High School Environmental Science

Guidelines for Human Sexuality Education

Based on the understanding that human sexuality education is a right and responsibility of parents, teachers whose curricular material includes human sexuality content are obligated to work together with parents to ensure that parents know what is being taught to their children and how it is being covered.

If topics in High School Environmental Science address human sexuality education, please inform the parents of your students with the topic and timeline.

Please consult with your principal and/or pastor to determine the local directives on parental collaboration that are aligned with directives outlined in the May 4, 2011 letter from Bishop William Patrick Callahan. A copy of that letter can be found in the front pocket of this curriculum binder.

Grade: High School **Subject:** Environmental Science

Standard A: Science Connections that reveal God's creation

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Understand the diversity of life on planet Earth.
2. Explain the complex relationships that exist within ecosystems.
3. Explain how the principle of stewardship as taught by the Catholic Church helps one to distinguish between human wants and environmental needs.
4. Identify the impact of human actions on our future environment on a global, national, regional, and local scale.
5. Demonstrate the negative effects of land, water, and air pollution.
6. Demonstrate the roles industrial and agricultural technology play in reducing pollution.

LOCAL LEVEL SCHOOL ELEMENTS					
Text Alignment	Quarter / Date Taught				
	1	2	3	4	Assessment

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
DRC: Catholic Social Teaching III Second Tablet of the Law I A Respect civil authority **DRC: Catholic Social Teaching III Second Tablet of the Law I** B Respect human life *Renewing the Earth* – USCCB November 1991 http://www.americancatholic.org/Messenger/Oct2007/default.asp *St. Anthony Messenger Press*, October 2007 http://www.usccb.org/depts.shtml • Environmental Justice • Justice, Peace, and Human Development • Pro Life Activities – Respect for Life • Science and Human Values http://www.ncbcenter.org/NetCommunity/Page.aspx?pid=994 specific topics and ethics	**Life Science** Core Idea 4: Biological evolution explains the unity and diversity of species. A. Evidence of common ancestry and diversity B. Genetic Variation within a species C. Natural selection and adaptation D. Biodiversity and humans **Earth and Space Science** Core Idea 4: Human activities are constrained by and, in turn, affect all other processes at Earth's surface. A. Natural hazards B. Natural resources C. Human impact on the Earth D. Global climate change

DRC: Diocesan Religion Curriculum **CCC: Catechism of the Catholic Church**

Grade: High School **Subject:** Environmental Science

Standard B: The Nature of Science as created by God and discovered by man

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Understand that although science can lead to new possibilities, the moral and ethical implications must be evaluated according to God's law.
2. Describe how knowledge of the interaction of living and nonliving components helps us better understand the natural world.
3. Give examples of basic and applied research that have impacted agriculture and medicine (crop hybrids, genetic engineering, aquaculture, nutrition, and pharmaceuticals).
4. Understand how cultural views affect the use of resources and that the use of resources affects the global community.
5. Understand that environmental science is an applied science that builds on basic research conducted in a variety of fields.

LOCAL LEVEL SCHOOL ELEMENTS						
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	1	2	3	4	Assessment	

RELIGIOUS RESOURCES

DRC: Christian Morality IV Moral Judgment

A. Conscience is an application of the moral law
B. The components of moral choice are the object, intention, and circumstances
C. The ends do not justify the means

DRC: Catholic Social Teaching IV Second Tablet of the Law.

B. The truth is a common good.

CCC: 50 We can know God by His work
159 There is no discrepancy between faith and reason
2293 – 2294 Science and technology require respect for moral criteria and are meant to benefit all
2464 The 8th Commandment forbids misrepresenting the truth
2467 Man is obligated to be truthful

Fides et Ratio (Faith and Reason) – Pope John Paul II
http://www.usccb.org/depts.shtml

- Environmental Justice
- Justice, Peace, and Human Development
- Pro Life Activities – Respect for Life
- Science and Human Values

COMMON CORE STANDARDS

Engineering and Technology

Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints.

A Defining and researching technological problems
B Generating and evaluating solutions
C Optimizing and making tradeoffs

Core Idea 4: In today's modern world everyone makes technological decisions that affect or are affected by technology on a daily basis. Consequently, it is essential for all citizens to understand the risks and responsibilities that accompany such decisions.

A. Interactions of technology and society
B. Interactions of technology and environment
C. Analyzing issues involving technology and society

Earth and Space Science

Core Idea 4: Human activities are constrained by and, in turn, affect all other processes at Earth's surface.

A. Natural hazards
B. Natural resources
C. Human impact on the Earth
D. Global climate change

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Grade: High School **Subject:** Environmental Science

Standard C: Science Inquiry that reflects God's created order

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Formulate scientific questions based on current social issues, scientific literature, and observations of phenomena.
2. Develop and articulate hypotheses based on theory and past experience.
3. Recognize the best experimental approach to investigate a question (direct observation, controlled, computer modeling).
4. Design experiments to test hypotheses that use responsible, ethical, and safe procedures.
5. Use scientific tools and units of measurement competently and precisely.
6. Collect, analyze, and present data through text, tables, and graphs.
7. Draw conclusions from investigations and determine applications for further directions for research.
8. Replace inaccurate models, explain, and cite evidence supporting new hypotheses.
9. Respectfully critique own work and the work of others (classmates and published works) to evaluate scientific reasoning, experimental design and methods, and the validity of conclusions.

LOCAL LEVEL SCHOOL ELEMENTS						
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	1	2	3	4	Assessment	

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
CCC: 283 The origins of the world invite us to admiration for the greatness of the Creator 2295 Research on the human must maintain the dignity of the person 2415-2418 The 7th commandment requires respect for all creation – animals should not suffer – experimentation is acceptable if it contributes to caring for or saving human lives Diocesan Virtue Program - Respect National Catholic Bioethics Center http://www.ncbcenter.org/NetCommunity// Ethics United States Catholic Conference of Bishops (USCCB) http://www.usccb.org/ prolife activities and social justice	**Engineering and Technology** Core Idea 1: The study of the designed world is the study of designed systems, processes, materials, and products and of the technologies and the scientific principles by which they function. A. Products, processes, and systems B. Nature of technology C. Using tools and materials Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints. A. Defining and researching technological problems B. Generating and evaluating solutions C. Optimizing and making tradeoffs

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Grade: High School **Subject:** Environmental Science

Standard D: Physical Science as created by God

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Integrate knowledge of physical and chemical changes and how they affect ecosystems (temperature, atmospheric changes).
2. Demonstrate the conservation and transfer of energy from producers to consumers via food chains/webs.
3. Understand how nuclear fusion reactions on the sun directly and indirectly provide a variety of energy sources for life on earth.

LOCAL LEVEL SCHOOL ELEMENTS					
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RELIGIOUS RESOURCES	COMMON CORE STANDARDS
http://www.usccb.org/sdwp/ejp/ the environmental initiative *Renewing the Earth* – USCCB November 1991	**Physical Science** Core Idea 2: Forces due to fundamental interactions underlie all matter structures and transformations. Balance or imbalance of forces determines stability and change within all systems. A. Fundamental interactions B. Motion & stability C. Transformation of matter Core Idea 3: Transfers of energy within and between systems never change the total amount of energy, but energy tends to become more dispersed; energy availability regulates what can occur in any process. A. Descriptions of energy B. Energy for life and practical use. The special role of food and fuel C. Relationship between energy and forces **Life Science** Core Idea 3; Organisms and populations of organisms obtain necessary resources from their environment which includes other organisms and physical factors. A. Independent relationships in ecosystems B. Flow of matter and energy transfer in ecosystems C. Ecosystems dynamics, stability, and resilience

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Grade: High School **Subject:** Environmental Science

Standard E: Earth and Space Science as created by God

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Describe how energy from the earth, sun, and universe affects living organisms and the environment.
2. Explain biogeochemical cycles such as the carbon, nitrogen, and water cycles.
3. Describe the consequences of the acquisition, use, and overuse of the Earth's resources (e.g. fossil fuels, mining, harvesting, land & water use).
4. Describe how environmental conditions affect the rock cycle.

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	1	**2**	**3**	**4**	**Assessment**

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
http://www.usccb.org/sdwp/ejp/ children's health and the environmental initiative	**Earth and Space Science** Core Idea 1: Humans are a small part of a vast Universe; planet Earth is part of the Solar System which is part of the Milky Way galaxy, which is one of hundreds of billions of galaxies in the Universe. A. The Universe B. Gravity, energy, and matter in the Universe C. Earth and the Solar System Core Idea 3: Earth's surface continually changes from the cycling of water and rock driven by sunlight and gravity. A. The roles of water in Earth's surface processes B. Formation and alteration of rocks and landforms C. Weather and climate D. Biogeology Core Idea 4: Human activities are constrained by and, in turn, affect all other processes at Earth's surface. A. Natural hazards B. Natural resources C. Human impact on the Earth D. Global climate change

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Grade: High School **Subject:** Environmental Science

Standard F: Life and Environmental Science as created by God

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Describe the diversity of living organisms.
2. Trace the flow of energy through ecosystems.
3. Explain the interactions of living and nonliving components of an ecosystem.
4. Describe the impact of human actions on natural selection.
5. Predict populations in response to changes in environmental conditions.

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	1	**2**	**3**	**4**	**Assessment**	

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
CCC: 340 Creatures exist in dependence of each other National Catholic Bioethics Center http://www.ncbcenter.org/NetCommunity// Ethics United States Catholic Conference of Bishops (USCCB) http://www.usccb.org/ prolife issues and social justice	**Life Science** Core Idea 1: Organisms have structures and functions that facilitate their life processes, growth, and reproduction A. Structure and function B. Growth and development of organisms C. Organization for matter and energy flow in organisms Core Idea 3; Organisms and populations of organisms obtain necessary resources from their environment which includes other organisms and physical factors. A. Independent relationships in ecosystems B. Flow of matter and energy transfer in ecosystems C. Ecosystems dynamics, stability, and resilience Core Idea 4: Biological evolution explains the unity and diversity of species. A. Evidence of common ancestry and diversity B. Genetic Variation within a species C. Natural selection and adaptation D. Biodiversity and humans

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Grade: High School **Subject:** Environmental Science

Standard G: Science Applications that reflect God's goodness

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Demonstrate an understanding of applications of ecology to real-life issues.
2. Analyze the impact (cost, benefit, effects) of past and current biological and technological innovations on the environment.
3. Evaluate data (considering sources of information), validity, and short & long term implications of solutions to a problem and advocate for the most reasonable solution(s).
4. Demonstrate awareness and understanding of current developments in ecology and related fields.
5. Explore careers in science and technology.

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	1	**2**	**3**	**4**	**Assessment**

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
http://www.usccb.org/sdwp/ejp/ children's health and the environmental initiative climate change	**Engineering and Technology** Core Idea 1: The study of the designed world is the study of designed systems, processes, materials, and products and of the technologies and the scientific principles by which they function. A. Products, processes, and systems B. Nature of technology C. Using tools and materials Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints. A Defining and researching technological problems B. Generating and evaluating solutions C. Optimizing and making tradeoffs Core Idea 4: In today's modern world everyone makes technological decisions that affect or are affected by technology on a daily basis. Consequently, it is essential for all citizens to understand the risks and responsibilities that accompany such decisions. A. Interactions of technology and society B. Interactions of technology and environment C. Analyzing issues involving technology and society

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Grade: High School **Subject:** Environmental Science

Standard H: Personal, Social, and Moral Aspects of Science

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Show how science influences personal and social perspectives.
2. Show how non-scientific perspectives (social values, ethics, beliefs, and timeframes) influence policy decisions related to science.
3. Investigate current proposals or plans in resource management, waste disposal, and recycling and evaluate the costs, benefits, risks, and consequences to the environment and local communities.
4. Propose and evaluate (using models and/or explanations) scientific and technological solutions to a problem.
5. Evaluate the short and long term consequences of personal choices on our future environment and implement an action plan that can positively impact the environment.
6. Recognize and explore moral implications and issues in scientific inquiry and technology.
7. Promote God's commandments as expressed through Catholic virtues and moral teaching – especially respect for life, the sanctity of human life, and stewardship.
8. Contact politicians to advocate for positions that promote and protect the welfare of mankind and creation.

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RELIGIOUS RESOURCES	COMMON CORE STANDARDS
CCC: 339 Man must respect the goodness of each creature as a reflection of God's wisdom in creation. http://www.usccb.org/sdwp/ejp/ children's health climate change Diocesan Virtue Program - Respect	**Engineering and Technology** Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints. A. Defining and researching technological problems B. Generating and evaluating solutions C. Optimizing and making tradeoffs Core Idea 3: People are surrounded and supported by technological systems. Effectively using and improving these systems is essential for long-term survival and prosperity. A. Identifying and modeling technological systems B. Life cycles and maintenance of technological systems C. Control and feedback Core Idea 4: In today's modern world everyone makes technological decisions that affect or are affected by technology on a daily basis. Consequently, it is essential for all citizens to understand the risks and responsibilities that accompany such decisions. A. Interactions of technology and society B. Interactions of technology and environment C. Analyzing issues involving technology and society

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