

<b>Exploring Aeronautics</b>			
<b>2008 Science</b>			
<b>Grade and Course Level Expectations</b>			
<b>Missouri Science</b>			
<b>Grade 5</b>			
<b>Activity/Lesson</b>	<b>State</b>	<b>Standards</b>	
Fundamentals of Aeronautics (145-176)	MO	SCI.5.2.2.D.a	Describe how friction affects the amount of force needed to do work over different surfaces or through different media
Fundamentals of Aeronautics (145-176)	MO	SCI.5.2.2.F.a	Explain how work can be done on an object (force applied and distance moved)
Wings(177-208)	MO	SCI.5.8.1.A.a	Design and construct a machine, using materials and/or existing objects, that can be used to perform a task
Airplane Control(209-256)	MO	SCI.5.2.2.D.a	Describe how friction affects the amount of force needed to do work over different surfaces or through different media
Airplane Control(209-256)	MO	SCI.5.2.2.F.a	Explain how work can be done on an object (force applied and distance moved)
Tools of Aeronautics(257-326)	MO	SCI.5.8.1.A.a	Design and construct a machine, using materials and/or existing objects, that can be used to perform a task
Tools of Aeronautics(257-326)	MO	SCI.5.8.1.B.a	Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, electronic balances, electronic microscopes, x-ray technology, computers, ultrasounds, computer probes such as thermometers)
How an Airplane Flies	MO	SCI.5.2.2.A.a	Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load
How an Airplane Flies	MO	SCI.5.2.2.D.a	Describe how friction affects the amount of force needed to do work over different surfaces or through different media
How an Airplane Flies	MO	SCI.5.2.2.F.a	Explain how work can be done on an object (force applied and distance moved)
How an Airplane Flies	MO	SCI.5.2.2.F.d	Observe and explain that simple machines change the amount of effort force and/or direction of force
The Tools of Aeronautics	MO	SCI.5.8.1.B.a	Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, electronic balances, electronic microscopes, x-ray technology, computers, ultrasounds, computer probes such as thermometers)
The Activity Center	MO	SCI.5.2.2.A.a	Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load

The Activity Center	MO	SCI.5.2.2.D.a	Describe how friction affects the amount of force needed to do work over different surfaces or through different media
The Activity Center	MO	SCI.5.2.2.F.a	Explain how work can be done on an object (force applied and distance moved)
The Activity Center	MO	SCI.5.2.2.F.c	Compare the measures of effort force (measured using a spring scale to the nearest Newton) needed to lift a load with and without the use of simple machines
The Activity Center	MO	SCI.5.2.2.F.d	Observe and explain that simple machines change the amount of effort force and/or direction of force
The Activity Center	MO	SCI.5.7.1.A.d	Make suggestions for reasonable improvements or extensions of a fair test
The Resource Center	MO	SCI.5.8.1.B.a	Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, electronic balances, electronic microscopes, x-ray technology, computers, ultrasounds, computer probes such as thermometers)
Science of Flight	MO	SCI.5.2.2.A.a	Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load
Science of Flight	MO	SCI.5.2.2.D.a	Describe how friction affects the amount of force needed to do work over different surfaces or through different media
Science of Flight	MO	SCI.5.2.2.F.a	Explain how work can be done on an object (force applied and distance moved)
Science of Flight	MO	SCI.5.2.2.F.d	Observe and explain that simple machines change the amount of effort force and/or direction of force
Science of Flight	MO	SCI.5.8.1.C.a	Identify how the effects of inventions or technological advances (e.g., complex machinery, technologies used in space exploration, satellite imagery, weather observation and prediction, communication, transportation, robotics, tracking devices) may be helpful, harmful, or both
Science of Flight	MO	SCI.5.8.2.A.a	Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology
Science of Flight	MO	SCI.5.8.3.A.a	Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery)
Integrating with Aeronautics	MO	SCI.5.2.2.A.a	Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load

Integrating with Aeronautics	MO	SCI.5.2.2.D.a	Describe how friction affects the amount of force needed to do work over different surfaces or through different media
Integrating with Aeronautics	MO	SCI.5.2.2.F.a	Explain how work can be done on an object (force applied and distance moved)
Integrating with Aeronautics	MO	SCI.5.2.2.F.c	Compare the measures of effort force (measured using a spring scale to the nearest Newton) needed to lift a load with and without the use of simple machines
Intro to Aeronautics (109-123)	MO	SCI.5.8.1.A.a	Design and construct a machine, using materials and/or existing objects, that can be used to perform a task
Intro to Aeronautics (109-123)	MO	SCI.5.8.1.C.a	Identify how the effects of inventions or technological advances (e.g., complex machinery, technologies used in space exploration, satellite imagery, weather observation and prediction, communication, transportation, robotics, tracking devices) may be helpful, harmful, or both
Intro to Aeronautics (109-123)	MO	SCI.5.8.2.A.a	Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology
Scientific Method(124-144)	MO	SCI.5.8.1.A.a	Design and construct a machine, using materials and/or existing objects, that can be used to perform a task
Scientific Method(124-144)	MO	SCI.5.8.3.A.a	Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery)
<b>Exploring Aeronautics</b>			
<b>2008 Science</b>			
<b>Grade and Course Level Expectations</b>			
<b>Missouri Science</b>			
<b>Grade 6</b>			
<b>Activity/Lesson</b>	<b>State</b>	<b>Standards</b>	
Fundamentals of Aeronautics (145-176)	MO	SCI.6.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment
Fundamentals of Aeronautics (145-176)	MO	SCI.6.7.1.B.d	Measure length to the nearest millimeter, mass to the nearest gram, volume to the nearest milliliter, temperature to the nearest degree Celsius, force (weight) to the nearest Newton, time to the nearest second

Wings(177-208)	MO	SCI.6.8.3.B.a	Describe ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research)
How an Airplane Flies	MO	SCI.6.1.1.A.c	Describe and compare the masses (amounts of matter) of objects to the nearest gram using a balance
The Resource Center	MO	SCI.6.8.3.B.a	Describe ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research)
Science of Flight	MO	SCI.6.1.2.A.i	Describe how sound energy is transferred by wave-like disturbances that spread away from the source through a medium
Science of Flight	MO	SCI.6.1.2.A.j	Describe how changes in energy cause changes in loudness and pitch of a sound
Science of Flight	MO	SCI.6.1.2.A.k	Predict how the properties of the medium (e.g., air, water, empty space, rock) affect the speed of different types of mechanical waves (i.e., earthquake, sound)
Science of Flight	MO	SCI.6.8.3.B.a	Describe ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research)
Intro to Aeronautics (109-123)	MO	SCI.6.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment
Scientific Method(124-144)	MO	SCI.6.7.1.A.a	Formulate testable questions and hypotheses
Scientific Method(124-144)	MO	SCI.6.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment
Scientific Method(124-144)	MO	SCI.6.7.1.A.c	Design and conduct a valid experiment

Scientific Method(124-144)	MO	SCI.6.8.3.B.a	Describe ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research)
<b>Exploring Aeronautics</b>			
<b>2008 Science</b>			
<b>Grade and Course Level Expectations</b>			
<b>Missouri Science</b>			
<b>Grade 7</b>			
<b>Activity/Lesson</b>	<b>State</b>	<b>Standards</b>	
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.1.A.b	Classify different types of motion (e.g., straight line, projectile, circular, vibrational)
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.1.A.c	Given an object in motion, calculate its speed (distance/time)
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.1.A.d	Interpret a line graph representing an object's motion in terms of distance over time (speed) using metric units
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.2.B.c	Compare the amount of gravitational force acting between objects (which is dependent upon their masses and the distance between them)
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.2.D.a	Compare the effects of balanced and unbalanced forces (including magnetic, gravity, friction, push or pull) on an object's motion
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.2.D.b	Explain that when forces (including magnetic, gravity, friction, push or pull) are balanced, objects are at rest or their motion remains constant
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.2.D.c	Explain that a change in motion is the result of an unbalanced force acting upon an object
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.2.D.d	Explain how the acceleration of a moving object is affected by the amount of net force applied and the mass of the object
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.2.F.a	Recognize examples of work being done on an object (force applied and distance moved in the direction of the applied force) with and without the use of simple machines
Fundamentals of Aeronautics (145-176)	MO	SCI.7.2.2.F.b	Calculate the amount of work done when a force is applied to an object over a distance ( $W = F \times d$ )
Wings(177-208)	MO	SCI.7.2.2.F.e	Evaluate simple machine designs to determine which design requires the least amount of effort force and explain why

Airplane Control(209-256)	MO	SCI.7.2.1.A.b	Classify different types of motion (e.g., straight line, projectile, circular, vibrational)
Airplane Control(209-256)	MO	SCI.7.2.1.A.d	Interpret a line graph representing an object's motion in terms of distance over time (speed) using metric units
Airplane Control(209-256)	MO	SCI.7.2.2.A.a	Identify and describe the types of forces acting on an object in motion, at rest, floating/sinking (i.e., type of force, direction, amount of force in Newtons)
Airplane Control(209-256)	MO	SCI.7.2.2.A.b	Compare the forces acting on an object by using a spring scale to measure them to the nearest Newton
Airplane Control(209-256)	MO	SCI.7.2.2.B.c	Compare the amount of gravitational force acting between objects (which is dependent upon their masses and the distance between them)
Airplane Control(209-256)	MO	SCI.7.2.2.D.a	Compare the effects of balanced and unbalanced forces (including magnetic, gravity, friction, push or pull) on an object's motion
Airplane Control(209-256)	MO	SCI.7.2.2.D.b	Explain that when forces (including magnetic, gravity, friction, push or pull) are balanced, objects are at rest or their motion remains constant
Airplane Control(209-256)	MO	SCI.7.2.2.D.c	Explain that a change in motion is the result of an unbalanced force acting upon an object
Airplane Control(209-256)	MO	SCI.7.2.2.D.d	Explain how the acceleration of a moving object is affected by the amount of net force applied and the mass of the object
Airplane Control(209-256)	MO	SCI.7.2.2.F.a	Recognize examples of work being done on an object (force applied and distance moved in the direction of the applied force) with and without the use of simple machines
Airplane Control(209-256)	MO	SCI.7.2.2.F.b	Calculate the amount of work done when a force is applied to an object over a distance ( $W = F \times d$ )
Airplane Control(209-256)	MO	SCI.7.2.2.F.c	Explain how simple machines affect the amount of effort force, distance through which a force is applied, and/or direction of force while doing work
Tools of Aeronautics(257-326)	MO	SCI.7.5.2.F.e	Collect and interpret weather data (e.g., cloud cover, precipitation, wind speed and direction) from weather instruments and maps to explain present day weather and to predict the next day's weather
How an Airplane Flies	MO	SCI.7.2.1.A.c	Given an object in motion, calculate its speed (distance/time)
How an Airplane Flies	MO	SCI.7.2.1.A.d	Interpret a line graph representing an object's motion in terms of distance over time (speed) using metric units
How an Airplane Flies	MO	SCI.7.2.2.B.c	Compare the amount of gravitational force acting between objects (which is dependent upon their masses and the distance between them)

How an Airplane Flies	MO	SCI.7.2.2.D.a	Compare the effects of balanced and unbalanced forces (including magnetic, gravity, friction, push or pull) on an object's motion
How an Airplane Flies	MO	SCI.7.2.2.D.b	Explain that when forces (including magnetic, gravity, friction, push or pull) are balanced, objects are at rest or their motion remains constant
How an Airplane Flies	MO	SCI.7.2.2.D.c	Explain that a change in motion is the result of an unbalanced force acting upon an object
How an Airplane Flies	MO	SCI.7.2.2.D.d	Explain how the acceleration of a moving object is affected by the amount of net force applied and the mass of the object
How an Airplane Flies	MO	SCI.7.2.2.F.b	Calculate the amount of work done when a force is applied to an object over a distance ( $W = F \times d$ )
How an Airplane Flies	MO	SCI.7.2.2.F.c	Explain how simple machines affect the amount of effort force, distance through which a force is applied, and/or direction of force while doing work
The Activity Center	MO	SCI.7.2.2.A.b	Compare the forces acting on an object by using a spring scale to measure them to the nearest Newton
The Activity Center	MO	SCI.7.2.2.D.a	Compare the effects of balanced and unbalanced forces (including magnetic, gravity, friction, push or pull) on an object's motion
The Activity Center	MO	SCI.7.2.2.F.b	Calculate the amount of work done when a force is applied to an object over a distance ( $W = F \times d$ )
Science of Flight	MO	SCI.7.1.2.A.a	Identify thermal energy as the random motion (kinetic energy) of molecules or atoms within a substance
Science of Flight	MO	SCI.7.2.1.A.b	Classify different types of motion (e.g., straight line, projectile, circular, vibrational)
Science of Flight	MO	SCI.7.2.1.A.c	Given an object in motion, calculate its speed (distance/time)
Science of Flight	MO	SCI.7.2.1.A.d	Interpret a line graph representing an object's motion in terms of distance over time (speed) using metric units
Integrating with Aeronautics	MO	SCI.7.2.2.D.a	Compare the effects of balanced and unbalanced forces (including magnetic, gravity, friction, push or pull) on an object's motion
Integrating with Aeronautics	MO	SCI.7.2.2.D.c	Explain that a change in motion is the result of an unbalanced force acting upon an object
Integrating with Aeronautics	MO	SCI.7.2.2.D.d	Explain how the acceleration of a moving object is affected by the amount of net force applied and the mass of the object
Intro to Aeronautics (109-123)	MO	SCI.7.2.1.A.c	Given an object in motion, calculate its speed (distance/time)
Intro to Aeronautics (109-123)	MO	SCI.7.2.1.A.d	Interpret a line graph representing an object's motion in terms of distance over time (speed) using metric units

Intro to Aeronautics (109-123)	MO	SCI.7.2.2.A.a	Identify and describe the types of forces acting on an object in motion, at rest, floating/sinking (i.e., type of force, direction, amount of force in Newtons)
Intro to Aeronautics (109-123)	MO	SCI.7.2.2.B.c	Compare the amount of gravitational force acting between objects (which is dependent upon their masses and the distance between them)
Intro to Aeronautics (109-123)	MO	SCI.7.2.2.D.a	Compare the effects of balanced and unbalanced forces (including magnetic, gravity, friction, push or pull) on an object's motion
Intro to Aeronautics (109-123)	MO	SCI.7.2.2.D.b	Explain that when forces (including magnetic, gravity, friction, push or pull) are balanced, objects are at rest or their motion remains constant
Intro to Aeronautics (109-123)	MO	SCI.7.2.2.D.c	Explain that a change in motion is the result of an unbalanced force acting upon an object
Intro to Aeronautics (109-123)	MO	SCI.7.2.2.D.d	Explain how the acceleration of a moving object is affected by the amount of net force applied and the mass of the object
Intro to Aeronautics (109-123)	MO	SCI.7.2.2.F.a	Recognize examples of work being done on an object (force applied and distance moved in the direction of the applied force) with and without the use of simple machines
Intro to Aeronautics (109-123)	MO	SCI.7.2.2.F.b	Calculate the amount of work done when a force is applied to an object over a distance ( $W = F \times d$ )
Intro to Aeronautics (109-123)	MO	SCI.7.7.1.A.e	Recognize that different kinds of questions suggest different kinds of scientific investigations (e.g., some involve observing and describing objects organisms, or events; some involve collecting specimens; some involve experiments; some involve making observations in nature; some involve discovery of new objects and phenomena; some involve making models)
Intro to Aeronautics (109-123)	MO	SCI.7.7.1.A.f	Acknowledge there is no fixed procedure called "the scientific method", but some investigations involve systematic observations, carefully collected and relevant evidence, logical reasoning, and imagination in developing hypotheses and other explanations
Intro to Aeronautics (109-123)	MO	SCI.7.7.1.D.a.3	data tables (allowing for the recording and analysis of data relevant to the experiment, such as independent and dependent variables, multiple trials, beginning and ending times or temperatures, derived quantities)

Intro to Aeronautics (109-123)	MO	SCI.7.8.1.A.a	Explain how technological improvements, such as those developed for use in space exploration, the military, or medicine, have led to the invention of new products that may improve lives here on Earth (e.g., new materials, freeze-dried foods, infrared goggles, Velcro, satellite imagery, robotics, lasers)
Scientific Method(124-144)	MO	SCI.7.7.1.A.f	Acknowledge there is no fixed procedure called “the scientific method”, but some investigations involve systematic observations, carefully collected and relevant evidence, logical reasoning, and imagination in developing hypotheses and other explanations
Scientific Method(124-144)	MO	SCI.7.7.1.B.g	Calculate the range and average/mean of a set of data
Scientific Method(124-144)	MO	SCI.7.7.1.C.e	Analyze whether evidence (data) and scientific principles support proposed explanations (hypotheses, laws, theories)
Scientific Method(124-144)	MO	SCI.7.7.1.D.a.3	data tables (allowing for the recording and analysis of data relevant to the experiment, such as independent and dependent variables, multiple trials, beginning and ending times or temperatures, derived quantities)
<b>Exploring Aeronautics</b>			
<b>2008 Science</b>			
<b>Grade and Course Level Expectations</b>			
<b>Missouri Science</b>			
<b>Grade 8</b>			
<b>Activity/Lesson</b>	<b>State</b>	<b>Standards</b>	
Fundamentals of Aeronautics (145-176)	MO	SCI.8.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment
Fundamentals of Aeronautics (145-176)	MO	SCI.8.7.1.A.e	Recognize that different kinds of questions suggest different kinds of scientific investigations (e.g., some involve observing and describing objects organisms, or events; some involve collecting specimens; some involve experiments; some involve making observations in nature; some involve discovery of new objects and phenomena; some involve making models)
Fundamentals of Aeronautics (145-176)	MO	SCI.8.7.1.B.d	Measure length to the nearest millimeter, mass to the nearest gram, volume to the nearest milliliter, force (weight) to the nearest Newton, temperature to the nearest degree Celsius, time to the nearest second
The Activity Center	MO	SCI.8.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment

The Activity Center	MO	SCI.8.7.1.A.d	Evaluate the design of an experiment and make suggestions for reasonable improvements or extensions of an experiment
The Resource Center	MO	SCI.8.8.1.A.a	Explain how technological improvements, such as those developed for use in space exploration, the military, or medicine, have led to the invention of new products that may improve lives here on Earth (e.g., new materials, freeze-dried foods, infrared goggles, Velcro, satellite imagery, robotics, lasers)
The Resource Center	MO	SCI.8.8.3.B.a	Describe ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research)
Science of Flight	MO	SCI.8.1.2.F.a	Identify the evidence of different energy transformations (e.g., explosion of light, heat, and sound, temperature change, electrical charge) that may occur as chemical energy is released during a chemical reaction
Science of Flight	MO	SCI.8.5.1.A.c	Describe the methods used to identify the distinguishing properties of minerals
Science of Flight	MO	SCI.8.7.1.A.a	Formulate testable questions and hypotheses
Science of Flight	MO	SCI.8.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment
Intro to Aeronautics (109-123)	MO	SCI.8.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment
Intro to Aeronautics (109-123)	MO	SCI.8.7.1.D.a.3	data tables (allowing for the recording and analysis of data relevant to the experiment, such as independent and dependent variables, multiple trials, beginning and ending times or temperatures, derived quantities)
Scientific Method(124-144)	MO	SCI.8.7.1.A.a	Formulate testable questions and hypotheses
Scientific Method(124-144)	MO	SCI.8.7.1.A.b	Identify and describe the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment
Scientific Method(124-144)	MO	SCI.8.7.1.A.f	Acknowledge there is no fixed procedure called “the scientific method”, but some investigations involve systematic observations, carefully collected and relevant evidence, logical reasoning, and imagination in developing hypotheses and other explanations