

## PRE-KINDERGARTEN OBJECTIVES

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### A. INTEGRATED HEALTH

*The student will:*

1. list health service and safety providers such as firefighters, paramedics, police officers, dentists, nurses, physicians, etc...
2. describe the role of a health and/or safety provider.
3. discuss the importance of regular physical and dental check-ups.
4. demonstrate how to access health and safety services, i.e., dialing 911.
5. describe the procedure for obtaining common medication from parents or other authorized persons.
6. identify sources, causes, and health effects of pollution.
7. recognize the appropriate dress for weather conditions.
8. identify personal hygiene habits.
9. recognize bodies need for nutrients for energy and growth.
10. recognize the signs and symptoms of common illness.
11. identify the ways germs spread.
12. identify the ways to prevent the spread of disease.
13. compare and contrast communicable and non-communicable diseases.
14. distinguish between helpful and harmful substances.
15. identify behaviors that are safe and those that are harmful i.e., avoiding ingesting, inhaling and touching harmful substances.
16. identify school rules regarding medications and harmful substances.

### B. EARTH AND SPACE SCIENCE

*The student will:*

1. observe and use symbols to describe characteristics of the seasons.
2. observe and use symbols to record the weather of the day.
3. demonstrate appropriate dress for the weather using models.
4. discuss the difference between day and night.
5. discuss the planets, sun, moon, and stars.
6. use a map to locate various land forms.
7. discuss the water cycle.
8. discuss recycling as good use of resources and its relationship to stewardship.

## PRE-KINDERGARTEN OBJECTIVES

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### C. LIFE SCIENCE

*The student will:*

1. identify major parts of the body, i.e., face, parts of the face, hands, feet, head, back, shoulders, knees, toes, etc.
2. discuss the five senses.
3. experience and identify various sounds, smells, textures, and flavors.
4. recognize physical differences and similarities in human beings.
5. discuss skill development/stages of development, i.e., crawling to walking; drinking, holding a pencil/crayon appropriately, etc.
6. use observation to discuss plant growth.
7. name and identify the ways plants and animals are used by people.
8. introduce the understanding that living things need air, water, sun, and food.
9. discuss familiar animals.
10. discuss prehistoric animals.

### D. PHYSICAL SCIENCE

*The student will:*

1. discuss basic physical properties of matter, i.e., soft, hard, heavy, light, etc.
2. experience change in properties of matter, i.e., ice/snow melts.

### E. NATURE OF SCIENCE

*The student will:*

1. make predictions.
2. come to conclusions based on observations.
3. measure things relative to other things, i.e., larger-smaller, higher-lower, etc.
4. group objects based on common attributes.

# KINDERGARTEN OBJECTIVES

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## A. INTEGRATED HEALTH

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4. demonstrate how to access health and safety services, i.e., dialing 911.
5. describe the procedure for obtaining common medication from parents or other authorized persons.
6. identify sources, causes, and health effects of pollution.
7. recognize the appropriate dress for weather conditions.
8. identify personal hygiene habits.
9. recognize bodies need for nutrients for energy and growth.
10. recognize the signs and symptoms of common illness.
11. identify the ways germs spread.
12. identify the ways to prevent the spread of disease.
13. compare and contract communicable and non-communicable diseases.
14. distinguish between helpful and harmful substances.
15. identify behaviors that are safe and those that are harmful i.e., avoiding ingesting, inhaling and touching harmful substances.
16. identify school rules regarding medications and harmful substances.

## B. EARTH AND SPACE SCIENCE

*The student will:*

1. identify and describe the four seasons.
2. describe how the seasons affect living things.
3. select dress appropriate for the weather conditions.
4. discuss ways to conserve and/or recycle.
5. discuss types of pollution.

## KINDERGARTEN OBJECTIVES

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### C. LIFE SCIENCE

*The student will:*

1. give examples of living and non-living things.
2. identify characteristics of living and non-living things.
3. identify needs of living and non-living things.
4. identify own body parts: head, ears, eyes, mouth, nose, feet, toes, elbows, knees, etc.

### D. PHYSICAL SCIENCE

*The student will:*

1. identify physical properties of matter (ie...soft, hard, heavy, light).
2. identify the different physical properties of specific items.
3. demonstrate that physical properties can be changed ( ie...solids to liquids, liquids to solids).
4. compare the way various items respond to change agents such as increasing or decreasing temperature.

### E. NATURE OF SCIENCE

*The student will:*

1. make observations and predictions based on experiences.
2. explain how technology affects everyday life.
3. identify common elements of scientific investigations.
4. group objects based on common attributes.
5. list various forms and uses of technology.
6. Introduce and model making “if”-“then”-“because” prediction statements.

# 1<sup>ST</sup> GRADE OBJECTIVES

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## A. INTEGRATED HEALTH

*The student will:*

1. list health service and safety providers such as firefighters, paramedics, police officers, dentists, nurses, physicians, etc...
2. describe the role of a health and/or safety provider.
3. discuss the importance of regular physical and dental check-ups.
4. demonstrate how to access health and safety services, i.e., dialing 911.
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12. identify the ways to prevent the spread of disease.
13. compare and contract communicable and non-communicable diseases.
14. distinguish between helpful and harmful substances.
15. identify behaviors that are safe and those that are harmful i.e., avoiding ingesting, inhaling and touching harmful substances.
16. identify school rules regarding medications and harmful substances.

## B. EARTH AND SPACE SCIENCE

*The student will:*

1. identify and compare characteristics of the Earth's surface (land, water, air).
2. identify and compare uses of the Earth's surface (land, water, air).
3. identify the three layers of the Earth (core, mantle, crust).
4. communicate the characteristics of observable seasonal change.
5. describe how Earth's rotation and revolution determine night, day, and the length of the year.
6. identify the Earth as part of the solar system.
7. record observed data and graph weather patterns.
8. identify the sun, moon, and stars in relation to day.
9. Demonstrate and implement ways to recycle and/or conserve.
10. describe how pollution affects the Earth.

# 1<sup>ST</sup> GRADE OBJECTIVES

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## C. LIFE SCIENCE

*The student will:*

1. identify structures of plants and animals and how the structures help them live and grow (i.e... roots, stems, body parts)
2. list the needs of plants and animals.
3. compare and contrast characteristics and needs of plants and animals.
4. describe life cycles in plants and animals.
5. investigate properties using the five senses: touch, taste, hearing, smelling, and sight.

## D. PHYSICAL SCIENCE

*The student will:*

1. observe, classify, and measure matter.
2. demonstrate how to apply force and motion.
3. demonstrate the cause and effect of force and motion.
4. observe, classify, and measure types of energy.
5. observe and demonstrate that magnets can cause some things to move without being touched.

## E. NATURE OF SCIENCE

*The student will:*

1. investigate the use of standard and non-standard measurement.
2. investigate available forms of technology.
3. classify objects according to common properties that may include size, shape, and color.
4. participate in creating a group record of data observed.
5. make predictions based on observations and previous experiences.
6. frame simple scientific questions including the “if”, “then”, “because” statements.
7. participate effectively as a member of a team.

## 2<sup>ND</sup> GRADE OBJECTIVES

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### A. INTEGRATED HEALTH

*The student will:*

1. model healthy interactions with others in various situations.
2. identify changes in the body caused by strong emotions.
3. identify ways in which a person can prevent disease and illness.
4. list causes of disease such as found in congenital conditions, hazards/environment, or risk taking behavior.
5. explain the disease can be transmitted in various ways, i.e., blood-borne, physical contact, air-borne, etc...
6. identify immunity as the body's response to infection.
7. discuss treatment and reporting of illness and disease.
8. identify ways to maintain a functional level of health in the presence of disease or disability.
9. define "drug".
10. identify sources of drugs.
11. discuss the use and misuse of alcohol, tobacco, prescription and non-prescription drugs.
12. identify influences of peers and advertising on the use of alcohol, tobacco, and drugs and strategies for resisting these.
13. discuss the effects of second-hand smoke from tobacco.
14. identify changes that occur in human development from infancy to adulthood, emotionally, physically, socially and mentally.
15. list requirements for optimal growth and development.
16. discuss the relationship between nutrition, hygiene, exercise, risk-taking behavior and disease.
17. identify the strengths and weakness of person with development disabilities

### B. EARTH AND SPACE SCIENCE

*The student will:*

1. identify the planets of the solar system.
2. identify the four (4) major phases of the moon (new, waxing, waning, and full).
3. describe the relationships of the Earth, moon, and sun (orbit, rotation).
4. identify fresh water and salt water bodies.
5. identify types of pollution.
6. identify ways to recycle.
7. compare and contrast the four seasons.

## 2<sup>ND</sup> GRADE OBJECTIVES

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### C. LIFE SCIENCE

*The student will:*

1. describe a food chain.
2. describe basic needs of living things.
3. identify and locate major organs of the human body and describe their primary functions.

### D. PHYSICAL SCIENCE

*The student will:*

1. group common substances according to properties of matter (hard, soft, textured).
2. list sources of heat and light.
3. Investigate the effect of pushes and pulls in different directions on the resulting motion of objects.
4. Investigate the effect of pushes and pulls of different strengths on the resulting motion of objects.
5. construct an explanation for why an object subjected to multiple pushes and pulls might stay in one place or move.
6. analyze data to determine the relationship between friction and the motion of objects (e.g. objects sliding on various surfaces).
7. develop and share a design solution to reduce friction between two objects.
8. plan and carry out investigations of how the speed of an object determines changes in motion and or shape when the object touches or collides with another object.

### E. NATURE OF SCIENCE

*The student will:*

1. make predictions based on observations and previous experiences.
2. experiment to test predictions.
3. record information and data.
4. represent data on simple graphs.
5. draw conclusions from simple graphs.
6. demonstrate use of appropriate instruments to collect data.
7. use standard and non-standard measurement (actual and estimated).
8. distinguish between man-made and natural resources.

## 3<sup>RD</sup> GRADE OBJECTIVES

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### A. INTEGRATED HEALTH

*The student will:*

1. model healthy interactions with others in various situations.
2. identify changes in the body caused by strong emotions.
3. identify ways in which a person can prevent disease and illness.
4. list causes of disease such as found in congenital conditions, hazards/environment, or risk taking behavior.
5. explain the disease can be transmitted in various ways, i.e., blood-borne, physical contact, air-borne, etc...
6. identify immunity as the body's response to infection.
7. discuss treatment and reporting of illness and disease.
8. identify ways to maintain a functional level of health in the presence of disease or disability.
9. define "drug".
10. identify sources of drugs.
11. discuss the use and misuse of alcohol, tobacco, prescription and non-prescription drugs.
12. identify influences of peers and advertising on the use of alcohol, tobacco, and drugs and strategies for resisting these.
13. discuss the effects of second-hand smoke from tobacco.
14. identify changes that occur in human development from infancy to adulthood, emotionally, physically, socially and mentally.
15. list requirements for optimal growth and development.
16. discuss the relationship between nutrition, hygiene, exercise, risk-taking behavior and disease.
17. identify the strengths and weakness of person with development disabilities.

### B. EARTH AND SPACE SCIENCE

*The student will:*

1. describe the characteristics of the planets( inner rocky planets vs. outer gas giants).
2. illustrate the order of planets.
3. design and build a model of the solar system.
4. classify types of rocks (sedimentary, igneous, metamorphic).
5. explain formation of fossils.
6. describe the water cycle.
7. identify the types of clouds and discuss their relationship to weather.

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## 3<sup>RD</sup> GRADE OBJECTIVES

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8. identify basic weather instruments.
9. explain conservation of natural resources and how it impacts pollution and recycling issues.
10. analyze how solar energy affects life on Earth.

### C. LIFE SCIENCE

*The student will:*

1. identify and model how living things interact with their environment.
2. identify living things from both now and long ago including extinct species.
3. explain how environmental factors lead to species endangerment or extinction.
4. describe the oxygen cycle for plants and animals.
5. explain how plants use photosynthesis.
6. identify major systems of the human body (digestive, respiratory, circulatory and skeletal) .

### D. PHYSICAL SCIENCE

*The student will:*

1. describe changes in the states of matter.
2. describe items using physical properties.
3. collect data and keep written records on plant growth.
4. explain that all things are made up of smaller particles.
5. demonstrate the properties and behavior of magnets.
6. Identify the relationship between electricity and magnetism.
7. identify the effects of gravity on objects.
8. contrast common forms of energy (wind, light, fossil fuel).

### E. NATURE OF SCIENCE

*The student will:*

1. make predictions based on observations and previous experiences.
2. use scientific devices to collect data using metric measurements, i.e., thermometers, balances, rulers, etc.
3. follow a plan to use the Scientific method to conduct a scientific investigation that includes question (problem), hypothesis, gathering data, and drawing conclusions.
4. write a hypothesis using the “if, then, because” statement.
5. collect data and interpret and communicate results in a variety of ways, i.e., graphs, oral presentations, charts, etc.
6. explore occupations in science.

## 4<sup>TH</sup> GRADE OBJECTIVES

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### A. INTEGRATED HEALTH

*The student will:*

1. discuss how individuals, communities, and states cooperate to control environmental problems and maintain a healthy environment.
2. list the objectives of “health laws,” i.e. restaurant inspections, immunizations, etc...
3. describe the influence of society and science on personal health.
4. identify common sources of stress for children and ways to manage the stress.
5. compare and contrast the effect of heredity, culture, and family on personal health.
6. name the basic structure and functions of the human body systems.
7. discuss causes and prevention of disease i.e., practicing good personal hygiene, making healthy food choices, acknowledging the importance of immunization, and cooperating with regular health screenings.
8. identify the benefits of early detection of disease.
9. differentiate between the use of prescription and non-prescription drugs.
10. identify the influences that promote alcohol, tobacco and other drug use i.e., peer pressure, adult modeling, advertising, availability, cost etc...
11. identify strategies to avoid and/or resist, recognize and respond to negative social influences and pressure to use alcohol, tobacco or other drugs.
12. recognize high risk substance abuse situations that pose an immediate threat to oneself, or ones friends and family i.e., drunk driving, violent behaviors etc...
13. discuss how alcohol, tobacco and drugs affect people.
14. identify the changes that occur during puberty.
15. recognize the difference between individuals in the rate of change during puberty.
16. identify the strengths and weakness of persons with disabilities.

### B. EARTH AND SPACE SCIENCE

*The student will:*

1. identify and sequence the life cycle of a star.
2. collect/record weather data (temperature, precipitation, sky conditions).
3. describe the atmospheric conditions associated with particular weather patterns.
4. compare and contrast climate types.
5. compare and contrast geological features and their formations.
6. describe the impact of pollution on living organisms and their environment.
7. compare forms of environmental protection (water, soil, and air).

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## 4<sup>TH</sup> GRADE OBJECTIVES

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8. evaluate the conservation of natural resources in the United States.
9. discuss the effects that climates have on weather.
10. diagram the water cycle.

### C. LIFE SCIENCE

*The student will:*

1. classify organisms based on structural features.
2. diagram the flow of energy through a food chain.
3. use evidence and describe patterns of variation in a trait across individuals of the same kind of organism.
4. describe how an organism's behavior is related to the nature of that organism's environment.
5. describe photosynthesis and respiration.
6. describe an ecosystem.

### D. PHYSICAL SCIENCE

*The student will:*

1. define physical properties of matter.
2. define chemical properties of matter.
3. compare and contrast chemical and physical properties.
4. define smaller particles (atoms, molecules, etc.).
5. build a simple electric circuit.
6. compare and contrast sound and light waves.
7. name and describe the properties of light waves.
8. name and describe the properties of sound waves.
9. define and demonstrate friction and resistance.
10. describe how electricity flows through current.
11. describe the elements of simple and complex machines.

## 4<sup>TH</sup> GRADE OBJECTIVES

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### E. NATURE OF SCIENCE

*The student will:*

1. follow plans to conduct scientific investigation using the scientific method that includes question (problem), hypothesis, gathering data, drawing conclusions and observing appropriate safety measures.
2. use scientific devices (especially metric instruments) to collect data.
3. use data to recognize/identify cause and effect.
4. report results in a variety of ways (graphs, tables, drawings, etc.).
5. demonstrate the predictable “repeatability” of scientific investigations.
6. generalize from a model to scientific reality.

## 5<sup>TH</sup> GRADE OBJECTIVES

Page 1 of 3

### A. INTEGRATED HEALTH

*The student will:*

1. discuss how individuals, communities, and states cooperate to control environmental problems and maintain a healthy environment.
2. list the objectives of “health laws,” i.e. restaurant inspections, immunizations, etc...
3. describe the influence of society and science on personal health.
4. identify common sources of stress for children and ways to manage the stress.
5. compare and contrast the effect of heredity, culture, and family on personal health.
6. name the basic structure and functions of the human body systems.
7. discuss causes and prevention of disease i.e., practicing good personal hygiene, making healthy food choices, acknowledging the importance of immunization, and cooperating with regular health screenings.
8. identify the benefits of early detection of disease.
9. differentiate between the use of prescription and non-prescription drugs.
10. identify the influences that promote alcohol, tobacco and other drug use i.e., peer pressure, adult modeling, advertising, availability, cost etc...
11. identify strategies to avoid and/or resist, recognize and respond to negative social influences and pressure to use alcohol, tobacco or other drugs.
12. recognize high risk substance abuse situations that pose an immediate threat to oneself, or ones friends and family i.e., drunk driving, violent behaviors etc...
13. discuss how alcohol, tobacco and drugs affect people.
14. identify the changes that occur during puberty.
15. recognize the difference between individuals in the rate of change during puberty.
16. identify the strengths and weakness of persons with disabilities.

### B. EARTH AND SPACE SCIENCE

*The student will:*

1. explain how forecasts of extreme or inclement weather help to ensure safety.
2. explain the uses of weather instruments used to forecast weather.
3. relate air pressure to wind and weather.
4. describe the development of thunderstorms.
5. compare and contrast the characteristics of hurricanes and tornadoes.
6. identify how weather affects the process of weathering and erosion.
7. name, measure, and label stars.

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## 5<sup>TH</sup> GRADE OBJECTIVES

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8. identify comets, meteors, and asteroids.
9. explain the use of technology in describing the process of space exploration and colonization.
10. identify the rock cycle.
11. identify oxygen-carbon and nitrogen cycles.

### C. LIFE SCIENCE

*The student will:*

1. list the five (5) levels of body organization: cells, tissues, organs, organ systems, organism.
2. describe cells and list cell functions.
3. compare organelle functions to organ functions.
4. identify the skeletal and muscular systems and their functions.
5. identify digestive, excretion and reproductive systems, and their functions.
6. identify respiratory and circulatory systems of the human body.
7. discuss human immune system and health measures.
8. identify brain and sensory organs and describe their functions.

### D. PHYSICAL SCIENCE

*The student will:*

1. demonstrate density and solubility.
2. show how when force is applied to an object, the object will speed up, slow down, or change direction.
3. demonstrate the relationship between the strength of a force and its effect on an object.
4. examine and illustrate the properties and composition of matter.
5. identify major areas of the Periodic Table of the Elements.
6. discuss different types of heat and matter.
7. describe and demonstrate how heat and matter are measured.
8. compare and contrast kinetic energy and potential energy.
9. give examples that have kinetic and potential energy.
10. discuss how friction and resistance affect kinetic and potential energy.
11. identify and discuss energy resources.
12. identify and discuss energy resources.

## 5<sup>TH</sup> GRADE OBJECTIVES

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### E. NATURE OF SCIENCE

*The student will:*

1. follow plans to conduct scientific investigation using the scientific method that includes question (problem), hypothesis, gathering data, and drawing conclusions while observing appropriate safety measures.
2. examine data to recognize cause and effect.
3. interpret results of experiments conducted in class and/or at home.
4. explain the predictable “repeatability” of scientific investigation.
5. design charts, graphs, and tables in order to explain results.
6. use and identify scientific equipment, including but not limited to flasks, beakers, graduated cylinders, balances, etc...
7. apply metric units for mass, volume and length.
8. compare and contrast advantages and disadvantages of advances in technology.
9. recognize and discuss the role of ethics in the advancement of science and technology.

## 6<sup>TH</sup> GRADE OBJECTIVES

Page 1 of 4

### A. INTEGRATED HEALTH

*The student will:*

1. discuss how eating properly can reduce health risks.
2. evaluate methods for altering body composition.
3. explain appropriate methods to maintain, lose or gain weight according to individual needs and scientific research.
4. describe eating disorders that affect health negatively i.e., anorexia, bulimia, and overeating.
5. list the principles of food safety involved with food storage and preparation.
6. explain the six basic nutrients including proper daily amounts.
7. identify and evaluate factors that influence food selection, i.e., activity level, peers, advertising, age, money, convenience, culture, etc...
8. illustrate how health is influenced by interaction of body systems.
9. compare the cause and prevention of disease and other health problems including pathogens, nutrition, hygiene, risk-taking behavior, family history, and other factors.
10. expose teenage myths about infectious and communicable diseases.
11. compare and contrast communicable, chronic and degenerative disease processes.
12. discuss personal rights and responsibilities in the treatment of disease i.e., proper use of medication.
13. discuss the function of the body's immune system in treating disease.
14. describe conditions that put individuals at higher risk for substance abuse problems i.e., tolerance level, genetic predisposition, low frustration tolerance, substance abuse already in family.
15. identify factors involved in the development of drug dependency and early observable signs and symptoms i.e., tolerance level, drug seeking behavior, loss of control, denial.
16. define short term and long term consequences of abuse of alcohol, tobacco, and other drugs.
17. identify public policy approaches to substance abuse control and prevention.
18. list community resources that are available to help those with alcohol, tobacco and other drug problems.
19. describe how the human body changes with age.
20. compare and contrast female and male sexuality.
21. explain the process of conception, pre-natal development and growth.

## 6<sup>TH</sup> GRADE OBJECTIVES

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### B. EARTH AND SPACE SCIENCE

*The student will:*

1. explain how forecasts of extreme or inclement weather help to ensure safety.
2. explain the uses of weather instruments used to forecast weather.
3. relate air pressure to wind and weather.
4. describe the development of thunderstorms.
5. compare and contrast the characteristics of hurricanes and tornadoes.
6. identify how weather affects the process of weathering and erosion.
7. research the current space program and the latest findings within the universe.
8. describe the functions of the two types of telescopes.
9. compare and contrast satellites and space probes.
10. state the theory of plate tectonics.
11. describe the evidence that supports plate tectonics.
12. examine the effects of plate tectonics on the Earth (volcanoes, earthquakes, mountains).
13. compare and contrast the layers of the Earth.
14. identify glacier formations.
15. describe the different kinds of fossils and how they are formed.
16. implement a conservation program in the classroom/school.

### C. LIFE SCIENCE

*The student will:*

1. discuss the effect of genetic mutation in organisms on population and the community.
2. describe the role of mutation in generating diversity (evolution).
3. compare and contrast food webs within and between different ecosystems and predict consequences of disrupting one of the organisms in a food web.
4. describe the changes in population due to migration and geographic isolation.
5. explain the processes of succession and the characteristics of a climax community.
6. describe how climate and soil affect an ecosystem.
7. describe the effect on the growth of the human population on ecosystems.
8. discuss appropriate stewardship of the environment.
9. define extinction and identify its importance in biodiversity (when the environment changes, the adaptive characteristics of some species are insufficient to allow for their survival).

## 6<sup>TH</sup> GRADE OBJECTIVES

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### D. PHYSICAL SCIENCE

*The student will:*

1. demonstrate and relate concepts of boiling and melting points.
2. demonstrate and explain pH and conductivity.
3. explain that atoms are the smallest particle of a substance that retains its properties and can combine to form a molecule.
4. recognize various elements of the Periodic Table of the Elements.
5. distinguish between the molecular arrangement of solids, liquids and gasses.
6. demonstrate the law of conservation of energy.
7. compare and contrast conduction and radiation, and convection.
8. develop and diagram the concept of gravitational force.
9. examine Newton's laws.
10. develop the relationship between electric currents and magnetism.
11. explain how friction and resistance affect electric currents and magnetism.

### E. NATURE OF SCIENCE

*The student will:*

1. formulate and create a written plan to conduct a scientific investigation using the scientific method.
2. use appropriate tools, equipment, technology and measurement units to gather and organize data.
3. introduce controls and variables and their effect on the outcome of a scientific investigation.
4. interpret and discuss the results of experiments conducted in class and/or at home using graphs, tables, and charts.
5. examine data to recognize cause and effect.
6. interpret and evaluate data in order to formulate conclusions from scientific investigation.
7. describe how certain scientific ideas have evolved over time.
8. describe contributions to the advancement of science by people in different cultures and at different times in history.
9. relate the historic conditions that led to various scientific contributions.
10. describe how people use science and technology in their professions.
11. identify certain ethical standards relating to scientific research and investigation.

## 6<sup>TH</sup> GRADE OBJECTIVES

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### F. SCIENCE READING LITERACY

*The student will:*

1. cite specific textual evidence to support analysis of scientific and technical texts.
2. summarize the broad ideas and specific conclusions made in a text, basing the summary on textual information rather than on prior knowledge or opinions.
3. determine the meaning of key terms, symbols and domain specific vocabulary used in a text.
4. analyze how each major part of a text contributes to an understanding of the topic discussed in the text.
5. analyze the purpose of an experiment or explanation in a text, including defining the problem or question to be resolved.
6. integrate information provided by the words in a text with a version of the information expressed graphically (e.g., in a flow chart, diagram, model, graph, or table).
7. distinguish facts or reasoned judgments based on research findings from opinions.
8. compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic.
9. read informational text independently, proficiently, and fluently in the grades 6-8 text level.

### G. SCIENCE WRITING LITERACY

*The student will:*

1. write arguments focused on science content in which they:
  - a) Introduce a claim about a topic or issue, distinguish it from alternate or opposing claims, and organize the reasons, data, and evidence logically to support the claim.
  - b) Support the claim with logical reasoning and detailed, accurate data evidenced from investigations.
  - c) Use words and phrases as well as specific science vocabulary to make clear the relationships among claims, reasons, data, and evidence.
  - d) Sustain an objective style and tone.
  - e) Provide a concluding statement or section that follows logically from the arguments.
2. perform short focused research projects in response to question or problem and generate additional related questions that allow for multiple avenues of exploration.
3. gather relevant information from multiple print and digital sources using effectively tailored searches; assess the credibility and accuracy of each source; and quote or paraphrase the evidence, avoiding plagiarism and following a standard format for citation.

## 7<sup>TH</sup> GRADE OBJECTIVES

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### I. INTEGRATED HEALTH OBJECTIVES

*The student will:*

1. discuss how eating properly can reduce health risks.
2. evaluate methods for altering body composition.
3. explain appropriate methods to maintain, lose or gain weight according to individual needs and scientific research.
4. describe eating disorders that affect health negatively i.e., anorexia, bulimia, and overeating.
5. list the principles of food safety involved with food storage and preparation.
6. explain the six basic nutrients including proper daily amounts.
7. identify and evaluate factors that influence food selection, i.e., activity level, peers, advertising, age, money, convenience, culture, etc...
8. illustrate how health is influenced by interaction of body systems.
9. compare the cause and prevention of disease and other health problems including pathogens, nutrition, hygiene, risk-taking behavior, family history, and other factors.
10. expose teenage myths about infectious and communicable diseases.
11. compare and contrast communicable, chronic and degenerative disease processes.
12. discuss personal rights and responsibilities in the treatment of disease i.e., proper use of medication.
13. discuss the function of the body's immune system in treating disease.
14. describe conditions that put individuals at higher risk for substance abuse problems i.e., tolerance level, genetic predisposition, low frustration tolerance, substance abuse already in family.
15. identify factors involved in the development of drug dependency and early observable signs and symptoms i.e., tolerance level, drug seeking behavior, loss of control, denial.
16. define short term and long term consequences of abuse of alcohol, tobacco, and other drugs.
17. identify public policy approaches to substance abuse control and prevention.
18. list community resources that are available to help those with alcohol, tobacco and other drug problems.
19. describe how the human body changes with age.
20. compare and contrast female and male sexuality.
21. explain the process of conception, pre-natal development and growth.

### B. ORGANISMS

#### A. Characteristics

*The student will:*

1. identify living and non-living things.
2. explain the characteristics used to identify living and non-living things.

## 7<sup>TH</sup> GRADE OBJECTIVES

Page 2 of 8

### **B. Viruses**

*The student will:*

1. identify the characteristics of viruses.
2. describe how viruses reproduce.
3. compare and contrast latent and active viruses.
4. compare and contrast viruses and bacteria.

### **C. Classification**

*The student will:*

1. list kingdoms and their subdivisions.
2. explain how scientists name species.
3. identify organisms using binomial nomenclature.
4. demonstrate the use of a dichotomous identification key or a field guide to identify an organism.

### **D. Bacteria, Protista, Fungi**

*The student will:*

1. list characteristics of each group (prokaryote, eukaryote).
2. identify some common members of each group (protists, fungi, unicellular, multicellular).
3. observe and classify an organism.

### **E. Plants**

*The student will:*

1. discuss the distinguishing characteristics of plants.
2. distinguish between vascular and non-vascular plants.
3. explain the characteristics of types of vascular tissue (xylem, phloem, and cambium).
4. describe photosynthesis.
5. distinguish between angiosperms and gymnosperms.
6. compare photosynthesis to cellular respiration.
7. diagram the oxygen cycle.
8. diagram the nitrogen cycle.
9. identify the parts of a complete flower.
10. distinguish between fruits and seeds.
11. demonstrate the difference between monocots and dicots.
12. discuss characteristics and methods of plant reproduction.

## 7<sup>TH</sup> GRADE OBJECTIVES

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### F. Animals

*The student will:*

1. distinguish between vertebrates and invertebrates and give examples of each (echinoderms, arthropods, mollusks, coelenterates, sponges, worms).
2. compare and contrast cold-blooded and warm-blooded vertebrates and give examples of each.
3. identify basic characteristics of the classes of animals (mammals, birds, reptiles, amphibians, fish).

### II. CELL STRUCTURE AND FUNCTION

*The student will:*

1. explain cell theory.
2. describe cell organelles and explain their functions.
3. compare and contrast animal, plant, and bacteria cells.
4. describe the diffusion of molecules by osmosis and active transport.
5. define cellular respiration.
6. explain the difference between single cell and multi-cellular organisms.
7. recognize and define cells, tissues, organs, and organ systems as levels of organization.
8. discuss the process and phases of mitosis.
9. discuss the process and phases of meiosis.
10. compare and contrast sexual and asexual reproduction.

*(Note: Assistance in explaining the Catholic Church's stand on reproductive issues may be found in the Catechism of the Catholic Church. Excerpts on this subject are included in the Appendix of the Science Curriculum Guideline. Religion teachers, the principal, and the pastor may also be appropriate resources if questions arise on this topic.)*

### III. HEREDITY/GENETICS

*The student will:*

1. identify characteristics of chromosomes.
2. define heredity and describe how traits are passed from parent to offspring.
3. describe Mendel's experiments and list his results and conclusions.
4. experiment with determining probability using Punnett squares.
5. describe the functions of DNA, genes, and chromosomes.
6. define dominant, recessive, incomplete dominance, and co-dominance.

*(Continued on page 30)*

## 7<sup>TH</sup> GRADE OBJECTIVES

Page 4 of 8

7. compare and contrast homozygous and heterozygous traits.
8. discuss the pros and cons of inbreeding, hybridization, and selective breeding.
9. explain how eggs and sperm are produced by meiosis.
10. define and give two examples of X-chromosome linked traits.
11. differentiate between inborn and acquired traits and behaviors (nature versus nurture).
12. identify and explain several examples of genetic disease.
13. explain how mutations take place.
14. describe the transfer of information between generations.

### IV. HUMAN ANATOMY

#### Major Human Body Systems

##### 1. Skeletal

*The student will:*

1. describe the four functions of the human skeleton.
2. identify structures of a bone.
3. compare and contrast the types of joints.
4. identify bones of the skeletal system.

##### 2. Muscular

*The student will:*

1. identify major muscles of the muscular system.
2. compare and contrast three types of muscle tissue.

##### 3. Skin

*The student will:*

1. describe the two main layers of skin.
2. identify the five functions of skin.

##### 4. Digestive

*The student will:*

1. identify and explain the function of the organs in the digestive system.
2. illustrate the path of a particle of food through the system.
3. list the classes of nutrients and describe their uses.

**7<sup>TH</sup> GRADE OBJECTIVES**

Page 5 of 8

**5. Circulatory***The student will:*

1. identify and explain the functions of the circulatory system including heart, blood cells, blood vessels, lymph vessels, and tissue fluid.
2. illustrate the path of blood between the heart and lungs.

**6. Respiratory System***The student will:*

1. identify the parts and function of the respiratory system.
2. compare and contrast cellular respiration and the breathing process.
3. illustrate the pathway of the exchange of gasses in the human body.

**7. Excretory System***The student will:*

1. list the organs that excrete waste.
2. describe excretion of wastes by lungs, skin, and kidney.

**8. Reproductive System***The student will:*

1. identify the parts and functions of the reproductive system.

**9. Nervous System***The student will:*

1. identify the parts and functions of the nervous system including the three parts of the brain, the spinal cord, and nerve cells.
2. illustrate the path of an impulse.
3. illustrate the path of a reflex arc.
4. compare and contrast the central and peripheral nervous systems.
5. demonstrate the relationship between stimuli and responses.
6. regarding sight:
  - a) identify and define the parts of the eye.
  - b) explain how the eye processes light.
  - c) discuss some common abnormalities and how they affect sight.
7. regarding hearing:
  - a) identify and define the parts of the ear.
  - b) explain how the ear processes sound.

*(Continued on page 32)*

## 7<sup>TH</sup> GRADE OBJECTIVES

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- c) discuss some common abnormalities and how they affect hearing.
- 8. identify the parts of the tongue and how they process taste.
- 9. describe how the nose processes odors.
- 10. describe how sensations are transmitted from the skin to the brain.

### 9. Endocrine System

*The student will:*

- 1. identify the endocrine glands and discuss their function.

### 10. Reproductive System

*The student will:*

- 1. identify the parts and functions of the reproductive system.
- 2. illustrate the growth and development of a human being, from fertilization to birth.
- 3. discuss the Catholic Church's teachings on the beginning of life.

*(Note: Assistance in explaining the Catholic Church's stand on reproductive issues may be found in the Catechism of the Catholic Church. Excerpts on this subject are included in the Appendix of the Science Curriculum Guideline. Religion teachers, the principal, and the pastor may also be appropriate resources if questions arise on this topic.)*

### 11. Immune System:

*The student will:*

- 1. identify the parts and functions of the immune system.
- 2. identify t-cells, bone marrow, white blood cells, lymphatic system, etc.
- 3. discuss some internal causes of disease (viruses, bacteria, cell mutation).
- 4. discuss some external causes of disease (malnutrition, sanitation, food contamination, etc.).
- 5. discuss methods of disease prevention.

### 12. Interaction of the Human Body Systems

*The student will:*

- 1. discuss how the systems of the human body interact with one another.

## 7<sup>TH</sup> GRADE OBJECTIVES

Page 7 of 8

### V. NATURE OF SCIENCE

*The student will:*

1. formulate and create, using scientific method, a written plan to conduct scientific experiments.
2. use appropriate tools, equipment, technology, and measurement units (metric) to gather and organize data.
3. describe the function of the microscope.
4. name and locate the parts of a microscope.
5. demonstrate the purpose and proper use of a microscope.
6. incorporate controls and variables into scientific investigation.
7. interpret and discuss the results of experiments conducted in class and/or at home using graphs, tables, and charts.
8. formulate conclusions by interpreting and evaluating data from scientific investigations.
9. debate and/or defend certain ethical standards associated with scientific study.
10. incorporate official Catholic Church teachings that directly relate to ethical standards dealing with science (cloning, abortion, evolution, organ transplant, animal research and experimentation, etc.).

### VI. SCIENCE READING LITERACY

*The student will:*

1. cite specific textual evidence to support analysis of scientific and technical texts.
2. summarize the broad ideas and specific conclusions made in a text, basing the summary on textual information rather than on prior knowledge or opinions.
3. determine the meaning of key terms, symbols and domain specific vocabulary used in a text.
4. analyze how each major part of a text contributes to an understanding of the topic discussed in the text.
5. analyze the purpose of an experiment or explanation in a text, including defining the problem or question to be resolved.
6. integrate information provided by the words in a text with a version of the information expressed graphically (e.g., in a flow chart, diagram, model, graph, or table).
7. distinguish facts or reasoned judgments based on research findings from opinions.
8. compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic.
9. read informational text independently, proficiently, and fluently in the grades 6-8 text level.

## 7<sup>TH</sup> GRADE OBJECTIVES

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### VII. SCIENCE WRITING LITERACY

*The student will:*

1. write arguments focused on science content in which they:
  - a) Introduce a claim about a topic or issue, distinguish it from alternate or opposing claims, and organize the reasons, data, and evidence logically to support the claim.
  - b) support the claim with logical reasoning and detailed, accurate data evidenced from investigations.
  - c) use words and phrases as well as specific science vocabulary to make clear the relationships among claims, reasons, data, and evidence.
  - d) sustain an objective style and tone.
  - e) provide a concluding statement or section that follows logically from the arguments.
2. perform short focused research projects in response to question or problem and generate additional related questions that allow for multiple avenues of exploration.
3. gather relevant information from multiple print and digital sources using effectively tailored searches; assess the credibility and accuracy of each source; and quote or paraphrase the evidence, avoiding plagiarism and following a standard format for citation.

## 8<sup>TH</sup> GRADE OBJECTIVES

Page 1 of 7

### I. INTEGRATED HEALTH OBJECTIVES

*The student will:*

1. discuss how eating properly can reduce health risks.
2. evaluate methods for altering body composition.
3. explain appropriate methods to maintain, lose or gain weight according to individual needs and scientific research.
4. describe eating disorders that affect health negatively i.e., anorexia, bulimia, and overeating.
5. list the principles of food safety involved with food storage and preparation.
6. explain the six basic nutrients including proper daily amounts.
7. identify and evaluate factors that influence food selection, i.e., activity level, peers, advertising, age, money, convenience, culture, etc...
8. illustrate how health is influenced by interaction of body systems.
9. compare the cause and prevention of disease and other health problems including pathogens, nutrition, hygiene, risk-taking behavior, family history, and other factors.
10. expose teenage myths about infectious and communicable diseases.
11. compare and contrast communicable, chronic and degenerative disease processes.
12. discuss personal rights and responsibilities in the treatment of disease i.e., proper use of medication.
13. discuss the function of the body's immune system in treating disease.
14. describe conditions that put individuals at higher risk for substance abuse problems i.e., tolerance level, genetic predisposition, low frustration tolerance, substance abuse already in family.
15. identify factors involved in the development of drug dependency and early observable signs and symptoms i.e., tolerance level, drug seeking behavior, loss of control, denial.
16. define short term and long term consequences of abuse of alcohol, tobacco, and other drugs.
17. identify public policy approaches to substance abuse control and prevention.
18. list community resources that are available to help those with alcohol, tobacco and other drug problems.
19. describe how the human body changes with age.
20. compare and contrast female and male sexuality.
21. explain the process of conception, pre-natal development and growth.

## 8<sup>TH</sup> GRADE OBJECTIVES

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### II. MATTER

#### A. Physical Properties

*The student will*

1. identify physical properties of matter.

#### B. Chemical Properties

*The student will*

1. identify the chemical properties of substances.

#### C. Atomic Structure

*The student will:*

1. identify parts of an atom.
2. trace the history of atomic models.

#### D. Periodic Table of Elements

*The student will:*

1. define elements.
2. describe the development of the periodic table of elements.
3. explain how the elements are arranged in modern tables.
4. name the groups and periods in the Periodic Table.
5. name the characteristics of the Periodic Table.

#### E. Compounds and Mixtures

*The student will:*

1. define molecules, ions, compounds, and mixtures.
2. distinguish between compounds and mixtures.
3. give the chemical formula for a compound and identify the atoms in the compound.
4. compare and contrast the characteristics of suspensions and solutions.
5. compare and contrast colloids and emulsions.

#### F. Chemical Reactions

*The student will:*

1. prepare and evaluate chemical reactions.
2. describe the chemistry of hydrocarbons as they relate to biological and geological processes.

## 8<sup>TH</sup> GRADE OBJECTIVES

Page 3 of 7

### G. Chemical Equations

*The student will:*

1. identify and illustrate how an atom's valence electrons affect bonding.
2. compare and contrast ionic and covalent bonding.
3. identify the reactants and the products in a chemical equation.

### H. Acids/Bases

*The student will:*

1. list properties of acids and bases.
2. define and describe neutralization.
3. discuss the formulation of hydronium and hydroxide ions in water.
4. describe the relationship of the pH scale and acidity of solutions.

## III. EARTH'S SURFACE

### A. Minerals

*The student will*

1. identify properties and characteristics of minerals.

### B. Rocks

*The student will:*

1. differentiate between the different types of rocks.
2. identify the various types of igneous rocks.
3. identify the various types of metamorphic rocks.
4. identify the various types of sedimentary rocks.

### C. Water

*The student will:*

1. identify ground water structures.
2. identify the various types of materials that compose ocean water.
3. identify the different types of ocean currents.
4. identify the characteristics of waves.

## 8<sup>TH</sup> GRADE OBJECTIVES

Page 4 of 7

### D. Atmosphere

*The student will:*

1. examine the effects of Earth's revolution/rotation and physical characteristics on weather and climate.
2. identify the major gasses present in the Earth's atmosphere.
3. identify the layers of Earth's atmosphere.
4. explain the effects of the sun on the Earth's surface and its relationship to the atmosphere.

### E. Landforms

*The student will:*

1. identify the landforms.
2. identify the types of mountains.
3. classify the types of volcanoes.
4. differentiate between plains and plateaus.
5. interpret landforms using topographical maps.
6. describe the topography of the ocean.

## IV. SURFACE CHANGING PROCESSES

*The student will*

1. list the agents of erosion.

### A. Wind

*The student will:*

1. identify wind as an agent of erosion.
2. identify the kinds of surface changes made by wind deposits.

### B. Water

*The student will:*

1. identify the types of changes caused by river and rain erosion.
2. discuss the types of erosion caused by ground water.

### C. Glaciers

*The student will:*

1. distinguish between continental and alpine glaciers.
2. discuss the development of glacier features in relation to glacial movement.
3. identify the types of glacial deposits.

## 8<sup>TH</sup> GRADE OBJECTIVES

Page 5 of 7

### **D. Mountain Building**

*The student will*

1. compare and contrast mountain building processes.

### **E. Earth Movement**

*The student will:*

1. explain the cause of an earthquake.
2. identify the types of waves produced by earthquake activity.
3. analyze how seismic episodes give us clues to the composition of the Earth's interior.
4. examine the development of the theory of plate tectonics and the theory of continental drift.
5. examine and interpret evidence that supports the theory of continental drift.
6. compare and contrast the three types of tectonic plate boundaries.
7. compare and contrast types of faults.

## **V. INTERNAL CHANGING PROCESSES**

### **A. Geological Time Scale**

*The student will:*

1. explain the types of evidence used by geologists to measure the age of the Earth.
2. describe the basis for dividing the geological time scale into various subdivisions.
3. describe the major characteristics of each geological era as to their flora and fauna.

### **B. Electricity and Magnetism**

*The student will:*

1. list the properties of a magnet.
2. describe the Earth's magnetic field.
3. discuss the relationship between electricity and magnetism.

## **VI. EARTH'S RESOURCES**

### **A. Renewable and Non-Renewable Resources**

*The student will:*

1. identify the renewable natural resources of the Earth.
2. analyze ways that the renewable natural resources can be conserved.
3. identify the earth's non-renewable natural resources.

*(Continued on page 40)*

## 8<sup>TH</sup> GRADE OBJECTIVES

Page 6 of 7

- analyze ways that the non-renewable natural resources can be conserved.

### **B. Energy**

*The student will:*

- identify the Earth's energy resources.
- discuss the use of exploration for resource development.
- discuss the pros and cons of resource development.
- describe the use of models in the study of the Earth.

### **VII. ASTRONOMY**

*The student will:*

- describe the development and life stages of the stars.
- describe the different types of galaxies.
- compare and contrast the universe formation theories.

### **VIII. NATURE OF SCIENCE**

*The student will:*

- formulate and create a written plan to conduct a scientific investigation using the scientific method.
- use appropriate tools, equipment, technology, and measurement units (metric) to gather and organize data.
- incorporate controls and variables into scientific investigation.
- interpret and discuss the results of experiments conducted in class and/or at home using graphs, tables, and charts.
- formulate conclusions by interpreting and evaluating data from scientific investigations.
- debate and/or defend certain ethical standards associated with scientific study.
- incorporate official Catholic Church teachings that directly relate to ethical standards dealing with science (equitable use of resources among peoples of the world, faith-based understanding of creation, etc.).

### **IX. SCIENCE READING LITERACY**

*The student will:*

- cite specific textual evidence to support analysis of scientific and technical texts.
- summarize the broad ideas and specific conclusions made in a text, basing the summary on textual information rather than on prior knowledge or opinions.
- determine the meaning of key terms, symbols and domain specific vocabulary used in a text.

*(Continued on page 41)*

## 8<sup>TH</sup> GRADE OBJECTIVES

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4. analyze how each major part of a text contributes to an understanding of the topic discussed in the text.
5. analyze the purpose of an experiment or explanation in a text, including defining the problem or question to be resolved.
6. integrate information provided by the words in a text with a version of the information expressed graphically (e.g., in a flow chart, diagram, model, graph, or table).
7. distinguish facts or reasoned judgments based on research findings from opinions.
8. compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic.
9. read informational text independently, proficiently, and fluently in the grades 6-8 text level.

### X. SCIENCE WRITING LITERACY

*The student will:*

1. write arguments focused on science content in which they:
  - a) introduce a claim about a topic or issue, distinguish it from alternate or opposing claims, and organize the reasons, data, and evidence logically to support the claim.
  - b) support the claim with logical reasoning and detailed, accurate data evidenced from investigations.
  - c) use words and phrases as well as specific science vocabulary to make clear the relationships among claims, reasons, data, and evidence.
  - d) sustain an objective style and tone.
  - e) provide a concluding statement or section that follows logically from the arguments.
2. perform short focused research projects in response to question or problem and generate additional related questions that allow for multiple avenues of exploration.
3. gather relevant information from multiple print and digital sources using effectively tailored searches; assess the credibility and accuracy of each source; and quote or paraphrase the evidence, avoiding plagiarism and following a standard format for citation.

## HIGH SCHOOL OBJECTIVES

### Biology Page 1 of 5

#### I. INTRODUCTION TO BIOLOGY

*The student will:*

1. define Biology and some of the major fields of Biology.
2. explain the characteristics of living organisms.
3. explain the scientific method.
4. identify the units of SI measurement.
5. identify and explain the parts of the light microscope.
6. demonstrate the proper usage of the microscope and preparation of wet mounts and staining.

#### II. BIOLOGY AND CHEMISTRY

*The student will:*

1. identify the main elements necessary for living organisms (e.g., C, H, O, N, S, Fe, P, Mg, etc.).
2. identify and explain the chemical structure of carbohydrates, lipids, proteins, and nucleic acids.

#### III. CELL STRUCTURE AND FUNCTION

*The student will:*

1. describe the structure and function of cells and cell organelles.
2. explain levels of organization of living organisms.
3. explain the fluid mosaic model of the plasma membrane.
4. compare diffusion, osmosis, and active transport.
5. describe the use of cell energy and the ADP-ATP cycle.
6. explain how the cell uses enzymes in chemical reactions.
7. describe the chemical process of photosynthesis, including materials, products, and steps of the process.
8. describe the process of respiration, including the materials, products, and steps of the process.
9. compare aerobic and anaerobic respiration.
10. compare and differentiate between the processes of mitosis, cell cycle, and meiosis.
11. describe the process of mitosis and the cell cycle.
12. distinguish between sexual and asexual reproduction.

## HIGH SCHOOL OBJECTIVES

### Biology Page 2 of 5

#### IV. GENETICS

The student will:

1. describe the laws of genetics described by Mendel.
2. demonstrate the use of the Punnett Square for monohybrid and dihybrid crosses.
3. explain the inheritance of sex-linked traits, incomplete dominance, multiple alleles and polygenic inheritance.
4. discuss how the laws of genetics apply to common human, plant, and animal genetic traits.

#### V. NUCLEIC ACIDS

The student will:

1. describe the relationship of genes and chromosomes.
2. explain the Watson-Crick model of the structure of DNA.
3. explain the process of DNA replication.
4. explain the structure of RNA and how it relates to protein synthesis.
5. describe how mutations occur and explain their causes and effects.
6. discuss current advances in DNA technology, including recombinant DNA, DNA cloning, DNA fingerprinting, gene therapy, human genome project, etc. Include Catholic Church teachings and ethical implications.

*(Note: Assistance in explaining the Catholic Church's stand on reproductive issues may be found in the Catechism of the Catholic Church. Excerpts on this subject are included in the Appendix of the Science Curriculum Guideline. Religion teachers, the principal, and the pastor may also be appropriate resources if questions arise on this topic.)*

#### VI. EVOLUTION

The student will:

1. compare spontaneous generation and biogenesis.
2. compare the theories of evolution proposed by Lamarck and Darwin.
3. discuss the evidence for evolution.
4. explain and compare genetic equilibrium, methods of disruption of genetic equilibrium, and speciation.
5. describe the fossil evidence for human evolution.
6. describe the current theories for human evolution.

## HIGH SCHOOL OBJECTIVES

### Biology Page 3 of 5

#### VI. ECOLOGY

*The student will:*

1. distinguish between communities, populations, ecosystems, and biomes.
2. describe the major biomes.
3. compare the interactions of organisms with the biotic and abiotic environment.
4. analyze the interactions that cause changes in populations and their effects in the ecosystem.

#### VII. TAXONOMY

*The student will:*

1. describe the classification system of living organisms.
2. compare the use of a phylogentic tree and a cladogram.
3. use a classification key to identify sample organisms (archaebacteria, eubacteria, protists, fungi, and viruses).
4. explain how changes in technology result in changes in the classification system.

#### IX. PROTISTA, FUNGI, BACTERIA/VIRUSES

*The student will:*

1. explain the characteristics and diversity of the organisms in these kingdoms.
2. identify common organisms of this group.
3. describe the relationship and importance of this group to other living organisms.

#### X. KINGDOM PLANTAE

*The student will:*

1. explain the characteristics and diversity of this kingdom.
2. identify common organisms of this group.
3. distinguish between vascular and non-vascular plants.
4. describe the characteristics of seed plants.
5. describe the function of roots, stems, and leaves in vascular plants.
6. explain the functions of seeds, cones, fruits, and flowers in reproduction.
7. describe the relationship and importance of this group to other living organisms.

## HIGH SCHOOL OBJECTIVES

### Biology Page 4 of 5

#### XI. KINGDOM ANIMALIA

*The student will:*

1. explain the characteristics and diversity of the animal kingdom and the major phyla of animals.
2. identify common organisms of each phylum.
3. compare the evolutionary advantages of each phylum (e.g., symmetry, development of coelom, germ layers, cephalization, etc.).
4. compare vertebrates and invertebrates.
5. describe the relationship and importance of each phylum to other living organisms.

#### XII. HUMAN ANATOMY AND PHYSIOLOGY

*The student will:*

1. identify the systems of the human body and the functions of each system.
2. identify the major organs of each system of the body.
3. describe the function of the major organs of the body.
4. describe the food groups and the need for a balanced diet.
5. identify causes of infectious diseases and the body's immune response.
6. compare the structure and function of the male and female reproductive systems.
7. describe the process of fertilization and development of the human embryo.
8. describe the process of birth.

### Honors Biology

Offering Honors Level courses in science indicates that the regular curricular objectives will be covered in more depth and, in some cases, with additional topics. Typically, laboratory work in such courses is more sophisticated. Advanced Placement (AP) science courses may also be offered. The curriculum guidelines for these courses are defined and strictly monitored by other sources. Students enrolled in these courses should be prepared to take the appropriate AP Exam at the end of the course. Science electives may be offered based on student interest and faculty availability.

#### SCIENCE LITERACY READING OBJECTIVES

1. cite specific textual evidence to support analysis of scientific and technical texts. Including analysis of important distinctions the author makes between ideas or pieces of information.
2. summarize complex information or ideas presented in a text, paraphrasing it in simpler but still accurate terms.
3. follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the causes of the specific results based on information from the text.

*(Continued on page 46)*

## HIGH SCHOOL OBJECTIVES

### Biology Page 5 of 5

4. determine the meaning of key terms, symbols, and scientific vocabulary used in the text, attending to the precise meaning of terms as they are used in particular scientific and technical contexts.
5. analyze the relationships among concepts in a text.
6. analyze the scope and purpose of an experiment or explanation and determine which related issues remain unresolved or uncertain.
7. integrate and synthesize quantitative or technical information presented graphically with other information text.
8. assess the extent to which the evidence in text supports a scientific claim or a recommendation for solving a technical problem.
9. compare experimental findings presented in a text to information found in other sources, noting when the findings support or contradict previous explanations or accounts.
10. read informational text independently, proficiently and at appropriate grade level.

### SCIENCE LITERACY WRITING OBJECTIVES

1. write arguments on scientific content which:
  - a) introduce a precise or substantive claim, distinguish it from alternate or opposing claims, and provides an organization that establishes clear relationships among the claim, reasons, data, and evidence.
  - b) develop a claim thoroughly and fairly with logical reasoning, supplying the most relevant data and evidence acquired in scientifically acceptable form.
  - c) use precise words phrases as well as scientific vocabulary to make clear relationships between claims and reasons and between reasons and the data and evidence.
  - d) sustain an objective style and tone while attending to the norms and conventions of scientific writing.
  - e) provide a concluding statement or section that follows logically from the argument.
2. perform short, focused research projects and more sustained research; synthesize multiple authoritative sources on a subject to answer a question or solve a problem.
3. gather relevant information from multiple print and digital sources; assess its credibility and accuracy and its usefulness in terms of purpose, task, and audience; and integrate selected information into the text, avoiding overreliance on any one source, avoiding plagiarism, and following a standard format citation.
4. write in response to informational sources, drawing on textual evidence to support and analysis and reflection as well as to describe what they have learned.

## HIGH SCHOOL OBJECTIVES

### Chemistry Page 1 of 3

#### I. MATTER

##### A. Structure and Properties of Atoms, Molecules, and Compounds

*The student will:*

1. explain the organization of matter to include atomic structure, periodic law, and chemical bonding.
2. differentiate between empirical and molecular formulas.
3. write chemical formulas.
4. write and explain the differences between the types of chemical reactions (i.e., synthesis, decomposition, single displacement, double displacement, and combustion reactions).
5. explain how chemical formulas are used in describing chemical equations and reactions.
6. explain the mechanisms of chemical reactions.
7. explain the physical and chemical properties of solids, liquids, and gases.
8. explain the differences between organic and inorganic chemistry.
9. explain the use of Spectroscopy to determine the chemical structure of a substance.
10. list the three basic assumptions of the Kinetic Theory of Matter.
11. describe the characteristics of polar and the non-polar combination.
12. describe and identify factors that affect the rate of solution.

##### B. Interaction of Matter

*The student will:*

1. explain the effect of ions in solutions as they effect pH.
2. demonstrate a knowledge of chemical properties of acids and bases.
3. explain chemical equilibrium.
4. demonstrate an understanding of gas laws (Charles, Boyles, etc.) and stoichiometry (including moles) by working related problems.

#### II. ENERGY

*The student will:*

1. differentiate between the meaning of energy, force, work and heat (thermo chemistry).
2. describe the classes and forces of energy and energy changes.
3. solve simple calorimetric problems.

## HIGH SCHOOL OBJECTIVES

### Chemistry Page 2 of 3

#### IV. SCIENTIFIC PROCESS, INVESTIGATION AND DESIGN

##### A. Nature of Scientific Knowledge

*The student will:*

1. distinguish between pure and applied science.
2. create and defend a written plan of action for scientific investigation.
3. identify sources of error within an investigation.
4. recognize and analyze alternative explanations.
5. identify and/or demonstrate use of lab equipment.
6. use safety procedures in lab.

##### B. Scientific Measurement

*The student will:*

1. use standard SI units in collecting and processing data.
2. use charts, graphs, etc., to explain and report observations and data collected.

## Honors Chemistry

Offering Honors Level courses in science indicates that the regular curricular objectives will be covered in more depth and, in some cases, with additional topics. Typically, laboratory work in such courses is more sophisticated. Advanced Placement (AP) science courses may also be offered. The curriculum guidelines for these courses are defined and strictly monitored by other sources. Students enrolled in these courses should be prepared to take the appropriate AP Exam at the end of the course. Science electives may be offered based on student interest and faculty availability.

#### SCIENCE LITERACY READING OBJECTIVES

1. cite specific textual evidence to support analysis of scientific and technical texts. Including analysis of important distinctions the author makes between ideas or pieces of information.
2. summarize complex information or ideas presented in a text, paraphrasing it in simpler but still accurate terms.
3. follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the causes of the specific results based on information from the text.
4. determine the meaning of key terms, symbols, and scientific vocabulary used in the text, attending to the precise meaning of terms as they are used in particular scientific and technical contexts.
5. analyze the relationships among concepts in a text.
6. analyze the scope and purpose of an experiment or explanation and determine which related issues remain unresolved or uncertain.

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## HIGH SCHOOL OBJECTIVES

### Chemistry Page 3 of 3

7. integrate and synthesize quantitative or technical information presented graphically with other information text.
8. assess the extent to which the evidence in text supports a scientific claim or a recommendation for solving a technical problem.
9. compare experimental findings presented in a text to information found in other sources, noting when the findings support or contradict previous explanations or accounts.
10. read informational text independently, proficiently and at appropriate grade level.

### SCIENCE LITERACY WRITING OBJECTIVES

1. write arguments on scientific content which:
  - a) introduce a precise or substantive claim, distinguish it from alternate or opposing claims, and provides an organization that establishes clear relationships among the claim, reasons, data, and evidence.
  - b) develop a claim thoroughly and fairly with logical reasoning, supplying the most relevant data and evidence acquired in scientifically acceptable form.
  - c) use precise words phrases as well as scientific vocabulary to make clear relationships between claims and reasons and between reasons and the data and evidence.
  - d) sustain an objective style and tone while attending to the norms and conventions of scientific writing.
  - e) provide a concluding statement or section that follows logically from the argument.
2. perform short, focused research projects and more sustained research; synthesize multiple authoritative sources on a subject to answer a question or solve a problem.
3. gather relevant information from multiple print and digital sources; assess its credibility and accuracy and its usefulness in terms of purpose, task, and audience; and integrate selected information into the text, avoiding overreliance on any one source, avoiding plagiarism, and following a standard format citation.
4. write in response to informational sources, drawing on textual evidence to support and analysis and reflection as well as to describe what they have learned.

# HIGH SCHOOL OBJECTIVES

## Physics Page 1 of 6

### I. INTRODUCTION

#### A. Measurement, Units, and Conversion

*The student will:*

1. demonstrate the ability to measure various quantities in the lab with the appropriate devices and convert these measured quantities to SI units.

#### B. Order of Magnitude and Rapid Estimating

*The student will:*

1. use order of magnitude to quickly estimate values and, also, check his/her work for accuracy.

#### C. Laboratory Techniques

*The student will:*

1. apply the scientific method using inductive and deductive reasoning and intuitive and mathematical analysis to set up and solve, in the lab, problems in physics.

### II. DYNAMICS AND STATICS

#### A. Straight Line Motion – Velocity and Acceleration

*The student will:*

1. explain the difference between velocity and speed.
2. explain the difference between distance and displacement.
3. demonstrate the solution of acceleration problems.
4. solve various types of vector velocity problems.
5. demonstrate the relationship between velocity and acceleration of a free falling object.
6. apply the equations of velocity and acceleration to two-dimensional problems using projectile motion.

#### B. Gravity and Falling Objects

*The student will:*

1. explain Newton's Law of Motion and Gravitation by solving problems related to them.
2. apply Newton's Law of Motion and Gravitation to problems of satellite and planetary motion.
3. give examples of phenomena that demonstrate Newton's Laws.
4. show how Einstein amended Newton's 2nd Law of Motion to account for the space-time continuum by the Theory of Relativity.

## HIGH SCHOOL OBJECTIVES

### Physics Page 2 of 6

#### C. Forces, Free Body Diagrams

The student will:

1. demonstrate the solution of composition of force problems by mathematics and with the use of lab equipment.
2. demonstrate lab and mathematic methods to solve resolution of force problems.

#### D. Vectors and Projectile Motion

The student will:

1. calculate the component of a vector along a specified axis, or resolve a vector into components along two specified mutually perpendicular axes.
2. analyze the motion of a projectile that is projected above level ground with a specified initial velocity.

#### E. Friction and Simple Machines

The student will:

1. explain and demonstrate the determination of frictional forces.
2. compare and contrast six simple machines in terms of complexity and determine the efficiency of representative examples.

#### F. Work, Power and Energy

The student will:

1. understand the work-energy theorem and use it for the case of motion in one dimension.
2. understand and use potential, kinetic energy.
3. apply conservation of energy in analyzing the motion of bodies.
4. calculate the power required to maintain the motion of a body with constant acceleration.

#### G. Momentum and Collisions

The student will:

1. explain the Law of Conservation of Momentum.
2. determine solutions to energy and momentum problems including those involving collisions.

#### H. Rotational Motion and Torque

The student will:

1. differentiate between centripetal and centrifugal force.
2. explain and demonstrate the solution to vertical and horizontal circular motion problems.
3. demonstrate the solution of angular acceleration and rotational inertia problems using lab equipment.

## HIGH SCHOOL OBJECTIVES

### Physics Page 3 of 6

#### III. FLUIDS

##### A. Pressure and Pascal's Principle

The student will:

1. explain Pascal's Principle.
2. compute pressure using Pascal's Principle.

##### B. Continuity and Bernoulli's Equation

The student will:

1. demonstrate and apply Bernoulli's equation.

#### IV. WAVES, SOUND AND LIGHT

##### A. Simple Harmonic Motion

The student will:

1. identify periodic and harmonic motion and cite several examples of each.
2. design an experiment to demonstrate periodic motion.
3. describe how various waves are formed, propagated, and altered in various media.
4. explain and demonstrate wave properties using laboratory equipment.

##### B. Sources of Sound, Intensity, The Doppler Effect, and Ultrasound

The student will:

1. describe the production, properties, and transmission of waves in the sonic spectrum.
2. describe and solve problems related to the measurement of sound intensity and pitch.
3. recognize examples of the Doppler effect and calculate changes in frequency due to motion.
4. demonstrate the cause and effect of resonance and show how various harmonics of the musical scales are produced from standing waves sounded on strings and tubes.

##### C. Light, Reflection, Mirrors, Snell's Law and Lenses

The student will:

1. explain the historical development of the theory of light.
2. label the components of the electromagnetic spectrum and list their properties.
3. explain the laws of reflection and their relationship to the formation of images by plane mirrors.
4. compare the relationships between optical refraction and the wave character of light and between optical refraction and speed of light.

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## HIGH SCHOOL OBJECTIVES

### Physics Page 4 of 6

5. solve various types of wave-speed, wavelength, and frequency problems both by lab methods and by calculation.
6. using ray diagrams and lens equations calculate the distance and size of an image for an object projected through a lens.
7. compare the particle theory with the wave theory of light using demonstrations such as the pinhole camera and the formation of shadows, and properties such as diffraction, interference, and polarization.

#### **D. Huygens' Principle, Interference, Polarization and the Electromagnetic Spectrum**

*The student will:*

1. identify and discuss Huygens' Principle.
2. calculate interference of various substances.
3. compare and contrast the light spectrum and electro magnetic spectrum.

### **V. ELECTRO MAGNETISM**

#### **A. Electrostatics**

*The student will:*

1. identify the types of electrostatic charges, methods of storage, and transmission and the forces generated.
2. solve problems involving potential difference force, capacitance, and quality of charge.
3. demonstrate the existence of electrostatic forces using laboratory equipment.
4. discuss the effect of Coulomb's Law.

#### **B. Direct Current**

*The student will:*

1. demonstrate how direct current charges are formed, stored, transmitted, and used.
2. explain how electric fields are generated and propagated.
3. analyze direct current circuits using ammeter and voltmeter in the lab.
4. calculate the important aspects of direct currents using Ohm's Law.
5. demonstrate the use of Kirchhoff's Rules.
6. solve problems in electricity involving heat, energy, and electrical power.

#### **C. Magnetism**

*The student will:*

1. explain and demonstrate the causes and characteristics of magnetism.
2. demonstrate the relationship between magnetism and electricity using lab equipment.
3. demonstrate knowledge of electromagnetic devices and equipment such as CRT's, transformers, inductors, oscillation and radio transmission, and semiconductors.

## HIGH SCHOOL OBJECTIVES

### Physics Page 5 of 6

#### D. Alternating Current

The student will:

1. explain how alternating current charges are formed by electromagnetic induction.
2. discuss and apply Levy's Law.

### Honors Physics

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Honors Physics includes:

#### VI. QUANTUM MECHANICS

The student will:

1. identify, explain, and apply,
  - a) the quantum theory of light.
  - b) the Photon Theory.
  - c) Photoelectric effect.
  - d) lasers and holography.
2. compare, contrast, and explain the appropriate use of each
  - a) solids
  - b) semiconductors
  - c) transistors

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## HIGH SCHOOL OBJECTIVES

### Physics Page 6 of 6

5. analyze the relationships among concepts in a text.
6. analyze the scope and purpose of an experiment or explanation and determine which related issues remain unresolved or uncertain.
7. integrate and synthesize quantitative or technical information presented graphically with other information text.
8. assess the extent to which the evidence in text supports a scientific claim or a recommendation for solving a technical problem.
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