

# **Diocese of Jefferson City Science Standards**

The spirit of science education described in this document is based on the premise that science is an evolving, active process within the creation of God. To do science, students will be actively engaged in posing questions, designing experiments to gain information related to their questions, and communicating their ideas within the classroom “community of scientists.” Experiencing science that is inquiry driven enables students to become immersed in scientific ways of thinking that are both distinct and complimentary to other content areas. The process of inquiry is central to science learning and builds a foundation that will enable students to experience science as a dynamic, human enterprise. It is in this spirit of inquiry that students will experience the simplicity, the great diversity, the interdependence of the physical and biotic aspects of nature, and the enormity of God’s plan.

## **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

## **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

## **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

## **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

## **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

## **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.

**Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

**Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

**Curriculum Connection Codes**

<b>AR</b>	ART	<b>MU</b>	MUSIC
<b>EE</b>	ENVIRONMENTAL EDUCATION	<b>PE</b>	PHYSICAL EDUCATION
<b>FL</b>	FOREIGN LANGUAGE	<b>RE</b>	RELIGION
<b>HE</b>	HEALTH	<b>SC</b>	SCIENCE
<b>IT</b>	INFORMATION TECHNOLOGY	<b>SR</b>	COMMUNITY SERVICE
<b>LA</b>	LANGUAGE ARTS	<b>SS</b>	SOCIAL STUDIES
<b>MA</b>	MATH		

**Note** – These grade level performance standards are listed developmentally. However, each school is uniquely organized. Therefore, a specific grade level standard may not be addressed at the grade indicated, but will be addressed within a 4 year time span. (K-4, 5-8).

# **GRADE 4 EXIT LEVEL SCIENCE PERFORMANCE STANDARDS**

## **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

By the end of Grade **Four**, students will:

1. When conducting science investigations, ask and answer questions that will help decide the general areas of science being addressed.
2. When faced with a science-related problem, decide what evidence, models, or explanations previously studied can be used to better understand what is happening now.
3. When investigating a science-related problem, decide what data can be collected to determine the most useful explanation.
4. When studying science-related problems, decide which of the science themes are important.
5. When studying a science-related problem, decide what changes over time are occurring or have occurred.

## **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

By the end of Grade **Four**, students will:

1. Use encyclopedias, source books, texts, computers, teachers, parents, other adults, journals, popular press, and various other sources, to help answer science-related questions and plan investigations.
2. Acquire information about people who have contributed to the development of major ideas in the sciences and learn about the cultures, in which these people lived and worked.
3. Show how the major developments of scientific knowledge in the earth and space, life and environmental and physical sciences have changed over time.

## **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

By the end of Grade **Four**, students will:

1. Use the vocabulary of the unifying themes to ask questions about objects, organisms, and events being studied.
2. Use the science content being learned to ask questions, plan investigations, make observations, make predictions, and offer explanations.
3. Select multiple sources of information to help answer questions selected for classroom investigations.

4. Use simple science equipment safely and effectively, including rulers, balances, graduated cylinders, hand lenses, thermometers, and computers, to collect data relevant to questions and investigations.
5. Use data they have collected to develop explanations and answer questions generated by investigations.
6. Communicate the results of their investigations in ways their audiences will understand by using charts, graphs, drawings, written descriptions, and various other means, to display their answers.
7. Support their conclusions with logical arguments.
8. Ask additional questions that might help focus or further an investigation.

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

By the end of Grade **Four**, students will:

#### **Properties of Earth Materials**

1. Understand that objects are made of more than one substance by observing, describing and measuring the properties of earth materials, including properties of size, weight, shape, color, temperature, and the ability to react with other substances.
2. Group and/or classify objects and substances based on the properties of earth materials.
3. Understand that substances can exist in different states: solid, liquid and gas.
4. Observe and describe changes in form, temperature, color, speed, and direction of objects and construct explanations for the changes.
5. Construct simple models of what is happening to materials and substances undergoing change, using simple instruments or tools to aid observations and collect data.

#### **Position and Motion of Objects**

6. Observe and describe physical events in objects at rest or in motion.
7. Observe and describe physical events involving objects and develop record-keeping systems to follow these events by measuring and describing changes in their properties, including position relative to another object, motion over time, and position due to force.

#### **Heat, Light, Electricity, and Magnetism**

8. Ask questions and make observations to discover the differences between substances that can be touched (matter) and substances that cannot be touched (forms of energy, light, heat, electricity, sound and magnetism).

### **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

By the end of Grade **Four**, students will:

#### **Properties of Earth Materials**

1. Investigate that earth materials are composed of rocks and soils and correctly use the vocabulary for rocks, minerals, and soils during these investigations.
2. Show that earth materials have different physical and chemical properties, including the properties of soils found in Missouri.
3. Develop descriptions of the land and water masses of the earth and Missouri's rocks and minerals, using the common vocabulary of earth and space science.

### **Objects in the Sky**

4. Identify celestial objects (stars, sun, moon, and planets) in the sky, noting changes in patterns of those objects over time.

### **Changes in the Earth and Sky**

5. Describe the weather commonly found in Missouri in terms of clouds, temperature, humidity, and forms of precipitation, and the changes that occur over time, including seasonal changes.
6. Using the science themes, find patterns and cycles in the earth's daily, yearly, and long-term changes.
7. Using the science themes, describe resources used in the home, community, and nation as a whole.
8. Illustrate human resources used in mining, forestry, farming, and manufacturing in Missouri and elsewhere in the world.

### **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.

By the end of Grade **Four**, students will:

#### **Characteristics of Organisms**

1. Discover how each organism meets its basic needs for water, nutrients, protection, and energy in order to survive.
2. Investigate how organisms, especially plants, respond to both internal cues (the need for water) and external cues (changes in the environment).

#### **Life Cycles of Organisms**

3. Illustrate the different ways that organisms grow through life states and survive to produce new members of their type.

### **Organisms and Their Environment Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.

4. Using the science themes, develop explanations for the connections among living things and non-living things in various environments.

### **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

By the end of Grade **Four**, students will:

1. Identify the technology used by someone employed in a job or position in Missouri and explain how the technology helps.
2. Discover what changes in technology have occurred in a career chosen by a parent, grandparent, or an adult friend over a long period of time.
3. Determine what science discoveries have led to changes in technologies that are being used in the workplace by someone employed locally.

4. Identify the combinations of simple machines in a device used in the home, the workplace, or elsewhere in the community, to make or repair things, or to move goods or people.
5. Ask questions to find answers about how devices and machines were invented and produced.

### **Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

By the end of Grade **Four**, students will:

1. Describe how science and technology have helped, and in some cases hindered; progress in providing better food, more rapid information, quicker and safer transportation, and more effective health care.
2. Using the science themes, identify local and state issues that are helped by science and technology and explain how science and technology can also cause a problem.
3. Show how science has contributed to meeting personal needs, including hygiene, nutrition, exercise, safety, and health care.
4. Develop a list of issues that citizens must make decisions about and describe a strategy for becoming informed about the science behind these issues.

## **GRADE 8 EXIT LEVEL SCIENCE PERFORMANCE STANDARDS**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

By the end of Grade **Eight**, students will:

1. Develop their understanding of the science themes by using the themes to frame questions about science-related issues and problems.
2. Describe limitations of science systems and give reasons why specific science themes are included in or excluded from those systems.
3. Defend explanations and models by collecting and organizing evidence that supports them and critique explanations and models by collecting and organizing evidence that conflicts with them.
4. Collect evidence to show that models developed as explanations for events were (and are) based on the evidence available to scientists at the time.
5. Show how models and explanations, based on systems, were changed as new evidence accumulated (the effects of constancy, evolution, change, and measurement should all be part of these explanations).
6. Use models and explanations to predict actions and events in the natural world.
7. Design real or thought investigations to test the usefulness and limitations of a model.
8. Use the themes of evolution, equilibrium, and energy to predict future events or changes in the natural world.

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

By the end of Grade **Eight**, students will:

1. Describe how scientific knowledge and concepts have changed over time in the earth and space, life and environmental, and physical sciences.
2. Identify and describe major changes that have occurred over time in conceptual models and explanations in the earth and space, life and environmental, and physical sciences and identify the people, cultures, and conditions that led to these developments.
3. Explain how the general rules of science apply to the development and use of evidence in science investigations, model-making, and applications.
4. Describe types of reasoning and evidence used outside of science to draw conclusions about the natural world.
5. Explain ways in which science knowledge is shared, checked, and extended, and show how these processes change over time.
6. Explain the ways in which scientific knowledge is useful and also limited when applied to social issues.

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

By the end of Grade **Eight**, students will:

1. Identify questions they can investigate using resources and equipment they have available.
2. Identify data and locate sources of information including their own records to answer the questions being investigated.
3. Design and safely conduct investigations that provide reliable quantitative or qualitative data, as appropriate, to answer their questions.
4. Use inferences to help decide possible results of their investigations, use observations to check their inferences.
5. Use accepted scientific knowledge, models, and theories to explain their results and to raise further questions about their investigations.
6. State what they have learned from investigations, relating their inferences to scientific knowledge and to data they have collected.
7. Explain their data and conclusions in ways that allow an audience to understand the questions they selected for investigation and the answers they have developed.
8. Use computer software and other technologies to organize, process, and present their data.
9. Evaluate, explain, and defend the validity of questions, hypotheses, and conclusions to their investigations.
10. Discuss the importance of their results and implications of their work with peers, teachers, and other adults. Raise further questions which still need to be answered.

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate and understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

By the end of Grade **Eight**, students will:

#### **Properties and Changes of Properties in Matter**

1. Observe, describe, and measure physical and chemical properties of elements and other substances to identify and group them according to properties such as density, melting points, boiling points, conductivity, magnetic attraction, solubility, and reactions to common physical and chemical tests.
2. Use the major ideas of atomic theory and molecular theory to describe physical and chemical interactions among substances, including solids, liquids, and gases.
3. Understand how chemical interactions and behaviors lead to new substances with different properties.
4. While conducting investigations, use the science themes to develop explanations of physical and chemical interactions and energy exchanges.

#### **Motions and Forces**

5. While conducting investigations, explain the motion of objects by describing the forces acting on them.
6. While conducting investigations, explain the motion of objects using concepts of speed, velocity, acceleration, friction, momentum, and changes over time, among others, and apply these concepts and explanations to real-life situations outside the classroom.

7. While conducting investigations of common physical and chemical interactions occurring in the laboratory and the outside world, use commonly accepted definitions of energy and the idea of energy conservation.

### **Transfer of Energy**

8. Describe and investigate the properties of light, heat, gravity, radio waves, magnetic fields, electrical fields, and sound waves as they interact with material objects in common situations.
9. Explain the behaviors of various forms of energy by using the models of energy transmission, both in the laboratory and in real-life situations in the outside world.
10. Explain how models of the atomic structure of matter have changed over time, including historical models and modern atomic theory.

### **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

By the end of Grade **Eight**, students will:

#### **Structure of Earth System**

1. Using the science themes, explain and predict changes in major features of land, water, and atmospheric systems.
2. Describe underlying structures of the earth that cause changes in the earth's surface.
3. Using the science themes during the process of investigation, describe climate, weather, ocean currents, soil movements and changes in the forces acting on the earth.
4. Using the science themes, analyze the influence living organisms have had on the earth's systems, including their impact on the composition of the atmosphere and the weathering of rocks.

#### **Earth's History**

5. Analyze the geologic and life history of the earth, including change over time, using various forms of scientific evidence.
6. Describe through investigations the use of the earth's resources by humans in both past and current cultures, particularly how changes in the resources used for the past 100 years are the basis for efforts to conserve and recycle renewable and non-renewable resources.

#### **Earth in the Solar System**

7. Describe the general structure of the solar system, galaxies, and the universe, explaining the nature of the evidence used to develop current models of the universe.
8. Using past and current models of the structure of the solar system, explain the daily, monthly, yearly and long-term cycles of the earth, citing evidence gained from personal observations as well as evidence used by scientists.

### **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.

By the end of Grade **Eight**, students will:

#### **Structure and Function in Living Things**

1. Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms.

2. Show how organisms have adapted structures to match their functions, providing means of encouraging individual and group survival within specific environments.
3. Differentiate between single-celled and multiple-celled organisms (humans) through investigations, comparing the cell functions of specialized cells for each type of organism.

#### **Reproduction and Heredity**

4. Investigate and explain that heredity is comprised of characteristic traits found in genes within the cell of an organism.
5. Show how different structures both reproduce and pass on characteristics of their group.

#### **Regulation and Behavior**

6. Understand that an organism is regulated both internally and externally.
7. Understand that an organism's behavior evolves through adaptation to its environment.

#### **Populations and Ecosystems**

8. Show through investigations how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems, which in turn contribute to the total system of life on the planet.

#### **Diversity and Adaptations of Organisms**

9. Explain how some of the changes on the earth are contributing to changes in the balance of life and affecting the survival or population growth of certain species.
10. Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends.

### **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

By the end of Grade **Eight**, students will:

1. Identify and investigate the skills people need for a career in science or technology and identify the academic courses that a person pursuing such a career would need.
2. Explain how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers.
3. Illustrate the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.
4. Propose a design (or re-design) of an applied science model or a machine that will have an impact in the community or elsewhere in the world and show how the design (or re-design) might work, including potential side-effects.
5. Investigate a specific local problem for which there has been a scientific or technological solution including proposals for alternative courses of action, the choices that were made, reasons for the choices, any new problems created, and subsequent community satisfaction.
6. Use current texts, encyclopedias, source books, computers, experts, the popular press, or other relevant sources to identify examples of how scientific discoveries have resulted in new technology, and/or caused moral dilemmas.
7. Show evidence of how science and technology are interdependent, using some examples drawn from personally conducted investigations.

## **Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

By the end of Grade **Eight**, students will:

1. Evaluate the scientific evidence used in various media (for example, television, radio, Internet, Popular press, and scientific journals) to address a social issue, using criteria of accuracy, logic, bias, relevance of data and credibility of sources.
2. Present a scientific solution to a problem involving the earth and space, life and environmental, or physical sciences and participate in a consensus-building discussion to arrive at a group decision.
3. Understand the consequences of decisions affecting personal health and safety.

## Grade Level Performance Standards Kindergarten

*Please refer to the list of **GRADE 4 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Kindergarten science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- K.A.1 Pose and solve problems. MA
- K.A.2 Sort, graph, draw pictures, and compare and share information. MA
- K.A.3 Explore themes of constancy, change and measurement. MA
- K.A.4
  - a. Observe changes in the environment. EE
  - b. Identify that life and all creation are God's gift to us. RE

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- K.B.1
  - a. Demonstrate that science is important in our lives.
  - b. Demonstrate that science is fun and interesting.

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- K.C.1
  - a. Ask questions about objects, organisms, and events in their environment. LA
  - b. Demonstrate that science involves asking questions and looking for answers. LA

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate and understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- K.D.2 Identify water and land masses. MA, SS
- K.D.3 Identify liquids and solids. MA
- K.D.4 Observe changes in the weather. EE
- K.D.5 Make models of earth and simple weather instruments. AR, SS
- K.D.6 Observe and experiment with objects in motion. MA
- K.D.7 Describe, measure and keep records. MA, LA

**Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- K.E.1 Observe sand, earth and rock samples. EE
- K.E.2 Identify differences in sand, earth and rock samples. MA, EE
- K.E.3 Describe earth formations. LA, SS
- K.E.4 Identify the sun.
- K.E.5 Describe weather changes. LA, EE
- K.E.6 Observe daily and long term weather patterns. LA, MA, IT
- K.E.7 Use simple weather instruments.
- K.E.8 Identify the importance of water. SS

**Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living

- K.F.2 Experiment using plants. EE
- K.F.3 Match adult and baby animals. MA
- K.F.4 Sort living and non-living things. MA

**Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- K.G.1 Understand that science tools are used in exploration.

**Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- K.H.2 Identify which objects can be recycled. SS
- K.H.3 Recognize that food, shelter, clothing, safety and security are basic human needs. SS

## **Grade Level Performance Standards Grade One**

*Please refer to the list of **GRADE 4 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our First Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 1.A.1 Pose and solve problems. MA
- 1.A.2 Collect and organize data. MA
- 1.A.4 Explore themes of constancy, change and measurement. MA
- 1.A.5
  - a. Observe and explain changes over time. LA
  - b. See that through our care of our environment, plants and animals we express our love for God. RE

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 1.B.2 Understand and demonstrate that people can choose science as a career or hobby. SS

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 1.C.1 Make and share observations to help answer questions.
- 1.C.4 Measure objects in their environment. MA
- 1.C.6 Explain that in science, it is helpful to work with a team and share findings. LA

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate and understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 1.D.1
  - a. Observe differences in color and water.
  - b. Observe characteristics of water and air.
- 1.D.2 Classify and sort objects according to color and buoyancy. MA
- 1.D.3 Observe various states of water.
- 1.D.4
  - a. Observe changes in color, water and air.

- b. Observe and record changes in color, and water properties, including absorption and buoyancy. LA
- 1.D.5 Construct models relating to color and life cycles. AR

**Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 1.E.3 Describe the relationship of oceans and surface of the earth. LA, SS
- 1.E.5 Observe and describe types of weather types in Missouri. LA
- 1.E.6 Observe changes in clouds and the effect that wind has on weather. LA, EE
- 1.E.7 Explain the use of weather balloons. LA

**Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living

- 1.F.2 Explain how plants and animals respond to different environments. LA
- 1.F.3 Observe various stages in life cycles of plants and animals.
- 1.F.4 Observe connections among plants, animals, and non-living things.

**Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 1.G.4 Identify weather instruments used in the home.
- 1.G.5 Identify scientists and their inventions. SS

**Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 1.H.3 Have responsibility for their own basic needs and for their communities. SS, RE

## **Grade Level Performance Standards Grade Two**

*Please refer to the list of **GRADE 4 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Second Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 2.A.1 Pose and solve problems. MA
- 2.A.3
  - a. Collect, organize and interpret data. MA
  - b. Understand that the stories of the Bible show us God's creation and love for our world. RE

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 2.B.2
  - a. Understand and demonstrate that people have made many contributions throughout the history of science and technology. IT, SS
  - b. Understand and demonstrate that science and technology have been practiced by people for a long time. IT, SS
- 2.B.3 Understand and demonstrate that science and technology continue to change over time. IT, SS

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 2.C.2 Compare and contrast objects and events and communicate findings. LA
- 2.C.4
  - a. Identify a simple problem, test a possible solution to the problem, and communicate results. LA
  - b. Demonstrate that instruments can be used to extend the senses. LA
- 2.C.6 Recognize that instructions that others can follow in carrying out a procedure need to be clearly stated. LA
- 2.C.7 Explain that learning can come from careful observation and simple experiments. LA

## **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 2.D.2 a. Compare and classify substances. MA  
b. Observe and describe changes in natural environments. LA, SS, EE
- 2.D.3 Observe changes due to heat energy. MA
- 2.D.8 a. Compare and contrast how magnets attract and repel a variety of objects. LA  
b. Create musical instruments and magnetic models. AR, MU  
c. Recognize that objects can be moved by magnetic force through a variety of substances.  
d. Recognize that sound vibrations travel through different materials. MU  
e. Conduct experiments using magnets, sound, light and energy. MU

## **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 2.E.1 Observe differences in rocks and soils. LA, SS
- 2.E.2 Observe properties of soils and rocks.
- 2.E.4 Identify objects in space. IT, LA
- 2.E.6 Observe changes in natural environments. SS, EE
- 2.E.7 a. Explain how energy affects everyday life. LA, SS  
b. Explain how people use resources to improve life. LA, SS

## **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living

- 2.F.1 a. Discover how the human body is composed of different systems, serving various purposes.  
b. Illustrate how food chains show how living things depend on each other. AR, HE, SS
- 2.F.2 a. Discover how environmental changes such as the weather and seasons influence the life and death of animals and plants. SS, EE
- 2.F.3 a. Observe that organisms alive today may resemble extinct organisms. SS  
b. Identify how life has continued on earth for a very long time. SS
- 2.F.4 a. Group animals and plants by their characteristics. MA  
b. Observe that living things are part of a system and are interdependent with their living and non-living surroundings. SS  
c. Discover that natural resources are limited and must be used very carefully. SS  
d. Observe how human influences have initiated change in earth environments. SS, RE, EE

## **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 2.G.3 a. Explain how technology has helped people. LA, IT  
b. Conduct a problem solving investigation. MA
- 2.G.4 Use the tools of science. MA
- 2.G.5 a. Explain scientific contributions of people. LA, SS  
b. Explain the outcomes of their investigations. LA

**Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 2.H.1 a. Demonstrate an individual's and populations quality of life and ability to survive are affected by environmental factors. HE, SS  
b. Demonstrate that drugs can have positive or negative effects depending upon how they are used. HE
- 2.H.3 a. Relate scientific knowledge to safety and health issues. HE  
b. Demonstrate that balanced nutrition, exercise and a healthy life style are essential to good health. HE
- 2.H.4 Identify problems caused by noise pollution. HE, SS

## **Grade Level Performance Standards Grade 3**

*Please refer to the list of **GRADE 4 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Third Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 3.A.1 a. Pose and solve problems. MA  
b. Collect, organize, and interpret data. MA
- 3.A.2 a. Draw on prior knowledge in constructing a food pyramid and a model of a habitat. LA, AR, HE  
b. Through exploring the meaning of the 10 Commandments, understand how to live in a good relationship with each other and God. RE

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 3.B.1 a. Understand and demonstrate that scientific understanding is always changing. RE, IT, SS  
b. Understand and demonstrate that students can be scientists. SS
- 3.B.2 Define and use scientific vocabulary. LA
- 3.B.3 Compare and contrast scientific beliefs about the solar system of the past and in the present. MA, LA

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 3.C.3 Consult reliable sources for scientific information.
- 3.C.4 a. Choose and operate measuring tools. MA  
b. Construct and conduct an experiment to answer scientific questions. AR
- 3.C.5 Use data to construct explanations. MA
- 3.C.6 a. Demonstrate alternative ways to display data. MA, AR, IT  
b. Demonstrate that explanations are developed from observation and are based on what is already known about the world. SS

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 3.D.3 Observe the various states of water.
- 3.D.4 Construct models of a simple machine. AR
- 3.D.6 Observe and communicate reasons for objects at rest or in motion. LA

### **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 3.E.1 Observe natural environment is in constant state of change. SS
- 3.E.4
  - a. Identify sun and moon and explain changes in patterns. LA
  - b. Construct model of a habitat. AR
  - c. Describe similarities and differences of the earth and moon. LA
  - d. Observe and identify diversity and changes in the solar system.
- 3.E.6 Observe shadows and the nature of eclipse.

### **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living

- 3.F.1
  - a. Illustrate how living things can be sorted into groups in many ways. AR
  - b. Categorize populations of organisms into groups of producers, consumers and decomposers. MA
- 3.F.2
  - a. Observe internal and external cues influence behavior.
  - b. Explain how organisms are affected by day and night. LA
  - c. Recognize all organisms cause changes in their environments. SS, EE
- 3.F.3
  - a. Observe that all organisms are composed of cells.
  - b. Discover how human organisms have interacting systems.
  - c. Investigate how some living organisms are so small we can only see them through a microscope.
  - d. Illustrate that plants and animals have life cycles that include birth, growth, reproduction, and death. LA, AR
  - e. Identify that some characteristics are inherited in various combinations from parents. SS
- 3.F.4
  - a. Observe that a population consists of all organisms living together at a given place and time.
  - b. Investigate that an ecosystem is composed of all populations of organisms living. SS
  - c. Observe how humans can pollute ecosystems, but that this can be prevented or resolved. SS

### **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 3.G.1 Discover how machines have brought changes in the work place. SS
- 3.G.3 Identify how people use technology to solve problems. IT, RE
- 3.G.5 Explain scientific contributions of people. LA, SS

**Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 3.H.1
  - a. Identify how astronomers use technology. IT
  - b. Demonstrate that some substances can damage the body and how it functions. HE
- 3.H.2 Demonstrate new ideas and inventions continue to affect people. SS
- 3.H.3
  - a. Explain how science has contribute to nutrition knowledge. LA, HE
  - b. Demonstrate rest, exercise, and good nutrition are important to the maintenance and improvement on health. HE
- 3.H.4 Explain how people use technology to solve problems of water pollution and filtration.  
LA, IT, HE, SS

## Grade Level Performance Standards Grade 4

*Please refer to the list of **GRADE 4 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Fourth Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 4.A.1      a. Use, pose and solve problems. MA  
              b. Collect and organize. MA  
              c. Interpret data. MA
- 4.A.5      a. Explain changes over time in rock cycle, matter, insects, plants and animals. LA  
              b. Reading and studying scripture, understand that we incorporate God's way of caring for our environment. RE, LA, EE

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 4.B.1      a. Understand and demonstrate knowledge that a variety of resources are available to help answer science related questions and plan investigations. IT  
              b. Define and use scientific vocabulary. LA
- 4.B.2      a. Understand and demonstrate that many individuals have contributed to the traditions of science.  
              b. Understand and demonstrate that science has been practiced by different individuals in different cultures and in different ways.
- 4.B.3      Compare and contrast scientific classification systems. MA, LA

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 4.C.1      Question the reliability of sources for scientific information. IT
- 4.C.2      a. Conduct a valid experiment.  
              b. Critique explanations of scientific events. LA
- 4.C.6      Demonstrate that scientists make the results of their investigations public, communicating in ways that enable others to repeat the investigations.

- 4.C.7 a. Cite evidence to support conclusions. LA, SS
- b. Demonstrate that good explanations are based on evidence from systematic scientific investigations.
- 4.C.8 Demonstrate that scientists review and ask questions about the results of other scientists' work.

**Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate and understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 4.D.2 Observe, describe, and classify diversity and patterns in earth materials based on properties of matter. LA, MA
- 4.D.3 a. Describe how rocks, minerals and matter elements exist in different states. LA
- b. Observe and describe changes in rocks and air. LA
- 4.D.4 Describe changes in rocks and weather elements due to forces. LA
- 4.D.5 Construct models that demonstrate knowledge about rocks and weather. AR

**Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 4.E.1 Use scientific terms for knowledge of rocks. LA
- 4.E.2 Describe chemical properties of earth's atmosphere and its effect on earth. LA
- 4.E.3 a. Identify Missouri landforms, rocks and minerals. SS
- b. Communicate knowledge of rocks using correct scientific terms. LA
- 4.E.5 Identify weather patterns in Missouri. SS
- 4.E.6 Describe rock and weather cycles. LA, SS
- 4.E.8 Describe importance of people in Missouri industry. LA, SS

**Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living

- 4.F.1 a. Describe how plants and animals meet their basic needs in order to survive. LA, SS
- b. Identify that there are differences between animal and plant cells. AR
- c. Identify that the systems of the human body have a variety of structures and functions. HE
- 4.F.2 Discover that groups of cells form tissues, organs, organ systems and organisms. HE
- 4.F.3 a. Describe life cycles of insects, plants and animals. LA
- b. Observe that characteristics of organisms are inherited or environmentally influenced. SS
- c. Identify that variations within a species may give individuals an important advantage in surviving and reproducing.
- d. Investigate that fossils provide evidence of previous life forms and fossils can be compared to one another and to living organisms to observe their similarities and differences.
- 4.F.4 Explain how plants and animals use living and non-living things to survive. LA

### **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 4.G.1 Describe technology used by someone employed in a weather-related career. LA, IT, SS
- 4.G.2 Relate current technology in weather prediction. IT
- 4.G.3 Identify that scientific discoveries have created new products. SS, RE
- 4.G.5 Explain scientific contributions of people. LA, SS

### **Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 4.H.1
  - a. Examine how pest control has changed due to science and technology. IT, SS
  - b. Examine how the use of tobacco products increases the risk of illness. HE
  - c. Recognize that different consequences result from environmental changes occurring at different rates. HE, RE, SS
- 4.H.2
  - a. Identify those resources that are basic materials.
  - b. Examine changes in environments that can be natural or influenced by humans. SS
  - c. Demonstrate that the size of a population can increase or decrease based on many factors. MA
- 4.H.3
  - a. Realize that alcohol, tobacco and other drugs are often abused substances. HE
  - b. Be aware that science and technology have greatly affected the quality of life for most people. RE
- 4.H.4 Identify those resources that are limited. SS

## Grade Level Performance Standards Grade Five

*Please refer to the list of **GRADE 8 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Fifth Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 5.A.1
  - a. Develop an understanding of the main features of the germ theory and use this understanding to frame questions about disease/health related issues and problems. HE.
  - b. Develop an understanding of the main features of a heliocentric system and use the features of this system to frame questions about a solar system/ galaxy/universe. AR
- 5.A.2
  - a. Describe how a science system consists of many parts that usually influence one another. LA
  - b. Describe how a science system may not work as well (or not at all) if a part of it is missing, broken, worn out, mismatched, or misconnected. LA
- 5.A.3 Explain that by its nature, a model is different from the real thing but can be used to learn about, explain, critique, or make predictions about the real thing. LA
- 5.A.4 Demonstrate that different models can be used to represent the same physical phenomena, concept, proposition, or theory.
- 5.A.6
  - a. Use models to make predictions about actions/events in the natural world. MA, AR
  - b. Demonstrate that the usefulness of a model to describe/predict may be limited if it is too simple or if it is unnecessarily complicated.
- 5.A.7 Be able to ask “How do I know?” in appropriate situations and attempt reasonable answers. LA

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 5.B.1 Describe how scientific knowledge is subject to modification or change. For example, new information challenges existing theories; a new theory leads to looking at old observations in new ways. LA
- 5.B.2
  - a. Identify and describe the main changes in scientists’ conceptions of the germ theory and the role played by microscopes in making germs in diseased tissue visible. Key scientist: Pasteur. LA

- b. Identify and describe the main features of the heliocentric theory, and contrast them with those of the geocentric theory. Key scientists: Copernicus, Ptolemy, Kepler. LA
- 5.B.3 a. Explain why when a scientific investigation is repeatedly done in the same way, we can expect to get a very similar result. LA
- b. Explain that scientific investigations may take many different forms. For example, observing what things are alike, observing what is happening, collecting specimens for analysis, doing experiments. LA
- 5.B.4 Explain that scientists' explanations about what happens in the world comes partly from what they observe and partly from what they think. LA, SS
- 5.B.5 Explain that scientific knowledge is shared through a strong commitment to the process of peer review and publication. LA
- 5.B.6 Explain that the process of science is heavily influenced/dependent on what else is happening in society or history. LA, SS

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 5.C.1. Pose questions that can be answered through scientific investigations. LA
- 5.C.2, 5.C.7, 5.C.8 Use tools to gather, analyze and interpret data. MA, IT
- 5.C.2, 5.C.7, 5.C.8 Recognize data that does not fit a pattern. MA
- 5.C.3 Use knowledge of subject matter to conduct investigations and create explanations. LA
- 5.C.4, 5.C.5, 5.C.6, 5.C.9 Form a logical argument about cause and effect relationships in experiments.
- 5.C.4, 5.C.5, 5.C.6, 5.C.9 Use mathematics to structure convincing explanations. MA
- 5.C.10 a. Summarize results of others' investigations. LA
- b. Listen to and respect the explanations proposed by other students. RE

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 5.D.2 Demonstrate how mixtures can be formed and separated using the characteristic properties of each.
- 5.D.3 Explain how elements may combine to form compounds. LA
- 5.D.5 a. Investigate how simple machines such as levers, pulleys, axles, inclined planes and screws make work easier. LA, SS, MA
- b. Explain movement of light and sound waves by conducting experiments. MU, LA
- 5.D.7 Explain what happens to earth's energy in a day. LA
- 5.D.8 Investigate and categorize the different forms of energy.
- 5.D.9 a. Use models to explain the behavior of light and sound. MA, MU, AR
- b. Demonstrate the relationship between kinetic and potential energy.

## **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 5.E.1 Explain and predict changes in landforms, atmosphere and environment. LA, MA, SS
- 5.E.2
  - a. Describe the movement of earth's plates. LA, SS
  - b. Describe how rocks may be brought to the surface by the forces that drive plate motion which continues the rock cycle. LA
- 5.E.3 Describe the relationship of the forces on the ocean, plates and weather. LA, SS
- 5.E.4 Demonstrate that rocks at the earth's surface weather, forming sediments that are buried, compacted, heat and form new rocks.
- 5.E.5
  - a. Identify changes on earth over time. SS
  - b. Observe how land forms have resulted from a combination of constructive and destructive forces. SS
  - c. Show how water, air and land can be polluted by various factors in the environment. SS, AR
- 5.E.6 Identify and describe how fossils provide evidence of how life and environmental conditions have changed. LA, SS, RE

## **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things and the processes of life.

- 5.F.1
  - a. Discover how living systems at all levels of organization demonstrate the complementary nature of structure and function.
  - b. Identify and compare parts that make up various living systems. MA
  - c. Realize that the systems of the human body have a variety of structures and functions. HE
- 5.F.3 Recognize and describe differences in single-celled and multi-cellular organisms. LA, HE
- 5.F.4
  - a. Realize that reproduction is a characteristic of all living organisms. HE, RE
  - b. Describe how every organism has a set of instructions (genes) specifying cell division and heredity. HE
- 5.F.5 Realize that small differences between parents and their offspring can accumulate so that descendents can be very different from their ancestors. HE, RE
- 5.F.6 Discover that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.
- 5.F.8
  - a. Identify how various organisms depend on one another for survival. RE
  - b. Explain the basic components and importance of the food web. LA, AR, HE
- 5.F.9
  - a. Realize that environments support a diversity of plants and animals that share limited natural resources. EE
  - b. Describe how life forms are affected by changes in the earth and climate. SS, LA
- 5.F.10 Describe how human activities affect ecosystems LA, SS, RE, HE, EE

## **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 5.G.1
  - a. Identify and investigate the skills people need for a career in science or technology and the academic courses that a person pursuing such a career would need.
  - b. Identify the skills needed to pursue careers in oceanography, or meteorology. MA, IT, AR
- 5.G.2
  - a. Explain how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers.
  - b. Recognize the importance of new technologies for oceanic or atmospheric careers. IT
- 5.G.3
  - a. Illustrate the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.
  - b. Describe the impact of technology on society, environment, and everyday life. SS, RE, IT
- 5.G.4
  - a. Propose a design (or re-design) of an applied science model or a machine that will have an impact in the community or elsewhere in the world and show how the design (or re-design) might work, including potential side-effects. AR, MA
  - b. Build and utilize simple equipment to forecast weather. AR, MA

## **Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 5.H.1
  - a. Evaluate the scientific evidence used in various media (for example, television, radio, Internet, popular press, and scientific journals) to address a social issue, using criteria of accuracy, logic, bias, relevance of data and credibility of sources. HE, AR
  - b. Create working solutions for the problems of alcoholism and drug addiction. HE, RE

## Grade Level Performance Standards Grade Six

*Please refer to the list of **GRADE 8 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Sixth Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 6.A.1 a. Develop an understanding of the main components of the earth (atmosphere, hydrosphere, and lithosphere) and use this understanding to frame questions about the shape and location of continents and ocean basins. LA  
b. Develop an understanding of the age of the earth and use this understanding to form questions about the age of things around us. LA, SS
- 6.A.2 Describe how a science system may include processes as well as physical things. LA
- 6.A.3 Explain the difference between a physical model and a conceptual model; and describe how both types of models can be used to compare and contrast how two or more things, events, or concepts are alike or different. LA
- 6.A.5 Use models to represent processes that happen too slowly/quickly, or on too small/large of a scale to be observed directly. MA, AR
- 6.A.6 Demonstrate that the usefulness of a model can be tested by comparing its predictions to actual observations in the real world. MA
- 6.A.7 Ask “How do I know?” questions in appropriate situations and design simple investigations to test the questions posed. LA
- 6.A.8 Utilize models to demonstrate how physical/biological systems tend to change until they become stable (e.g., in equilibrium) and then remain that way unless their surroundings change. MA, AR

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 6.B.1 Describe how from time to time, major shifts occur in the scientific view of how the world works (most often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge). LA
- 6.B.2 a. Identify and describe the main changes in scientists’ conceptions of the earth’s surface, the shape and location of the continents and ocean basins. Key scientist: Wegener.

- b. Identify and describe the main changes in the scientists' conceptions of the age of the earth from a few thousand years to many million years. Key scientists: Lyell, Darwin. LA
- 6.B.3 a. Explain that scientific investigations are conducted for different reasons (for example, to explore new phenomena; to verify previous results; to test personal ideas/thinking; to test how well an existing theory predicts; or to compare/contrast different theories). LA
- 6.B.4 Explain there are different traditions in science about what counts as evidence, and how an investigation should be conducted (for example, scientists have a common basic belief about the value of evidence, logic, and good arguments). LA
- 6.B.5 Explain that scientific knowledge is shared through a strong commitment to the process of peer review and publication. This process serves to keep the vast majority of scientists well within the bounds of ethical behavior. LA
- 6.B.6 Explain that scientists can bring information, insight, and analytical skills to bear on matters of public concern (for example, scientists can help people understand cause and effects of events). Outside their expertise, however, scientists do not possess special credibility. LA

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 6.C.1 Differentiate those questions which are scientific in nature from those which are not. RE, LA
- 6.C.2, 6.C.7, 6.C.8 Choose appropriate tools and techniques to gather data. MA
- 6.C.3 a. Cite knowledge of subject matter when making judgments. RE
- b. Demonstrate the ability to make systematic observations and accurate measurements of variables. MA
- 6.C.4, 6.C.5, 6.C.6, 6.C.9
- a. Differentiate between an explanation, a description and a theory. LA
- b. Demonstrate that mathematics is an important aspect of scientific inquiry. MA

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 6.D.1 Observe and describe the physical properties of matter. LA
- 6.D.2 a. Using the atomic and molecular theory, describe the physical properties of matter. LA
- b. Using models, illustrate that matter is made up of atoms. AR, MA
- 6.D.3 Observe chemical changes as new products are made.
- 6.D.6 a. Investigate the motion of an object in relation to its position, speed, and direction of motions. MA
- b. Discover how the force of friction alters the motion of an object.
- 6.D.7 Observe that energy can neither be created nor destroyed, yet can be transformed from one form to another.

6.D.8 Observe how light interacts with matter by transmission, absorption, or scattering. AR

### **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 6.E.1 Identify, observe and describe the biomes of the earth. SS, LA
- 6.E.2
  - a. Demonstrate how rocks are classified into categories by properties. AR, MA
  - b. Observe and identify that soil is found in layers. LA
- 6.E.3
  - a. Describe and illustrate the process of the water cycle. LA, AR
  - b. Identify atmospheric contents.
  - c. Describe the various properties of the atmosphere at different layers. LA
- 6.E.4
  - a. Describe how soil is made of weathered rocks and decomposed organic material. LA
  - b. Describe how living organisms have played many roles in the earth system. LA, SS
- 6.E.5 Analyze layers of sedimentary rocks to confirm the long history of the earth. MA, SS, LA
- 6.E.7 Discover, describe and show that the solar system contains a variety of bodies. LA, AR
- 6.E.8
  - a. Demonstrate how most objects in the solar system are in regular and predictable motion. LA, AR
  - b. Show that predictable motions explain days, phases of the moon and eclipses. LA
  - c. Relate the relationship between the earth and everything else in the solar system. RE

### **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things and the processes of life.

- 6.F.1
  - a. Identify that cells carry on many functions needed to sustain life.
  - b. Discover that disease in organisms results from a failure in structures and functions or damage by infection.
- 6.F.2 Explain how plant and animal adaptations allow them to survive. LA
- 6.F.3
  - a. Recognize that organisms are grouped into kingdoms and broken down further into classifications based on their characteristics. MA
  - b. Observe structure and activities of single-celled and multi-celled animals and classify their physical characteristics. MA
- 6.F.6 Observe behavior as one kind of response an organism can make to an internal or environmental condition.
- 6.F.7
  - a. Identify that an ecosystem is composed of all populations of organisms living together and physical factors with which they react. SS, MA, RE
  - b. Describe how plants and animals adapt to their environment. LA, SS
- 6.F.8
  - a. Investigate the importance of habitat on an ecosystem. MA, SS
  - b. Describe how plants and animals adapt to their environment. LA, SS
- 6.F.9 Identify changes which cause species to become endangered and/or extinct. SS

### **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 6.G.1 Identify the skills needed to pursue careers in environmental and medical careers. SS, IT

- 6.G.2 Recognize and report on the importance of new technologies in the chemical and engineering fields. IT, LA
- 6.G.3 Describe the impact, both good and bad, of technology on society, the environment and everyday life. RE, LA, SS
- 6.G.4 Produce a model or experiment to demonstrate an environmental concern and solution. AR
- 6.G.6 Report on current trends in the engineering or environmental fields utilizing various sources. LA, SS

**Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 6.H.1 Examine the issues of land use and environmental concerns of overpopulation and waste control. SS
- 6.H.2
  - a. Research and present solutions for discussion on the topics of recycling and/or land management. LA, SS
  - b. Demonstrate and experiment on how electrical energy is produced and the problems associated with electrical power generation.

## Grade Level Performance Standards Grade 7

*Please refer to the list of **GRADE 8 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Seventh Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 7.A.1 a. Develop an understanding about the main features of Newton’s Laws of Motion and use this to frame questions about Newton’s concepts of mass, force, and acceleration. LA, MA
  - b. Develop an understanding about the main features of the atomic theory and use this understanding to frame questions about the basic structure of the atom, conservation of matter, and its relationship to energy. LA
- 7.A.2 Describe how a system is usually connected to other systems, both internally and externally, for example, a system may be thought of as containing subsystems or as being a subsystem of a larger system. LA
- 7.A.3, 7.A.4, 7.A.5 Demonstrate how models work after changes are made to it; and suggest how the phenomena the model represents would work if the same changes were made to it. MA, AR
- 7.A.6 a. Demonstrate an understanding that the complexity of models to be employed in any given situation is based on its purpose (to predict, explain, organize, compare/contrast, etc). LA
  - b. Demonstrate an understanding that computers have greatly improved the power and usefulness of modes to summarize, predict or demonstrate how events change in the natural world. IT
- 7.A.7 Ask “How do I know?” questions in appropriate situations and design investigations (using evidence, logic and good argument) to test the usefulness or limitations of a specific physical/conceptual model.

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 7.B.1 Describe how the process of testing, revising, and occasional discarding of scientific knowledge never ends. LA
- 7.B.2 a. Identify and describe the main components of Newton’s unified view of force and motion in which motion everywhere in the universe can be explained by the same few rules. Key scientists: Newton, Kepler. LA, MA, SS

- b. Identify and describe the main changes in scientists' conceptions of the atomic theory and the process of conservation of matter. Key scientists: Democritus, Lavoisier, Proust, Dalton, Rutherford, Thompson, Curie, Bohr, Fermi LA, SS
- 7.B.3
  - a. Explain why the results of similar scientific investigations seldom turn out exactly the same (for example, differences in the things being investigated; differences in methods used or circumstances in which the investigation is carried out). LA
  - b. Explain the importance of an individual's prior knowledge/understanding (for example, what people expect to observe often affects what they actually do observe; strong beliefs about what should happen in particular circumstances can prevent scientists from detecting other results). LA, RE
  - c. Explain that hypotheses are widely used in science for: guiding methodology; choosing what data to pay attention to; guiding what additional data to seek; guiding the interpretation of data; and forming conclusion. LA, MA
- 7.B.4 Explain that scientists usually do not pay much attention to claims about how something works unless the claims are backed up with evidence that can be confirmed or backed up by logical argument. LA, RE
- 7.B.5 Explain that scientific knowledge is shared through a strong commitment to the process of peer review and publication. (This process serves to keep the vast majority of scientists well within the bounds of ethical behavior. Deliberate deceit is likely to be exposed by the scientific enterprise. Violations of scientific ethics are strongly condemned by the scientific community). LA, RE, SS
- 7.B.6 Describe how some matters cannot be examined usefully in a scientific manner (for example, matters that by their nature cannot be tested objectively; matters of morality; matters of faith). LA, RE, SS

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 7.C.1 Describe how current scientific knowledge and understanding guide scientific investigation. LA, SS, RE
- 7.C.2, 7.C.7 Choose appropriate tools and techniques to gather data. IT, MA
- 7.C.3
  - a. Clarify those ideas that are influencing and guiding their inquiry.
  - b. Demonstrate ability to identify and count variables. MA
- 7.C.5 Demonstrate that scientific investigations sometimes result in new ideas and phenomena for study. RE
- 7.C.7 Choose appropriate tools and techniques to gather data.
- 7.C.10 Communicate experimental methods, follow instructions, describe observations, analyze results, and tell others about their investigations and explanations. LA, MA
- 7.C.11 Recognize that scientific investigations sometimes generate new methods or procedures for investigations or develop new technologies to improve the collection of data. MA

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 7.D.1 a. Identify substances and group them according to elements, compounds, or mixtures. MA
- b. Recognize how substances are identified and grouped using physical and chemical properties. MA
- c. Using the periodic table of elements, demonstrate how to illustrate the building blocks of matter. AR
- 7.D.4 Investigate the Conservation of Mass in chemical reactions. MA, LA, IT
- 7.D.5 a. Describe and explain the force of gravity on moving objects. LA
- b. Explain how convection currents affect the movement of water, air and the earth. LA, AR, MA
- 7.D.6 a. Experience measuring the motion of an object. MA
- b. Discover the difference between velocity and acceleration. MA, LA
- c. Experience and explain how friction affects moving objects. LA, MA, AR
- 7.D.7 Using equations, explain how light, water, and sound waves travel. MA, MU, AR
- 7.D.8 a. Experience and describe the properties of light interacting with opaque, transparent, and translucent objects. LA
- b. Describe the sun's energy in terms of infrared, ultraviolet, and the visible light spectrum. LA, AR, MA
- c. Experience the electromagnetic spectrum and apply the concepts. MA
- d. experience and describe the properties of sound waves interacting with air, water, and solid materials. MU

### **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 7.E.1 a. Explain and predict land changes shaped by rivers, streams, glaciers, rockslides, mudflows and water cycle. MA, LA, SS
- b. Relate how the lithospheric plates move in response to the movement of the mantle.
- c. Demonstrate how water moves through the water cycle. AR
- 7.E.2 Describe volcanoes and earthquakes. LA
- 7.E.3 a. Describe how energy forces affect earth and atmosphere. LA
- b. Observe and predict how local weather is influenced by various factors. MA
- 7.E.4 Describe how environment degradation and resource depletion vary on earth. LA, SS
- 7.E.5 Compare and contrast effects of wind and water, erosion, deposition and glaciers on earth plate tectonics. LA
- 7.E.6 a. Describe the water cycle, processes involved in the cycle and how the water cycle is an example of a renewable source. LA
- b. Illustrate that folding, breaking and uplifting are processes of the rock cycle. AR.
- 7.E.7 a. Identify and describe vocabulary relating to the solar system.
- b. Investigate various theories explaining the origins of the universe. RE
- 7.E.8 Diagram relative positions of sun, moon, and earth as they relate to the solar system. AR

### **Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living

- 7.F.1 Identify, compare, and contrast parts of living things. MA, LA

- 7.F.4 Investigate the history of genetics and understand the concepts of modern genetics. MA
- 7.F.5
  - a. Observe, and evaluate inheritance patterns in humans and other organisms. LA, MA
  - b. Recognize the process of changes in species over time and natural selection.
  - c. Explain how one-celled and multi-celled organisms reproduce. LA
- 7.F.7 Explain how limiting factors affect plant and animal behaviors. LA
- 7.F.8
  - a. Recognize that the number of organisms an ecosystem can support depends on the biotic and abiotic resources available. SS
  - b. Discover how organisms interact in an ecosystem. EE
  - c. Observe that some activities practiced by humans can accelerate changes in the natural environment. SS
- 7.F.9 Explain how natural changes and diversity affect an ecosystem. SS, LA
- 7.F.10 Examine the influence that humans have on the natural environment. SS, RE

### **Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 7.G.1 Identify the skills needed to pursue careers in biological or health related fields. MA, LA, IT
- 7.G.2 Recognize and relate the importance of new technologies in life science and medical fields. IT
- 7.G.3 Describe the impacts of other technologies on living systems. IT, LA
- 7.G.4 Demonstrate the interrelationships between science and technologies by creating or designing an object based on the grade level curriculum. AR, MU, LA, IT, MA
- 7.G.7 Use the Internet and other available resources to identify new technologies and predict future possibilities. IT, SS

### **Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 7.H.1 Demonstrate that the natural environments contain substances harmful to living organisms. SS, HE
- 7.H.2 Experiment and explain how some activities practiced by humans can accelerate natural changes. LA
- 7.H.3 Identify the consequences of altering the genetic make-up of naturally occurring systems.

## Grade Level Performance Standards Grade Eight

*Please refer to the list of **GRADE 8 EXIT LEVEL PERFORMANCE STANDARDS** for numbered competencies listed below.*

**WITHIN our Eighth Grade science curriculum, students will:**

### **Standard A Science Connections**

Students in the Diocese of Jefferson City will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines. These themes relate and interconnect the Diocese of Jefferson City Science Standards to one another.

- 8.A.1      a. Develop an understanding about the main feature of evolution by natural selection and use this understanding to frame questions about the diversity of life. LA, SS  
              b. Develop an understanding about the main changes in society that lead to the Industrial Revolution and use this understanding to frame questions about the impact of these changes on people’s lives. SS
- 8.A.2      Describe how thinking about science systems means looking at the relationships of the parts to each other. For example, the output from one part of a system (which can include material, energy, or information) can become the input for another part of a system.
- 8.A.3, 8.A.4, 8.A.5      Use geometric figures, number sequence, graphs, diagrams, sketches, number line, maps, stories, or 3-D objects to physically represent objects, events, processes, or conceptions (by their nature, such representations – physical or conceptual – can never be exact in every detail). MA, AR
- 8.A.6      Use mathematical models to explain/predict natural occurring events. MA
- 8.A.7      Design investigations to test the limitations or usefulness of a physical or conceptual model. AR, MA
- 8.A.8      Use physical or conceptual models to show how organisms evolve by natural selection, change in a steady repetitive or irregular ways. AR, MA, SS

### **Standard B Nature of Science**

Students in the Diocese of Jefferson City will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

- 8.B.1      Describe how the on-going process of changes in scientific knowledge can lead to a better understanding of how things work in the world but not to absolute truth. LA
- 8.B.2      a. Explain that when similar investigations give different results, the scientific challenge is to judge whether the differences are trivial or significant. LA  
              b. Explain the importance of variables in development of scientific investigations (for example, if more than one variable change at the same time in an experiment, the outcomes of the experiment may not be clearly attributed to any one variable; it may

not be possible to prevent outside variables from influencing the outcomes of an investigation). LA

### **Standard C Science Inquiry**

Students in the Diocese of Jefferson City will investigate questions using scientific method and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

- 8.C.1 Apply scientific ideas, concepts, and relationships to their formulations of scientific questions. RE
- 8.C.2, 8.C.7, 8.C.8 Explain how different scientific disciplines employ different methods, core theories, and standards to advance scientific knowledge and understanding. LA
- 8.C.3
  - a. Identify the assumptions that influence and guide their investigations.
  - b. State explanations in terms of the relationship between two or more variables. MA
  - c. Propose and critique alternative explanations and procedures. LA
- 8.C.4, 8.C.5, 8.C.6, 8.C.9 Make connections between the content of science and the contexts within which scientists develop new knowledge. RE

### **Standard D Physical Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

- 8.D.1
  - a. Describe the physical properties of metals, nonmetals and metalloids. LA
  - b. Identify and group minerals and rocks based on physical characteristics. MA
- 8.D.2 Explain how the ideas of atomic and molecular theory support chemical and physical interactions of solids, liquids and gases. LA
- 8.D.3
  - a. Describe materials before and after chemical changes. LA, AR
  - b. Understand and demonstrate that all types of matter are the result of changes in the arrangement, motion, and combination of atoms. AR
- 8.D.4 Experience and describe how the behavior of gases can be explained. AR, MA, LA
- 8.D.5
  - a. Investigate forces in relationship to Newtonian Laws of Motion. MA
  - b. Demonstrate, using equations, how simple machines make work easier. MA, AR
  - c. Understand and apply the concept of work and power to simple machines. MA, SS
  - d. Explain the forces acting upon the earth that cause erosion. AR, SS, LA
- 8.D.6 Observe the relationship of how force, mass, and acceleration can be represented mathematically. MA, IT
- 8.D.9
  - a. Experience examples of heat transfer by conduction, radiation, and convection. MA
  - b. Describe the form of nuclear energy and how this energy is transformed. LA, MA
  - c. Discover through experiments that in most chemical and nuclear reactions, energy is transferred into or out of the system.
  - d. Experience how electrical circuits provide a means of transferring electrical energy, when heat, light, sound, and chemical changes are produced.
  - e. Discover that energy comes to the earth in the form of electromagnetic radiation.

### **Standard E Earth and Space Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions.

- 8.E.2 Describe and construct models of earthquakes and volcanoes. AR, LA
- 8.E.3
  - a. Observe how global patterns of atmospheric movements influence local weather.
  - b. Relate how oceans affect climate.
  - c. Observe the interactions of global weather and climate.
- 8.E.5
  - a. Analyze locations of igneous, sedimentary, and metamorphic rocks to explain geologic history of the earth. LA
  - b. Illustrate how earth history and climate are influenced by occasional phenomena. AR, SS
  - c. Show how glaciers can cause physical changes in landform. AR, SS
- 8.E.6 Describe through investigation how energy resources are renewable and nonrenewable and list the ways that resources have changed over time. LA, SS
- 8.E.7 Identify the sun as the major source of energy for earth. SS
- 8.E.8
  - a. Observe how the seasons result from the variations of the amount of the sun's energy. SS
  - b. Identify natural hazards and the challenges they present.
  - c. Use historical weather patterns and phenomena to predict future weather. MA

**Standard F Life and Environmental Science**

Students in the Diocese of Jefferson City will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living

- 8.F.1 Recognize the relationship between cells, tissues, organs, organ systems, and organisms.
- 8.F.2
  - a. Explain structure and functions of various body systems and how they ensured survival. LA
  - b. Discuss how malfunctioning could occur within the body systems resulting in change of lifestyle or jeopardizing chance of survival. IT, SS
- 8.F.3 Explain why different cells have different functions. LA
- 8.F.4 Understand and observe that characteristics result from inherited traits and environmental factors.
- 8.F.6 Explain how various systems work together in the human body. IT, LA
- 8.F.8 Observe and recognize the impacts the cycles of nature have on life forms. RE, SS
- 8.F.9
  - a. Describe how diversity results from gradual biological evolution. LA, RE
  - b. Explain cyclical changes in the environment. LA, SS
- 8.F.10
  - a. Examine the influence that humans have on the natural environment. SS, RE
  - b. Explain how environmental changes may result in species extinction. SS, LA

**Standard G Science Applications**

Students in the Diocese of Jefferson City will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

- 8.G.1 Identify the skills needed to pursue careers in the space industry, computers, or physical science related fields. SS, IT
- 8.G.2 Relate the importance of new technologies in careers connected with chemistry or physics. IT, MA
- 8.G.3 Describe the impact of technology on new theories toward exploration of space and the complexity of the universe. LA, IT, RE

- 8.G.4 Demonstrate the interrelationship of science and technology by creating or designing a project or experiment related to the curriculum. LA, MA, AR
- 8.G.5 Investigate, demonstrate and report on a local problem or technology that will enable newer technologies or broaden the field of science. LA, MA
- 8.G.7 Utilize and experiment with new technologies to allow observations otherwise limited due to quantity, distance, location, size and speed. MA, IT, LA

**Standard H Social and Personal Perspectives**

Students in the Diocese of Jefferson City will use scientific information and skills to make decisions about themselves, Missouri, and the world in which they live.

- 8.H.1 Evaluate the risk analysis of various hazards, such as radiation, or chemical contaminations, and estimate the number of people that may be exposed and the number likely to suffer consequences. MA, SS, LA
- 8.H.2 Research and present solutions for societal challenges that include both positives and negatives in the area of physics and chemistry. LA, MA, SS, IT, HE, RE
- 8.H.3 Explain the need for environmental impact statements and for all people to get involved in the process using local issues of land management, mining or the use of erosion controls. LA, MA, SS, IT