



Geography: Geography provides students with an understanding of spatial perspectives and technologies for spatial analysis, awareness of interdependence of world regions and resources and how places are connected on local, national and global scales.

The study of geography creates an informed person with an understanding of spatial perspective and technologies for spatial analysis; and an awareness of the interdependence of the world regions and resources, and how places are connected at the local, national, and global scales. Students understand the complexity and interrelatedness of people, places, and environments. Geography helps students appreciate the dynamic relationships and complexity of the world.

The skills, concepts, and knowledge acquired in geography are fundamental literacy components for a 21st century student. Use of critical thinking, information literacy, collaboration, self-direction, and invention are apparent in every facet of geographic education. Geography helps students develop a framework for understanding the world, ultimately contributing to the creation of informed citizens.

Standards in Mathematics

In the 21st century, a vibrant democracy depends on the full, informed participation of all people. We have a vast and rapidly growing trove of information available at any moment. However, being informed means, in part, using one's sense of number, shape, data and symbols to organize, interpret, make and assess the validity of claims about quantitative information. In short, informed members of society know and do mathematics.

Mathematics is indispensable for understanding our world. In addition to providing the tools of arithmetic, algebra, geometry and statistics, it offers a way of thinking about patterns and relationships of quantity and space and the connections among them. Mathematical reasoning allows us to devise and evaluate methods for solving problems, make and test conjectures about properties and relationships, and model the world around us.

The Colorado academic standards in mathematics are the topical organization of the concepts and skills every Colorado student should know and be able to do throughout their preschool through twelfth-grade experience.

1. Number Sense, Properties, and Operations

Number sense provides students with a firm foundation in mathematics. Students build a deep understanding of quantity, ways of representing numbers, relationships among numbers, and number systems. Students learn that numbers are governed by properties and understanding these properties leads to fluency with operations.

2. Patterns, Functions, and Algebraic Structures

Pattern sense gives students a lens with which to understand trends and commonalities. Students recognize and represent mathematical relationships and analyze change. Students learn that the structures of algebra allow complex ideas to be expressed succinctly.

3. Data Analysis, Statistics, and Probability

Data and probability sense provides students with tools to understand information and uncertainty. Students ask questions and gather and use data to answer them. Students use a variety of data analysis and statistics strategies to analyze, develop and evaluate inferences based on data. Probability provides the foundation for collecting, describing, and interpreting data.

4. Shape, Dimension, and Geometric Relationships

Geometric sense allows students to comprehend space and shape. Students analyze the characteristics and relationships of shapes and structures, engage in logical reasoning, and use tools and techniques to determine measurement. Students learn that geometry and measurement are useful in representing and solving problems in the real world as well as in mathematics.

Prepared Graduates

The prepared graduate competencies are the preschool through twelfth-grade concepts and skills that all students who complete the Colorado education system must master to ensure their success in a postsecondary and workforce setting.

Prepared graduates in social studies:

1. Use the tools, thinking, and practices of history, geography, economics, and civics to:
 - a. Solve problems, make decisions and analyze issues from multiple perspectives as a responsible member of society
 - b. Read, write, and communicate ideas

Prepared graduates in geography:

1. Develop spatial understanding, perspectives, and personal connections to the world
2. Examine places and regions and the connections among them

Prepared graduates in mathematics:

- Understand the structure and properties of our number system. At their most basic level numbers are abstract symbols that represent real-world quantities
- Understand quantity through estimation, precision, order of magnitude, and comparison. The reasonableness of answers relies on the ability to judge appropriateness, compare, estimate, and analyze error
- Are fluent with basic numerical and symbolic facts and algorithms, and are able to select and use appropriate (mental math, paper and pencil, and technology) methods based on an understanding of their efficiency, precision, and transparency
- Make both relative (multiplicative) and absolute (arithmetic) comparisons between quantities. Multiplicative thinking underlies proportional reasoning
- Recognize and make sense of the many ways that variability, chance, and randomness appear in a variety of contexts
- Solve problems and make decisions that depend on understanding, explaining, and quantifying the variability in data
- Understand that equivalence is a foundation of mathematics represented in numbers, shapes, measures, expressions, and equations
- Make sound predictions and generalizations based on patterns and relationships that arise from numbers, shapes, symbols, and data
- Apply transformation to numbers, shapes, functional representations, and data
- Make claims about relationships among numbers, shapes, symbols, and data and defend those claims by relying on the properties that are the structure of mathematics
- Communicate effective logical arguments using mathematical justification and proof. Mathematical argumentation involves making and testing conjectures, drawing valid conclusions, and justifying thinking
- Use critical thinking to recognize problematic aspects of situations, create mathematical models, and present and defend solutions

Grade Level Expectations

High School

GEOGRAPHY

1. Use different types of maps and geographic tools to analyze features on Earth to investigate and solve geographic questions

Students can:

- a. Gather data, make inferences and draw conclusions from maps and other visual representations
- b. Create and interpret various graphs, tables, charts, and thematic maps
- c. Analyze and present information using a variety of geographic tools and geographic findings in graphs, tables, charts, and thematic maps
- d. Locate physical and human features and evaluate their implications for society

2. Explain and interpret geographic variables that influence the interaction of people, places, and environments

Students can:

- a. Apply geography skills to help investigate issues and justify possible resolutions involving people, places, and environments. Topics to include but not limited to how people prepare for and respond to natural hazards
- b. Identify, evaluate, and communicate strategies to respond to constraints placed on human systems by the physical environment
- c. Explain how altering the environment has brought prosperity to some places and created environmental dilemmas for others
- d. Research and interpret multiple viewpoints on issues that shaped the current policies and programs for resource use
- e. Explain how information and changing perceptions and values of places and environment influence personal actions
- f. Define sustainability and explain how an individual's actions may influence sustainability

3. The interconnected nature of the world, its people and places

Students can:

- a. Explain how the uneven distribution of resources in the world can lead to conflict, competition, or cooperation among nations, regions, and cultural groups
- b. Explain that the world's population is increasingly connected to and dependent upon other people for both human and natural resources
- c. Explain how migration of people and movement of goods and ideas can enrich cultures, but also create tensions
- d. Analyze how cooperation and conflict influence the division and control of Earth
- e. Analyze patterns of distribution and arrangements of settlements and the processes of the diffusion of human activities
- f. Make predictions and draw conclusions about the global impact of cultural diffusion

MATHEMATICS

1. Number Sense, Properties, and Operations

1. The complex number system includes real numbers and imaginary numbers
2. Quantitative reasoning is used to make sense of quantities and their relationships in problem situations

2. Patterns, Functions, and Algebraic Structures

1. Functions model situations where one quantity determines another and can be represented algebraically, graphically, and using tables
2. Quantitative relationships in the real world can be modeled and solved using functions
3. Expressions can be represented in multiple, equivalent forms
4. Solutions to equations, inequalities and systems of equations are found using a variety of tools

3. Data Analysis, Statistics, and Probability

1. Visual displays and summary statistics condense the information in data sets into usable knowledge
2. Statistical methods take variability into account supporting informed decisions making through quantitative studies designed to answer specific questions
3. Probability models outcomes for situations in which there is inherent randomness

4. Shape, Dimension, and Geometric Relationships

1. Objects in the plane can be transformed, and those transformations can be described and analyzed mathematically
2. Concepts of similarity are foundational to geometry and its applications
3. Objects in the plane can be described and analyzed algebraically
4. Attributes of two- and three-dimensional objects are measurable and can be quantified
5. Objects in the real world can be modeled using geometric concepts

Eighth Grade

1. Use geographic tools to analyze patterns in human and physical systems

Students can:

- a. Interpret maps and other geographic tools as a primary source to analyze a historic issue
- b. Describe the nature and spatial distribution of cultural patterns
- c. Recognize the patterns and networks of economic interdependence
- d. Explain the establishment of human settlements in relationship to physical attributes and important regional connections
- e. Calculate and analyze population trends

2. Conflict and cooperation occur over space and resources

Students can:

- a. Analyze how economic, political, cultural, and social processes interact to shape patterns of human population, interdependence, cooperation and conflict
- b. Compare how differing geographic perspectives apply to a historic issue
- c. Interpret from a geographic perspective the expansion of the United States by addressing issues of land, security, and sovereignty

1. Number Sense, Properties, and Operations

1. In the real number system, rational and irrational numbers are in one to one correspondence to points on the number line

2. Patterns, Functions, and Algebraic Structures

1. Linear functions model situations with a constant rate of change and can be represented numerically, algebraically, and graphically
2. Properties of algebra and equality are used to solve linear equations and systems of equations
3. Graphs, tables and equations can be used to distinguish between linear and nonlinear functions

3. Data Analysis, Statistics, and Probability

1. Visual displays and summary statistics of two-variable data condense the information in data sets into usable knowledge

4. Shape, Dimension, and Geometric Relationships

1. Transformations of objects can be used to define the concepts of congruence and similarity
2. Direct and indirect measurement can be used to describe and make comparisons

Seventh Grade

1. Use geographic tools to gather data and make geographic inferences and predictions

Students can:

- a. Interpret maps and other geographic tools to find patterns in human and physical systems
- b. Describe the characteristics and distribution of physical systems, cultural patterns and economic interdependence to make predictions. Topics to include but not limited to environmental issues and cultural diffusion
- c. Collect and analyze data to make geographic inferences and predictions regarding the Eastern Hemisphere
- d. Ask and answer questions after examining geographic sources

2. Regions have different issues and perspectives

Students can:

- a. Classify data to construct thematic maps and make inferences
- b. Analyze and interpret data using geographic tools and create maps
- c. Construct maps using fundamental principles to identify key information and analyze regional issues and perspectives in the Eastern Hemisphere
- d. Explain how the physical environment of a place influences its economy, culture, and trade patterns

1. Number Sense, Properties, and Operations

1. Proportional reasoning involves comparisons and multiplicative relationships among ratios
2. Formulate, represent, and use algorithms with rational numbers flexibly, accurately, and efficiently

2. Patterns, Functions, and Algebraic Structures

1. Properties of arithmetic can be used to generate equivalent expressions
2. Equations and expressions model quantitative relationships and phenomena

3. Data Analysis, Statistics, and Probability

1. Statistics can be used to gain information about populations by examining samples
2. Mathematical models are used to determine probability

4. Shape, Dimension, and Geometric Relationships

1. Modeling geometric figures and relationships leads to informal spatial reasoning and proof
2. Linear measure, angle measure, area, and volume are fundamentally different and require different units of measure

Sixth Grade

1. Use geographic tools to solve problems

Students can:

- a. Use longitude, latitude, and scale on maps and globes to solve problems
- b. Collect and analyze data to interpret regions in the Western Hemisphere
- c. Ask multiple types of questions after examining geographic sources
- d. Interpret and communicate geographic data to justify potential solutions to problems
- e. Distinguish different types of maps and use them in analyzing an issue

2. Human and physical systems vary and interact

Students can:

- a. Classify and analyze the types of connections between places
- b. Identify physical features and explain their effects on people in the Western Hemisphere
- c. Give examples of how people have adapted to their physical environment
- d. Analyze positive and negative interactions of human and physical systems in the Western Hemisphere

1. Number Sense, Properties, and Operations

1. Quantities can be expressed and compared using ratios and rates
2. Formulate, represent, and use algorithms with positive rational numbers with flexibility, accuracy, and efficiency
3. In the real number system, rational numbers have a unique location on the number line and in space

2. Patterns, Functions, and Algebraic Structures

1. Algebraic expressions can be used to generalize properties of arithmetic
2. Variables are used to represent unknown quantities within equations and inequalities

3. Data Analysis, Statistics, and Probability

1. Visual displays and summary statistics of one-variable data condense the information in data sets into usable knowledge

4. Shape, Dimension, and Geometric Relationships

1. Objects in space and their parts and attributes can be measured and analyzed

Fifth Grade

1. Use various geographic tools and sources to answer questions about the geography of the United States

Students can:

- a. Answer questions about regions of the United States using various types of maps
- b. Use geographic tools to identify, locate, and describe places and regions in the United States and suggest reasons for their location
- c. Locate resources in the United States and describe the influence of access on the development of local and regional communities

2. Causes and consequences of movement

Students can:

- a. Identify variables associated with discovery, exploration, and migration
- b. Explain migration, trade, and cultural patterns that result from interactions
- c. Describe and analyze how specific physical and political features influenced historical events, movements, and adaptation to the environment
- d. Analyze how cooperation and conflict among people contribute to political, economic, and social divisions in the United States
- e. Give examples of the influence of geography on the history of the United States

1. Number Sense, Properties, and Operations

1. The decimal number system describes place value patterns and relationships that are repeated in large and small numbers and forms the foundation for efficient algorithms
2. Formulate, represent, and use algorithms with multi-digit whole numbers and decimals with flexibility, accuracy, and efficiency
3. Formulate, represent, and use algorithms to add and subtract fractions with flexibility, accuracy, and efficiency
4. The concepts of multiplication and division can be applied to multiply and divide fractions

2. Patterns, Functions, and Algebraic Structures

1. Number patterns are based on operations and relationships

3. Data Analysis, Statistics, and Probability

1. Visual displays are used to interpret data

4. Shape, Dimension, and Geometric Relationships

1. Properties of multiplication and addition provide the foundation for volume an attribute of solids
2. Geometric figures can be described by their attributes and specific locations in the plane

Fourth Grade

1. Use several types of geographic tools to answer questions about the geography of Colorado

Students can:

- a. Answer questions about Colorado regions using maps and other geographic tools
- b. Use geographic grids to locate places on maps and images to answer questions
- c. Create and investigate geographic questions about Colorado in relation to other places
- d. Illustrate, using geographic tools, how places in Colorado have changed and developed over time due to human activity
- e. Describe similarities and differences between the physical geography of Colorado and its neighboring states

2. Connections within and across human and physical systems are developed

Students can:

- a. Describe how the physical environment provides opportunities for and places constraints on human activities
- b. Explain how physical environments influenced and limited immigration into the state
- c. Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment
- d. Describe how places in Colorado are connected by movement of goods and services and technology

1. Number Sense, Properties, and Operations

1. The decimal number system to the hundredths place describes place value patterns and relationships that are repeated in large and small numbers and forms the foundation for efficient algorithms
2. Different models and representations can be used to compare fractional parts
3. Formulate, represent, and use algorithms to compute with flexibility, accuracy, and efficiency

2. Patterns, Functions, and Algebraic Structures

1. Number patterns and relationships can be represented by symbols

3. Data Analysis, Statistics, and Probability

1. Visual displays are used to represent data

4. Shape, Dimension, and Geometric Relationships

1. Appropriate measurement tools, units, and systems are used to measure different attributes of objects and time
2. Geometric figures in the plane and in space are described and analyzed by their attributes

Third Grade

1. Use various types of geographic tools to develop spatial thinking

Students can:

- a. Read and interpret information from geographic tools and formulate geographic questions
- b. Find oceans and continents, major countries, bodies of water, mountains, and urban areas, the state of Colorado, and neighboring states on maps
- c. Locate the community on a map and describe its natural and human features
- d. Identify geography-based problems and examine the ways that people have tried to solve them

2. The concept of regions is developed through an understanding of similarities and differences in places

Students can:

- a. Observe and describe the physical characteristics and the cultural and human features of a region
- b. Identify the factors that make a region unique including cultural diversity, industry and agriculture, and land forms
- c. Give examples of places that are similar and different from a local region
- d. Characterize regions using different types of features such as physical, political, cultural, urban and rural

1. Number Sense, Properties, and Operations

1. The whole number system describes place value relationships and forms the foundation for efficient algorithms
2. Parts of a whole can be modeled and represented in different ways
3. Multiplication and division are inverse operations and can be modeled in a variety of ways

2. Patterns, Functions, and Algebraic Structures

Expectations for this standard are integrated into the other standards at this grade level

3. Data Analysis, Statistics, and Probability

1. Visual displays are used to describe data

4. Shape, Dimension, and Geometric Relationships

1. Geometric figures are described by their attributes
2. Linear and area measurement are fundamentally different and require different units of measure
3. Time and attributes of objects can be measured with appropriate tools

Second Grade

1. Use geographic terms and tools to describe space and place

Students can:

- a. Use map keys ,legends, symbols, intermediate directions, and compass rose to derive information from various maps
- b. Identify and locate various physical features on a map
- c. Identify the hemispheres, equator, and poles on a globe
- d. Identify and locate cultural, human, political, and natural features using map keys and legends

2. People in communities manage, modify, and depend on their environment

Students can:

- a. Identify how communities manage and use nonrenewable and renewable resources
- b. Identify local boundaries in the community
- c. Explain why people settle in certain areas
- d. Identify examples of physical features that affect human activity
- e. Describe how the size and the character of a community change over time for geographic reasons

1. Number Sense, Properties, and Operations

1. The whole number system describes place value relationships through 1,000 and forms the foundation for efficient algorithms
2. Formulate, represent, and use strategies to add and subtract within 100 with flexibility, accuracy, and efficiency

2. Patterns, Functions, and Algebraic Structures

Expectations for this standard are integrated into the other standards at this grade level.

3. Data Analysis, Statistics, and Probability

1. Visual displays of data can be constructed in a variety of formats to solve problems

4. Shape, Dimension, and Geometric Relationships

1. Shapes can be described by their attributes and used to represent part/whole relationships
2. Some attributes of objects are measurable and can be quantified using different tools

First Grade

1. Geographic tools such as maps and globes to represent places

Students can:

- a. Explain that maps and globes are different representations of Earth
- b. Use terms related to directions - forward and backward, left and right – and distance – near and far – when describing locations
- c. Recite address including city, state, and country and explain how those labels help find places on a map
- d. Distinguish between land and water on a map or globe
- e. Create simple maps showing both human and natural features

2. People in different groups and communities interact with each other and the environment

Students can:

- a. Identify examples of boundaries that affect family and friends
- b. Give examples of how people use and interrelate with Earth's resources
- c. Identify how community activities differ due to physical and cultural characteristics
- d. Give examples of how schools and neighborhoods in different places are alike and different
- e. Identify cultural and family traditions and their connections to other groups and the environment

1. Number Sense, Properties, and Operations

1. The whole number system describes place value relationships within and beyond 100 and forms the foundation for efficient algorithms

2. Number relationships can be used to solve addition and subtraction problems

2. Patterns, Functions, and Algebraic Structures

Expectations for this standard are integrated into the other standards at this grade level.

3. Data Analysis, Statistics, and Probability

1. Visual displays of information can be used to answer questions

4. Shape, Dimension, and Geometric Relationships

1. Shapes can be described by defining attributes and created by composing and decomposing

2. Measurement is used to compare and order objects and events

Kindergarten

1. People belong to different groups and live in different settings around the world that can be found on a map or globe

Students can:

- a. Compare and contrast how people live in different settings around the world
- b. Give examples of food, clothing, and shelter and how they change in different environments
- c. Distinguish between a map and a globe as ways to show places people live

1. Number Sense, Properties, and Operations

1. Whole numbers can be used to name, count, represent, and order quantity
2. Composing and decomposing quantity forms the foundation for addition and subtraction

2. Patterns, Functions, and Algebraic Structures

Expectations for this standard are integrated into the other standards at this grade level.

3. Data Analysis, Statistics, and Probability

Expectations for this standard are integrated into the other standards at this grade level.

4. Shape, Dimension, and Geometric Relationships

1. Shapes are described by their characteristics and position and created by composing and decomposing
2. Measurement is used to compare and order objects

Preschool

1. Develop spatial understanding, perspectives, and connections to the world

Students can:

- a. Use positional phrasing. Phrases to include but not limited to: over and under, here and there, inside and outside, up and down
- b. Identify common places to include but limited to home, school, cafeteria, and gymnasium
- c. Describe surroundings
- d. Use pictures to locate familiar places
- e. Use nonlinguistic representations to show understanding of geographic terms

1. Number Sense, Properties, and Operations

1. Quantities can be represented and counted

2. Patterns, Functions, and Algebraic Structures

Expectations for this standard are integrated into the other standards at this grade level.

3. Data Analysis, Statistics, and Probability

Expectations for this standard are integrated into the other standards at this grade level.

4. Shape, Dimension, and Geometric Relationships

1. Shapes can be observed in the world and described in relation to one another
2. Measurement is used to compare objects

21st Century Skills and Readiness Competencies in Social Studies

The social studies subcommittees embedded 21st century skills, school readiness, and postsecondary and workforce readiness skills into the draft revised standards utilizing descriptions developed by Coloradans and vetted by educators, policymakers, and citizens.

Colorado's description of 21st century skills

The 21st century skills are the synthesis of the essential abilities students must apply in our rapidly changing world. Today's students need a repertoire of knowledge and skills that are more diverse, complex, and integrated than any previous generation. Social studies is inherently demonstrated in each of Colorado 21st century skills, as follows:

Critical Thinking and Reasoning – Social studies is a discipline grounded in critical thinking and reasoning. Doing history, geography, civics and economics involves recognizing patterns and relationships across time and space. Social studies provide the structure that makes it possible to describe patterns that exist in nature and society.

Information Literacy – The disciplines of social studies equip students with tools and mental habits to organize and interpret a multitude of resources. A social studies student with information literacy skills can effectively analyze primary and secondary sources, detect bias, use learning tools, including technology, and clearly communicate thoughts using sound reasoning.

Collaboration – The content areas of social studies involve the give and take of ideas. In the course of understanding social studies, students offer ideas, strategies, solutions, justifications, and proofs for others to evaluate. In turn, the student interprets and evaluates the ideas, strategies, solutions, and justifications of others.

Self-Direction – Understanding social studies requires a productive disposition, curiosity and self-direction. This involves monitoring and assessing one's thinking and persisting to search for patterns, relationships, cause and effect, and an understanding of the events and people throughout time.

Invention – The social studies are a dynamic set of content area disciplines, ever expanding with new ideas and understandings. Invention is the key element as students make and test theories, create and use social studies tools, search for patterns and themes, and make connections among ideas, strategies and solutions.

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