| Learning to Fly: The Wright Brother's Adventure | | | |
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| 2009 Science | | | |
| Core Curriculum | | | |
| **Iowa Science** | | | |
| **Grades 6-8** | | | |
| **Activity/Lesson** | **State** | **Standards** | |
| The Society | IA | SCI.6-8.1.1.1 | Students should develop the ability to refine and refocus broad and ill-defined questions. An important aspect of this ability consists of clarifying questions and inquiries and directing them toward objects and phenomena that can be described, explained, or predicted by scientific investigations. |
| The Society | IA | SCI.6-8.1.1.2 | Students should develop the ability to connect their questions with scientific ideas, concepts, and quantitative relationships that guide investigations. |
| The Society | IA | SCI.6-8.1.2.1 | Students understand that different kinds of questions suggest different kinds of scientific investigations. |
| The Society | IA | SCI.6-8.1.2.4 | Students formulate questions, design investigations, execute investigations, interpret data, use evidence to generate explanations, propose alternative explanations, and critique explanations and procedures. |
| The Society | IA | SCI.6-8.1.4.1 | The use of tools and techniques, including computers, will be guided by the questions asked and the investigations students design. Students should be able to access, gather, store, retrieve, and organize data, using computer hardware and software designed for these purposes. |
| Wright Brothers: 1903 Flyer | IA | SCI.6-8.1.10 | Use appropriate safety procedures when conducting investigations. |
| 1900: Kitty Hawks | IA | SCI.6-8.1.3.1 | Some investigations involve observing and describing objects, organisms and events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models. |
| 1901: The First Improvement | IA | SCI.6-8.3.3.3 | If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in speed or direction of an object’s motion. |

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| New Data | IA | SCI.6-8.1.3.1 | Some investigations involve observing and describing objects, organisms and events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models. |
| New Data | IA | SCI.6-8.1.7.2 | Students should be able to review data from an experiment, summarize the data, and form a logical argument between cause and effect relationships. |
| New Data | IA | SCI.6-8.1.9.1 | Students should become competent in communicating experimental methods, describing observations and summarizing the results of investigations. Explanations can be communicated through various methods. |
| 1903: Powered Flight | IA | SCI.6-8.3.3.1 | The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph. |
| 1903: Powered Flight | IA | SCI.6-8.3.3.3 | If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in speed or direction of an object's motion. |
| 1904: Improvement in Dayton | IA | SCI.6-8.1.9.1 | Students should become competent in communicating experimental methods, describing observations and summarizing the results of investigations. Explanations can be communicated through various methods. |
| 1904: Improvement in Dayton | IA | SCI.6-8.3.3.3 | If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in speed or direction of an object's motion. |
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| **Learning to Fly: The Wright Brother's Adventure** | | | |
| **2009 Science** | | | |
| **Core Curriculum** | | | |
| **Iowa Science** | | | |
| **Grades 9-12** | | | |
| **Activity/Lesson** | **State** | **Standards** | |

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| The Society | IA | SCI.9-12.1.2.1 | Designing and conducting a scientific investigation requires introduction to the major concepts in the area being investigated, proper equipment, safety precautions, assistance with methodological problems, recommendations for use of technologies, clarification of ideas that guide the inquiry, and scientific knowledge obtained from sources other than the actual investigation. The investigation may also require student clarification of the question, method, controls, and variables; student organization and display of data; student revision of methods and explanations; and a public presentation of the results with a critical response from peers. Regardless of the scientific investigation performed, students must use evidence, apply logic, and construct an argument for their proposed explanations. |
| The Society | IA | SCI.9-12.1.8.1 | Mathematics is essential to asking and answering questions about the natural world. Mathematics can be used to ask questions; to gather, organize, and present data; and to structure convincing explanations. |
| 1900: Kitty Hawks | IA | SCI.9-12.1.7.1 | Students in school science programs develop the abilities associated with accurate and effective communication. These include writing and following procedures, expressing concepts, reviewing information, summarizing data, using language appropriately, developing diagrams and charts, explaining statistical analysis, speaking clearly and logically, constructing a reasoned argument, and responding appropriately to critical comments. |

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| 1901: The First Improvement | IA | SCI.9-12.1.2.1 | Designing and conducting a scientific investigation requires introduction to the major concepts in the area being investigated, proper equipment, safety precautions, assistance with methodological problems, recommendations for use of technologies, clarification of ideas that guide the inquiry, and scientific knowledge obtained from sources other than the actual investigation. The investigation may also require student clarification of the question, method, controls, and variables; student organization and display of data; student revision of methods and explanations; and a public presentation of the results with a critical response from peers. Regardless of the scientific investigation performed, students must use evidence, apply logic, and construct an argument for their proposed explanations. |
| 1901: The First Improvement | IA | SCI.9-12.3.3.5 | Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the relationship F = ma, which is independent of the nature of the force. Whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted on the first object. |
| 1901: The First Improvement | IA | SCI.9-12.1.4.1 | Student inquiries culminate in formulating an explanation or model. Models should be physical, conceptual, and mathematical. In the process of answering the questions, the students engage in discussions and arguments that result in the revision of their explanations. These discussions should be based on scientific knowledge, the use of logic, and evidence from their investigation. |
| New Data | IA | SCI.9-12.1.5.1 | Thinking critically about evidence includes deciding what evidence should be used and accounting for anomalous data. Specifically, students review data from a simple experiment, summarize the data, and form a logical argument about the cause-and-effect relationships in the experiment. |

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| 1902: Success at Last | IA | SCI.9-12.1.6.1 | This aspect of the standard emphasizes the critical abilities of analyzing an argument by reviewing current scientific understanding, weighing the evidence, and examining the logic so as to decide which explanations and models are best. In other words, although there may be several plausible explanations, they do not all have equal weight. Students use scientific criteria to find the preferred explanations. |
| 1902: Success at Last | IA | SCI.9-12.1.4.1 | Student inquiries culminate in formulating an explanation or model. Models should be physical, conceptual, and mathematical. In the process of answering the questions, the students engage in discussions and arguments that result in the revision of their explanations. These discussions should be based on scientific knowledge, the use of logic, and evidence from their investigation. |
| 1903: Powered Flight | IA | SCI.9-12.1.6.1 | This aspect of the standard emphasizes the critical abilities of analyzing an argument by reviewing current scientific understanding, weighing the evidence, and examining the logic so as to decide which explanations and models are best. In other words, although there may be several plausible explanations, they do not all have equal weight. Students use scientific criteria to find the preferred explanations. |
| 1903: Powered Flight | IA | SCI.9-12.1.3.1 | A variety of technologies, such as hand tools, measuring instruments, and calculators should be an integral component of scientific investigations. The use of computers for the collection, analysis, and display of data is also a part of this standard. Mathematics plays an essential role in all aspects of an inquiry investigation. For example, measurement is used for posing questions, formulas are used for developing explanations, and charts and graphs are used for communicating results. |
| 1903: Powered Flight | IA | SCI.9-12.1.4.1 | Student inquiries culminate in formulating an explanation or model. Models should be physical, conceptual, and mathematical. In the process of answering the questions, the students engage in discussions and arguments that result in the revision of their explanations. These discussions should be based on scientific knowledge, the use of logic, and evidence from their investigation. |

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| 1904: Improvement in Dayton | IA | SCI.9-12.1.2.1 | Designing and conducting a scientific investigation requires introduction to the major concepts in the area being investigated, proper equipment, safety precautions, assistance with methodological problems, recommendations for use of technologies, clarification of ideas that guide the inquiry, and scientific knowledge obtained from sources other than the actual investigation. The investigation may also require student clarification of the question, method, controls, and variables; student organization and display of data; student revision of methods and explanations; and a public presentation of the results with a critical response from peers. Regardless of the scientific investigation performed, students must use evidence, apply logic, and construct an argument for their proposed explanations. |
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