High School Biology

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.

In High School Biology, many curricular areas address human sexuality education. Please maintain frequent communication with the parents of your students.

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:** Biology

Standard A: Science Connections that reveal God's creation

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Evaluate short and long term consequences of the advancement of biological and genetic technology.
2. Describe how genetic engineering has impacted medical treatment and agricultural technology.

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

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
DRC: Social Teaching II Moral Law B: First 3 Commandments are love and justice **DRC: Social Teaching III Respect for Life B:** The 5th Commandment demands respect for human life from natural conception through natural death. **DRC: Social Teaching III Respect for Life C:** The 6th Commandment promotes marriage **CCC:** 2292-2296 Experimentation on humans (including organ transplants) must maintain the dignity of the human person http://www.usccb.org/shv/publications.shtml • Promise & Peril of Genetic Testing • Critical Decisions http://www.usccb.org/sdwp/ Diocesan Virtues Program – Respect	**Life Science** Core Idea 2: Organisms have mechanisms and processes for passing traits and variations of traits from one generation to the next A. Inheritance traits B. Variation of traits 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 **Engineering and Technology** 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

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

Grade: High School **Subject:** Biology

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

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Understand that all scientific research that can lead to new possibilities must be evaluated according to God's law.
2. Describe how knowledge of the characteristics, form, and function of living things helps us better understand the natural world.
3. Give examples of basic and applied research that has impacted agriculture and medicine (crop hybrids, genetic engineering, aquaculture, nutrition, and pharmaceuticals).
4. Compare and contrast the effect of cultural views vs. Catholic moral teaching on biological research and its applications in areas such as medicine and agriculture.

LOCAL LEVEL SCHOOL ELEMENTS						
Text Alignment	Quarter / Date Taught					
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RELIGIOUS RESOURCES

DRC: Christian Morality IV Moral Judgment
- A. Conscience and law
- B. Components of moral choice
- C. Proportional good and evils

CCC: 50 We can know God by His work
159 There is no discrepancy between faith and reason
373 Be stewards of the Earth
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

Healing the Culture by Robert Spitzer S.J.
http://www.usccb.org/shv/publications.shtml
- Promise & Peril of Genetic Testing
- Critical Decisions

http://www.usccb.org/sdwp/

COMMON CORE STANDARDS

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

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

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

Grade: High School **Subject:** Biology

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. Design experiments to test hypotheses that use responsible, ethical, and safe procedures.
4. Apply ethical and moral standards to the collection and study of living organisms.
5. Recognize the best experimental approach to investigate a question (direct observation, controlled, computer modeling).
6. Demonstrate appropriate experimental design through the proper use of independent, dependent, and control variables.
7. Use scientific tools and units of measurement competently and precisely.
8. Collect, analyze, and present data through text, tables, and graphs.
9. Draw conclusions from investigations and determine applications for further directions for research.
10. Replace inaccurate models, explain, and cite evidence supporting new hypotheses.
11. 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						
Text Alignment	Quarter / Date Taught					
	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 Virtues Program – Fortitude, Prudence, 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

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Grade: High School **Subject:** Biology

Standard D: Physical Science as created by God

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Describe how living organisms obtain and convert energy from one form to another (for example, food, light)
2. Explain the processes of organic chemistry that sustain life (for example, respiration, photosynthesis, Kreb's cycle, ATP cycle, enzymes)
3. Describe the influence of physical forces on living things (for example, kinesiology)

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RELIGIOUS RESOURCES	COMMON CORE STANDARDS
National Catholic Bioethics Center http://www.ncbcenter.org/NetCommunity// Ethics United States Catholic Conference of Bishops (USCCB) http://www.usccb.org/ life 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 **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

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

Grade: High School **Subject:** Biology

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 affect living organisms.
2. Describe how the earth's environment has changed over time (plate tectonics, atmospheric change) and how those changes have affected living organisms (evolution).

LOCAL LEVEL SCHOOL ELEMENTS						
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	1	**2**	**3**	**4**		

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
CCC: 283-284 The origins of the world contribute to the admiration for the greatness of the Creator **CCC:** 341 The beauty of creation reflect s the beauty of the Creator **Evolution: A Catholic Perspective** Article written by James Statson ETWN archive www.ewtn.com/library/humanity/evolutn.txt	**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 **Earth and Space Science** Core Idea 2: Earth is a complex and dynamic 4.6 billion-year-old system of rock, water, air, and life. A. Continental drift, plate tectonics, and earth's internal heat B. Earth's materials C. Earth's history

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

Grade: High School **Subject:** Biology

Standard F: Life and Environmental Science as created by God

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Know and apply scientific principles in ways that demonstrate respect for human dignity and the sanctity of human life.
2. Describe the diversity of life and properly classify living organisms.
3. Explain the structure of cells, the functions of cell components, the cell cycle, and the interactions between cells.
4. Identify the structure (form) and function of tissues, organs, and systems.
5. Trace the flow of energy and matter between living organisms and their environment.
6. Demonstrate the process of stimulus and response in living organisms. Understand that humans alone have received the gift of free choice.
7. Recognize that God's gift of human sexuality is a fundamental component of every person that is ordered to the union of male and female in marriage and to the procreation of children.
Explain the genetics of heredity, properly use genetic probability models, and evaluate the moral uses of biotechnology (genetic engineering, stem cells, cloning).
9. Describe how diseases are transmitted and prevented.
10. Identify current medical advancements and treatments. Evaluate ethical and moral implications, and take a Christian stance.
11. Describe how evolution of living organisms leads to adaptation and/or extinction.

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RELIGIOUS RESOURCES
CCC: 2296 Organ transplants must respect the donor **B:** Genesis 30:25-43 Jacob's flock Theology of the Body for Teens by Brian Butler and Jason and Crystalina Evert Theology of the Body for Beginners by Christopher West National Catholic Bioethics Center http://www.ncbcenter.org/NetCommunity// Ethics Teaching the Way of Love: Bodies and Boundaries
United States Catholic Conference of Bishops (USCCB) http://www.usccb.org/ prolife activities and social justice The Human Person by Brian Bransfield Diocesan Virtues Program - Respect

COMMON CORE STANDARDS

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 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

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

Grade: High School **Subject:** Biology

Standard G: Science Applications that reflect God's goodness

DIOCESAN REQUIREMENTS CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Demonstrate an understanding of applications of biology to real-life issues.
2. Analyze the impact (cost, benefit, effects, morality) of past and current biological and technological innovations on individuals and society.
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 biology and related fields.
5. Explore careers in science and technology.

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Grade: High School **Subject:** Biology

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, morality, beliefs, and time frames) influence policy decisions related to science.
3. Investigate current proposals or plans in resource management or waste disposal 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. Distinguish humans above other animals by virtue of God's gift of the soul, reason, and free choice (as opposed to simple stimulus-response).
6. Using Catholic teaching as your foundation, study the moral implications and issues in scientific inquiry and technology (e.g. genetic research, cloning, etc.).
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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