Exploring Aeronautics

National Standards

Grades 3 - 5 Mathematics

Source: National Standards Mathematics 2000

Lesson/Activity	Grades 3 - 5 Mathematics Standards
Fundamentals of Aeronautics (145-176)	model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions.
Fundamentals of Aeronautics (145-176)	understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;
Fundamentals of Aeronautics (145-176)	select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;
Fundamentals of Aeronautics (145-176)	design investigations to address a question and consider how data-collection methods affect the nature of the data set;
Fundamentals of Aeronautics (145-176)	collect data using observations, surveys, and experiments;
Fundamentals of Aeronautics (145-176)	represent data using tables and graphs such as line plots, bar graphs, and line graphs;
Fundamentals of Aeronautics (145-176)	recognize the differences in representing categorical and numerical data.
Fundamentals of Aeronautics (145-176)	compare different representations of the same data and evaluate how well each representation shows important aspects of the data.
Intro to Aeronautics (109-123)	design investigations to address a question and consider how data-collection methods affect the nature of the data set;
Intro to Aeronautics (109-123)	collect data using observations, surveys, and experiments;
Intro to Aeronautics (109-123)	describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed;
Integrating with Aeronautics	understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals;
Integrating with Aeronautics	explore numbers less than 0 by extending the number line and through familiar applications;
Integrating with Aeronautics	select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.
Integrating with Aeronautics	represent and analyze patterns and functions, using words, tables, and graphs.
Integrating with Aeronautics	represent the idea of a variable as an unknown quantity using a letter or a symbol;
Integrating with Aeronautics	express mathematical relationships using equations.
Integrating with Aeronautics	model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions.
Integrating with Aeronautics	investigate how a change in one variable relates to a change in a second variable;
Integrating with Aeronautics	identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes;
Integrating with Aeronautics	understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;
Integrating with Aeronautics	understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems;
Integrating with Aeronautics	understand that measurements are approximations and how differences in units affect precision;
Integrating with Aeronautics	select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;
Integrating with Aeronautics	represent data using tables and graphs such as line plots, bar graphs, and line graphs;
Airplane Control(209-256)	understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;
Airplane Control(209-256)	select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;
Wings(177-208)	understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;

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National Standards

Grades 3 - 5 - Mathematics

Source: National Standards Mathematics 2000

Lesson/Activity	Grades 3 - 5 Mathematics Standards
Wings(177-208)	select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;
Wings(177-208)	develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms;
Wings(177-208)	develop strategies to determine the surface areas and volumes of rectangular solids.
Science of Flight	make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.
Science of Flight	understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;
Science of Flight	select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;
Science of Flight	design investigations to address a question and consider how data-collection methods affect the nature of the data set;
Science of Flight	collect data using observations, surveys, and experiments;
Science of Flight	propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.
Scientific Method(124-144)	make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.
Scientific Method(124-144)	design investigations to address a question and consider how data-collection methods affect the nature of the data set;
Scientific Method(124-144)	collect data using observations, surveys, and experiments;
Scientific Method(124-144)	recognize the differences in representing categorical and numerical data.
Scientific Method(124-144)	describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed;
Scientific Method(124-144)	compare different representations of the same data and evaluate how well each representation shows important aspects of the data.
Scientific Method(124-144)	propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.
The Resource Center	understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals;
The Resource Center	explore numbers less than 0 by extending the number line and through familiar applications;
The Resource Center	describe classes of numbers according to characteristics such as the nature of their factors.

Exploring Aeronautics

National Standards

Grades 6 - 8 Mathematics

Source: National Standards Mathematics 2000

Lesson/Activity	Grades 6 - 8 Mathematics Standards
Fundamentals of Aeronautics (145-176)	model and solve contextualized problems using various representations, such as graphs, tables, and equations.
Fundamentals of Aeronautics (145-176)	understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects;
Fundamentals of Aeronautics (145-176)	draw geometric objects with specified properties, such as side lengths or angle measures;
Fundamentals of Aeronautics (145-176)	understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.
Fundamentals of Aeronautics (145-176)	select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision;
Fundamentals of Aeronautics (145-176)	formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population;
Fundamentals of Aeronautics (145-176)	select, create, and use appropriate graphical representations of data, including histograms, box plots, and scatterplots.
Fundamentals of Aeronautics (145-176)	discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots.
Intro to Aeronautics (109-123)	formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population;
Integrating with Aeronautics	compare and order fractions, decimals, and percents efficiently and find their approximate locations on a number line;
Integrating with Aeronautics	understand and use ratios and proportions to represent quantitative relationships;
Integrating with Aeronautics	select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;
Integrating with Aeronautics	develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.
Integrating with Aeronautics	represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules;
Integrating with Aeronautics	relate and compare different forms of representation for a relationship;
Integrating with Aeronautics	identify functions as linear or nonlinear and contrast their properties from tables, graphs, or equations.
Integrating with Aeronautics	develop an initial conceptual understanding of different uses of variables;
Integrating with Aeronautics	explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope;
Integrating with Aeronautics	model and solve contextualized problems using various representations, such as graphs, tables, and equations.
Integrating with Aeronautics	create and critique inductive and deductive arguments concerning geometric ideas and relationships, such as congruence, similarity, and the Pythagorean relationship.
Integrating with Aeronautics	select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision;
Integrating with Aeronautics	solve problems involving scale factors, using ratio and proportion;
Airplane Control(209-256)	understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects;
Airplane Control(209-256)	draw geometric objects with specified properties, such as side lengths or angle measures;

Exploring Aeronautics

National Standards

Grades 6 – 8 Mathematics

Source: National Standards Mathematics 2000

Lesson/Activity	Grades 6 - 8 Mathematics Standards
Airplane Control(209-256)	understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.
Airplane Control(209-256)	select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision;
Wings(177-208)	understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects;
Wings(177-208)	use two-dimensional representations of three-dimensional objects to visualize and solve problems such as those involving surface area and volume;
Wings(177-208)	understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.
Wings(177-208)	select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision;
Wings(177-208)	develop and use formulas to determine the circumference of circles and the area of triangles, parallelograms, trapezoids, and circles and develop strategies to find the area of more-complex shapes;
Wings(177-208)	develop strategies to determine the surface area and volume of selected prisms, pyramids, and cylinders;
Wings(177-208)	solve simple problems involving rates and derived measurements for such attributes as velocity and density.
Tools of Aeronautics(257-326)	select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;
Tools of Aeronautics(257-326)	use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations;
Science of Flight	select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;
Science of Flight	formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population;
Science of Flight	use conjectures to formulate new questions and plan new studies to answer them.
Science of Flight	use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations;
Scientific Method(124-144)	formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population;
Scientific Method(124-144)	select, create, and use appropriate graphical representations of data, including histograms, box plots, and scatterplots.
Scientific Method(124-144)	discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots.
Scientific Method(124-144)	use conjectures to formulate new questions, plan new studies to answer them.
The Tools of Aeronautics	select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;
The Tools of Aeronautics	use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations;