

High School Chemistry

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 Chemistry, some curricular areas address human sexuality education. Please keep the parents of your students informed about the timeline of topics relating to human sexuality in your curriculum.

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.

Standard A: Science Connections that reveal God’s creation

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Develop hypotheses regarding the short and long term consequences of the advancement of research in chemical properties, reactions and compounds.
2. Identify how atomic theory has changed over time.
3. Evaluate the impact of chemistry on social and environmental issues such as pollution, toxicity, and radioactivity.

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

RELIGIOUS RESOURCES
<p>DRC: Catholic Social Teaching I Principles of Catholic Social Teaching B The source of civil authority comes from God</p> <p>DRC: Catholic Social Teaching III Second tablet of the Law I A honor and obey all civil authority</p> <p>DRC: Catholic Social Teaching IV Second tablet of the Law II B Truth is a common good</p> <p>CCC: 2293 Research is to benefit all</p> <p>http://www.usccb.org/depts.shtml</p>

COMMON CORE STANDARDS
<p>Physical Science</p> <p>Core Idea 1: Macroscopic states and characteristic properties of matter depend on the type, arrangement, and motion of particles at the molecular and atomic scales.</p> <p style="padding-left: 20px;">A. Atomic structure of matter</p> <p style="padding-left: 20px;">B. Properties of matter</p> <p>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.</p> <p style="padding-left: 20px;">A. Fundamental interactions</p> <p style="padding-left: 20px;">B. Motion & stability</p> <p style="padding-left: 20px;">C. Transformation of matter</p> <p>Engineering and Technology</p> <p>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.</p> <p style="padding-left: 20px;">A. Interactions of technology and society</p> <p style="padding-left: 20px;">B. Interactions of technology and environment</p> <p>Analyzing issues involving technology and society</p>

DRC: Diocesan Religion Curriculum

CCC: Catechism of the Catholic Church

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

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Describe how knowledge of the properties of matter and the interaction of matter helps us better understand the natural world.
2. Give examples of basic and applied chemical research that have impacted individuals and society (eg. pharmaceuticals, polymers & plastics, adhesives).
3. Understand that although science can lead to new possibilities, the moral and ethical implications must be evaluated according to God's law.
4. Understand how cultural views affect the knowledge, regulation, and practice of chemical research and its outcomes.

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

RELIGIOUS RESOURCES
<p>DRC: Christian Morality IV Moral Judgment A Conscience depends on the moral law</p> <p>DRC: Christian Morality IV Moral Judgment B Components of moral choice include object, intention, and circumstances</p> <p>DRC: Christian Morality IV Moral Judgment C The end does not justify the means</p> <p>DRC: Catholic Social Teaching IV Second Tablet of the Law II B The truth is a common good</p> <p>CCC: 50 God has revealed his plan through Jesus</p> <p>CCC: 159 There is no discrepancy between faith and reason</p> <p>CCC: 2293-2294 Scientific research is for the benefit of all</p> <p>CCC: 2464-2467 Do not misrepresent the truth – we are obligated to tell the truth</p> <p>http://www.usccb.org/depts.shtml</p> <p><i>Fides et Ratio</i> (Faith and Reason) – Pope John Paul II</p>

COMMON CORE STANDARDS
<p>Physical Science</p> <p>Core Idea 1: Macroscopic states and characteristic properties of matter depend on the type, arrangement, and motion of particles at the molecular and atomic scales.</p> <ul style="list-style-type: none"> C. Atomic structure of matter D. Properties of matter <p>Engineering and Technology</p> <p>Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints.</p> <ul style="list-style-type: none"> A. Defining and researching technological problems B. Generating and evaluating solutions <p>Optimizing and making tradeoffs</p> <p>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.</p> <ul style="list-style-type: none"> A. Interactions of technology and society B. Interactions of technology and environment C. Analyzing issues involving technology and society

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

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Ask 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. Recognize the best experimental approach to investigate a question (direct observation, controlled, computer modeling).
5. Demonstrate appropriate experimental design through the proper use of independent, dependent, and control variables.
6. Use scientific tools and units of measurement competently and precisely.
7. Collect, analyze, and present data through text, tables, and graphs.
8. Draw conclusions from investigations and determine applications for further directions for research.
9. Replace inaccurate models, explain, and cite evidence supporting new hypotheses
10. 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
<p>CCC: 2292-2296 Research is to benefit the common good – be truthful in the results – respect the human person</p> <p>National Catholic Bioethics Center http://www.ncbcenter.org/NetCommunity// Ethics</p> <p>United States Catholic Conference of Bishops (USCCB) http://www.usccb.org/ life issues and social justice</p> <p>Diocesan Virtue Program - Fortitude</p>	<p>Engineering and Technology Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints.</p> <ul style="list-style-type: none"> A. Defining and researching technological problems B. Generating and evaluating solutions C. Optimizing and making tradeoffs

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Standard D: Physical Science as created by God

DIOCESAN REQUIREMENTS	
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS	
1.	Explain atomic and molecular structure and bonding (valence, covalent, ionic).
2.	Explain and predict physical and chemical properties and changes.
3.	Demonstrate the correct naming and chemical notation for elements and compounds.
4.	Write and balance chemical formulas and equations.
5.	Explain different types of chemical reactions including acids & bases, oxidation, exothermic, endothermic, decomposition, displacement, and synthesis reactions.
6.	Integrate knowledge of the interactions of matter and energy to explain changes in materials, living things, the earth and stars.
7.	Apply gas law equations (Boyle, Charles, Pascal).
8.	Understand and apply information from the periodic table, including the arrangement of elements (families, periodicity).
9.	Describe factors that can affect the balance of a chemical equilibrium and the speed of chemical reactions (eg. concentration, pressure, volume, temperature, catalysts).
10.	Demonstrate how carbon atoms can bond in various structures to create large molecules essential for life.

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RELIGIOUS RESOURCES

COMMON CORE STANDARDS
<p>Physical Science</p> <p>Core Idea 1: Macroscopic states and characteristic properties of matter depend on the type, arrangement, and motion of particles at the molecular and atomic scales.</p> <ul style="list-style-type: none"> A. Atomic structure of matter B. Properties of matter <p>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.</p> <ul style="list-style-type: none"> A. Fundamental interactions B. Motion & stability C. Transformation of matter <p>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.</p> <ul style="list-style-type: none"> A. Descriptions of energy B. Energy for life and practical use. The special role of food and fuel C. Relationship between energy and forces

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Standard E: Earth and Space Science as created by God

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Describe the process of radioactive decay and its influence on the earth system.
2. Describe how radio-dating helps scientists determine the age of earth materials.

LOCAL LEVEL SCHOOL ELEMENTS					
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	1	2	3	4	

RELIGIOUS RESOURCES	COMMON CORE STANDARDS
<p>CCC: 286-288 God reveals the mystery of creation</p>	<p>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</p> <p>Engineering and Technology 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</p>

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Standard F: Life and Environmental Science as created by God

DIOCESAN REQUIREMENTS
CONCEPTS, SKILLS, & CATHOLIC FAITH CONNECTIONS
1. Describe the molecular processes at work in the regulation of living cells, tissues, organs and organisms (respiration, metabolism, chemical messengers).
2. Explain the molecular structure of DNA.

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RELIGIOUS RESOURCES	COMMON CORE STANDARDS
<p>National Catholic Bioethics Center http://www.ncbcenter.org/NetCommunity// Ethics</p> <p>United States Catholic Conference of Bishops (USCCB) http://www.usccb.org/ life issues and social justice</p>	<p>Life Science</p> <p>Core Idea 1: Organisms have structures and functions that facilitate their life processes, growth, and reproduction</p> <ul style="list-style-type: none"> A. Structure and function B. Growth and development of organisms C. Organization for matter and energy flow in organisms <p>Core Idea 3; Organisms and populations of organisms obtain necessary resources from their environment which includes other organisms and physical factors.</p> <ul style="list-style-type: none"> A. Independent relationships in ecosystems B. Flow of matter and energy transfer in ecosystems C. Ecosystems dynamics, stability, and resilience <p>Core Idea 4: Biological evolution explains the unity and diversity of species.</p> <ul style="list-style-type: none"> 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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Standard G: Science Applications that reflect God’s goodness

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

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RELIGIOUS RESOURCES	COMMON CORE STANDARDS
<p>CCC: 2415 Respect the integrity of creation</p> <p>CCC: 2293-2294 Scientific research is to benefit all and is limited by man’s development</p>	<p>Engineering and Technology</p> <p>Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints.</p> <ul style="list-style-type: none"> A. Defining and researching technological problems B. Generating and evaluating solutions C. Optimizing and making tradeoffs <p>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.</p> <ul style="list-style-type: none"> A. Identifying and modeling technological systems B. Life cycles and maintenance of technological systems C. Control and feedback <p>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.</p> <ul style="list-style-type: none"> A. Interactions of technology and society B. Interactions of technology and environment C. Analyzing issues involving technology and society

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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 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. Recognize and explore moral implications and issues in scientific inquiry and technology.
6. Promote God’s commandments as expressed through Catholic virtues and moral teaching – especially respect for life, the sanctity of human life, and stewardship.

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	1	2	3	4	Assessment

RELIGIOUS RESOURCES
<p>CCC: 2295 Research must respect the dignity of the person</p> <p>DRC: Christian Morality – Utility Technology is at the service of the human person in conformity with the will of God</p> <p>National Catholic Bioethics Center http://www.ncbcenter.org/NetCommunity// Ethics</p> <p>United States Catholic Conference of Bishops (USCCB) http://www.usccb.org/ prolife activities and social justice</p> <p>Diocesan Virtues Program – Respect</p>

COMMON CORE STANDARDS
<p>Engineering and Technology</p> <p>Core Idea 2: Engineering design is a creative and iterative process for identifying and solving problems in the face of constraints.</p> <ul style="list-style-type: none"> A. Defining and researching technological problems B. Generating and evaluating solutions C. Optimizing and making tradeoffs <p>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.</p> <ul style="list-style-type: none"> A. Interactions of technology and society B. Interactions of technology and environment C. Analyzing issues involving technology and society

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