Body control systems 	CHEMICAL REACTIONS <ul style="list-style-type: none"> • Detecting reactions • Energy changes • Reaction rates • Equilibriums 	STATIC ELECTRICITY <ul style="list-style-type: none"> • Nature of charges • Transfer of charges • Electric fields • Electric potential 	LIFE PAC 6
INHERITANCE <ul style="list-style-type: none"> • Gregor Mendel's experiments • Chromosomes and heredity • Molecular genetics • Human genetics 	EQUILIBRIUM SYSTEMS <ul style="list-style-type: none"> • Solutions • Solubility equilibriums • Acid-base equilibriums • Redox equilibriums 	CURRENT ELECTRICITY <ul style="list-style-type: none"> • Electromotive force • Electron flow • Resistance • Circuits 	LIFE PAC 7
CELL DIVISION & REPRODUCTION <ul style="list-style-type: none"> • Mitosis and meiosis • Asexual reproduction • Sexual reproduction • Plant reproduction 	HYDROCARBONS <ul style="list-style-type: none"> • Organic compounds • Carbon atoms • Carbon bonds • Saturated and unsaturated 	MAGNETISM <ul style="list-style-type: none"> • Fields • Forces • Electromagnetism • Electron beams 	LIFE PAC 8
ECOLOGY & ENERGY <ul style="list-style-type: none"> • Ecosystems • Communities and habitats • Pollution • Energy 	CARBON CHEMISTRY <ul style="list-style-type: none"> • Saturated and unsaturated • Reaction types • Oxygen groups • Nitrogen groups 	ATOMIC AND NUCLEAR PHYSICS <ul style="list-style-type: none"> • Electromagnetic radiation • Quantum theory • Nuclear theory • Nuclear reaction 	LIFE PAC 9
APPLICATIONS OF BIOLOGY <ul style="list-style-type: none"> • Principles of experimentation • Principles of reproduction • Principles of life • Principles of ecology 	ATOMS TO HYDROCARBONS <ul style="list-style-type: none"> • Atoms and molecules • Chemical bonding • Chemical systems • Organic chemistry 	KINEMATICS TO NUCLEAR PHYSICS <ul style="list-style-type: none"> • Mechanics • Wave motion • Electricity • Modern physics 	LIFE PAC 10

INSTRUCTIONS FOR SCIENCE

The LIFEPAC curriculum from grades two through twelve is structured so that the daily instructional material is written directly into the LIFEPACs. The student is encouraged to read and follow this instructional material in order to develop independent study habits. The teacher should introduce the LIFEPAC to the student, set a required completion schedule, complete teacher checks, be available for questions regarding both content and procedures, administer and grade tests, and develop additional learning activities as desired. Teachers working with several students may schedule their time so that students are assigned to a quiet work activity when it is necessary to spend instructional time with one particular student.

The Teacher Notes section of the Teacher's Guide lists the required or suggested materials for the LIFEPACs and provides additional learning activities for the students. The materials section refers only to LIFEPAC materials and does not include materials which may be needed for the additional activities. Additional learning activities provide a change from the daily school routine, encourage the student's interest in learning and may be used as a reward for good study habits.

If you have limited facilities and are not able to perform all the experiments contained in the LIFEPAC curriculum, the Science Project List for grades 3-12 may be a useful tool for you. This list prioritizes experiments into three categories: those essential to perform, those which should be performed as time and facilities permit, and those not essential for mastery of LIFEPACs. Of course, for complete understanding of concepts and student participation in the curriculum, all experiments should be performed whenever practical. Materials for the experiments are shown in Teacher Notes —Materials Needed.

I. MATERIALS NEEDED

two coins, shoebox, 60 radish seeds, 2 petri dishes, sand-peat mixture, medicine dropper, box, PTC testing paper

II. ADDITIONAL LEARNING ACTIVITIES

Section I Gregor Mendel's Experiments

1. Obtain mixed pea seeds, colored corn, and pictures of mixed puppy litters. Discuss the variation in types.
2. Start an aquarium with guppies. Observe the variation expressed in the offspring.
3. Write a report on the raising of registered dogs, cats, cattle, horses, or rabbits. Talk to the owners of animals and ask them how they chose their breeding stock.

Section II Chromosome Basis of Heredity

1. Put out ripe bananas and capture the fruit flies that arrive and hatch. Preserve them in clear mineral oil. Observe under a magnifying glass. Sketch and compare with the drawing on page 24.
2. Purchase or borrow prepared slides showing cell division in plant and animal cells. Whitefish eggs and onion skin are commonly used.
3. Write a report on color blindness, male baldness, or hemophilia. Include sketches of genotypes in your report.

Section III Molecular Genetics

1. Use the Readers' Guide and read about families who have difficulties because of damage to the parents' genes caused by chemicals or radiation. Many disabled children are born to parents who were exposed to damaging chemicals or radiation. Write a one-page report.

Section IV Human Genetics

1. Write a report on hemophilia. Include material on either the English or Russian ruling families who suffered from this affliction.
2. Make a copy of your family tree or pedigree. Include any inheritable conditions on your chart.
3. Learn about the public facilities in your area that care for persons afflicted with physical disorders, such as Down's syndrome.

Science 1003 Answer Key

- | | | | |
|------|---|------|---|
| 3.9 | chloroplasts, definite nuclear membrane, sexual reproduction | 3.23 | b |
| 3.10 | one-celled | 3.24 | a |
| 3.11 | granulated protein bodies where starch is made | 3.25 | red (Rhodophyta) |
| 3.12 | a large cell believed to be involved in nitrogen fixation and in breaking colony chain | 3.26 | a. red tides
b. poisonous (or alkali) |
| 3.13 | blue-green (or nostoc) | 3.27 | brown (or Phaeophyta) |
| 3.14 | blue-green | 3.28 | kelp (or brown alga) |
| 3.15 | a. green
b. blue-green
c. blue-green
d. green
e. blue-green
f. green
g. green algae | 3.29 | brown pigment |
| 3.16 | b | 3.30 | fire (or Pyrrophyta) |
| 3.17 | c | 3.31 | bark of trees |
| 3.18 | b | 3.32 | silicon dioxide or silica |
| 3.19 | c | 3.33 | Example:
thicken ice cream, marshmallows, paint, whipped topping |
| 3.20 | a | 3.34 | used in filters, insulating material, abrasive, polishing substance |
| 3.21 | c | 3.35 | Example:
green algae eaten by small fish eaten by shark |
| 3.22 | a | 3.36 | pollution |
| | | 3.37 | Irish moss, dulse |
| | | 3.38 | agar |
| | | 3.39 | teacher check |

SECTION FOUR

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|-----|--|------|--|
| .1 | Any order:
a. molds (jelly, fruits, bread)
b. yeasts (cheeses, baker's yeast)
c. mildew on leaves | 4.8 | Either order; Examples:
a. antibiotics
b. cause diseases |
| 4.2 | conidiophore | 4.9 | carbon dioxide |
| 4.3 | sporangium | 4.10 | teacher check |
| 4.4 | nonliving | 4.11 | Any order:
a. coccus
b. spirillum
c. bacillus |
| 4.5 | budding | 4.12 | Either order:
a. staining properties
b. nutrients used |
| 4.6 | Penicillium | | |
| 4.7 | a. chrysogenum
b. notatum | | |