

# **Integrated Science**

## **A Model Course Guideline**

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# Foreword

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*Integrated Science Curricular Guidelines* is a model designed to assist in developing a rigorous and relevant course of study for Integrated Science, a course approved in the Secondary Science Program of Study (*Bulletin 741: Louisiana Handbook for School Administrators, 1997-2000*). The model includes a brief outline and more detailed course guidelines that embrace the core content essential skills and understandings embodied in *Compliance Handbook 308: Louisiana Science Framework* (May 1997)(formerly *Bulletin 1962*). It also presents a discussion of standards-based curriculum, the use of technology, inquiry-based science, laboratory safety, assessment, and the concept of rigorous and relevant learning for *all students*.

The intended audience for this publication includes science teachers, science chairpersons, supervisors of science, local curriculum developers, and school administrators who are involved in secondary science curriculum development and committed to high quality science education.

# Integrated Science

## Course Description

Integrated Science is an inquiry and laboratory-based study of how earth and space, life, physical and environmental sciences relate to each other in the everyday world. This course provides a strong foundation in the sciences. Mathematics skills through pre-algebra are used in problem solving.

## Content Outline

- I. Introduction to Science
  - A. Science as Inquiry
  - B. Scientific Method
  - C. Safety in the Laboratory
- II. Magnetism and Electricity
  - A. Magnets and Magnetism
  - B. Electricity
  - C. Electromagnetic Waves
- III. Atoms and Molecules
  - A. Structure of the Atom
  - B. The Periodic Table
  - C. Bonding of Atoms
  - D. Molecules in Motion
  - E. Organic Chemistry
- IV. Ecosystems
  - A. Forest Community
  - B. Freshwater Community
  - C. Marsh Community
  - D. Ocean Community
- V. Changes through Time
  - A. Reproduction
  - B. Heredity
  - C. The Shifting Earth
  - D. Geological Time
  - E. Changes of Life Forms
- VI. The World and Its Energy
  - A. The Solar System
  - B. Nuclear Energy

**Model Curriculum Guidelines**

<b>Integrated Science</b>	
<b>TOPICS</b>	<b>BENCHMARKS</b>
<p><b>I. Introduction to Integrated Science</b></p> <p><b>A. Science as Inquiry</b></p> <ol style="list-style-type: none"> <li>1. Explain inquiry investigations</li> <li>2. Conduct inquiry investigations on selected topics</li> </ol> <p><b>B. Scientific Method</b></p> <ol style="list-style-type: none"> <li>1. Apply the scientific method to conduct experiments</li> <li>2. Collect, analyze, and report scientific data</li> </ol> <p><b>C. Safety in the Laboratory</b></p> <ol style="list-style-type: none"> <li>1. Demonstrate safe laboratory procedures</li> <li>2. Use safe procedures when conducting investigations</li> </ol>	<p>PS-H-A 1 SI-H-B1-B5</p> <p>SI-H-A 1-A6</p> <p>SI-H-A7</p>
<p><b>II. Magnetism and Electricity</b></p> <p><b>A. Magnets and Magnetism</b></p> <ol style="list-style-type: none"> <li>1. Describe the action of like and unlike magnetic poles</li> <li>2. Relate the earth's magnetic field to the operation of a compass</li> </ol> <p><b>B. Electricity</b></p> <ol style="list-style-type: none"> <li>1. Describe how electric charges are formed and how they interact</li> <li>2. Explain the relationship between magnetism and electricity</li> <li>3. Explain the role of electrolytes in conductivity</li> </ol> <p><b>C. Electromagnetic Waves</b></p> <ol style="list-style-type: none"> <li>1. Identify the parts of the electromagnetic spectrum, and show how they affect objects and humans</li> <li>2. Describe the interrelationships among light, color, and wavelength</li> </ol>	<p>PS-H-E1</p> <p>PS-H-E1 PS-H-G1-G3</p> <p>PS-H-G1, G3</p>
<p><b>III. Atoms and Molecules</b></p> <p><b>A. Structure of the Atom</b></p> <ol style="list-style-type: none"> <li>1. State the modern atomic theory</li> </ol>	<p>PS-H-B1, B3 PS-H-C2</p>



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TOPICS	BENCHMARKS
<p><b>B. Freshwater Community</b></p> <ol style="list-style-type: none"> <li>1. Construct a typical food web of a freshwater community</li> <li>2. Analyze food chains and identify the various trophic levels</li> <li>3. Describe how habitat, carrying capacity, and limiting factors influence plant and animal populations (including humans)</li> </ol> <p><b>C. Marsh Community</b></p> <ol style="list-style-type: none"> <li>1. Construct a typical food web of a freshwater community</li> <li>2. Analyze food chains and identify the various trophic levels</li> <li>3. Describe how habitat, carrying capacity, and limiting factors influence plant and animal populations (including humans)</li> </ol> <p><b>D. Ocean Community</b></p> <ol style="list-style-type: none"> <li>1. Construct a typical food web of a freshwater community</li> <li>2. Analyze food chains and identify the various trophic levels</li> <li>3. Describe how habitat, carrying capacity, and limiting factors influence plant and animal populations (including humans)</li> </ol>	<p>SE-H-A2 LS-H-D2 ESS-H-A1</p> <p>SE-H-A3</p> <p>LS-H-D2 SE-H-A2 ESS-H-A1 SE-H-A3</p> <p>LS-H-D2 SE-H-A2 ESS-H-A1 SE-H-A3</p>
<p><b>V. Changes through Time</b></p> <p><b>A. Reproduction</b></p> <ol style="list-style-type: none"> <li>1. Compare and contrast mitosis and meiosis</li> <li>2. Describe vegetative, asexual, and sexual reproduction in plants and animals</li> </ol> <p><b>B. Heredity</b></p> <ol style="list-style-type: none"> <li>1. Apply Mendel's Laws to the transmission of traits from parents to offspring</li> <li>2. Explain the role of DNA, RNA and protein synthesis in the expression of inherited traits</li> <li>3. Explore advances in biotechnology (genesplicing, cloning, recombinant DNA, DNA fingerprinting, etc.)</li> </ol>	<p>LS-H-B2 LS-H-F1 LS-H-A1</p> <p>LS-H-B1-B4</p>

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TOPICS	BENCHMARKS
<p>C. The Shifting Earth</p> <ol style="list-style-type: none"> <li>1. Model and explain the theory of continental drift</li> <li>2. Model and explain plate tectonics</li> </ol> <p>D. Geological Time</p> <ol style="list-style-type: none"> <li>1. Identify changes over time as they relate to the history of Earth</li> <li>2. Explain how fossils provide evidence of the history of Earth</li> <li>3. Describe how rocks are formed, broken down, and recycled (The Rock Cycle)</li> </ol> <p>E. Changes of Life forms</p> <ol style="list-style-type: none"> <li>1. Explain how fossil evidence relates to the evolution of life</li> <li>3. Describe the components of the Darwinian theory of evolution</li> </ol>	<p>ESS-H-A7</p> <p>ESS-H-C2-C5 ESS-H-D1, D2 ESS-H-B1</p> <p>LS-H-C1-C3 ESS-H-C4</p>
<p>VI. The World and Its Energy</p> <p>A. The Solar System</p> <ol style="list-style-type: none"> <li>1. Discuss the formation of the solar system</li> <li>2. Compare and contrast the Sun with other stars</li> <li>3. Describe the organization of the known universe</li> </ol> <p>B. Nuclear Energy</p> <ol style="list-style-type: none"> <li>1. Compare and contrast nuclear fission and fusion</li> <li>2. Investigate nuclear energy as a source of power</li> <li>3. Explain how fission and fusion relate to Earth's internal and external heat sources</li> </ol>	<p>ESS-H-A3 ESS-H-C1, C2 ESS-H-D3, D4, D7 PS-H-B2</p>

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