GEOGRAPHY STANDARD 2: How to use mental maps to organize information about people, places, and environments in a spatial context

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A spatial understanding of the environments people live in assists with making sense of the world.

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Aboriginal Dreaming stories are sometimes told with sand drawings that contain symbols reflecting the locations of campsites and scarce water sources used by generations of people in desert regions of Australia.

The geographically informed person must mentally organize spatial information about people, places, and environments and must be able to call upon and use this information in appropriate contexts. Knowing the locations and characteristics of people, places, and environments is a necessary precursor to—and outcome of—geographic learning and thinking. An effective way of doing this is to develop and use what is called a mental map: an individual's internalized representation of aspects of Earth's surface. These maps in the mind are what a person knows about the locations and characteristics of places at a variety of scales, from the local (the layout of a person's bedroom) to the global (the distribution of oceans and continents across Earth). Mental maps are a mix of objective knowledge and subjective perceptions: precise knowledge about the location of geographic features as well as impressions of places, rough estimates of size and location, and a general sense of the connections between places.

Therefore, Standard 2 contains these themes: Developing Mental Maps, Using Mental Maps, and Individual Perceptions Shape Mental Maps.

Mental maps provide people with essential means of making sense of the world and of storing and recalling information about the patterns of Earth's physical and human features. These maps represent ever-changing summaries of spatial knowledge and are indicators of how well people know the spatial characteristics of places. We develop and refine our mental maps through learning from teachers and the media and through personal experience, moving from simple to more complex levels of completeness and accuracy, continuing to add layers of information so that our mental maps reflect a growing understanding of a changing world. As people read, hear, observe, and think more about the world around them, they add more detail and structure to their mental maps and accumulate layers of information that can be used in problem solving and decision making. Students must understand the role that perception plays in the creation and development of their understandings of the world.

Students must build their mental maps to develop detailed understandings of peoples, places, and environments. By understanding these themes, students can build and apply the mental maps that are the foundations for learning geography and other subjects.

Essential Element: The World in Spatial Terms

GEOGRAPHY STANDARD 2: How to use mental maps to organize information about people, places, and environments in a spatial context

4th GRADE

the student knows and understands:

Developing Mental Maps

1. The locations and characteristics of physical and human features are the basis for mental maps at local to global scales

Therefore, the student is able to:

A. Identify from memory the position and arrangement of physical and human features, as exemplified by being able to

- Identify from memory the locations of physical and human features (landmarks) in the classroom or school setting.
- Identify from memory the locations of physical or human features of interest to the student on their routes between home and school.
- Identify from memory on a sketch map the locations of the setting from a favorite book or movie.

2. Mental maps can change with direct experience (such as travel) and indirect experience (such as media exposure and looking at other maps)

Therefore, the student is able to:

A. Identify from memory with increasing detail maps of a place or region, as exemplified by being able to

- Identify details in a student's mental map of a route used frequently (e.g., to and from the grocery store, to and from a park, to and from a relative's home) over a period of time with an emphasis of adding details to the map.
- Identify from memory on a sketch map the locations of major community landmarks or boundaries.
- Identify from memory on a sketch map the locations of state physical features and the political boundaries of the student's home state before and after studying a state map.

8th GRADE

the student knows and understands:

Developing Mental Maps

1. The locations, characteristics, and patterns of physical and human features are the basis for mental maps at local to global scales

Therefore, the student is able to:

A. Identify from memory and describe locations, patterns, and characteristics of physical and human features, as exemplified by being able to

- Identify from memory and describe the locations of state political boundaries and major physical features.
- Identify from memory the locations of major land acquisitions to the United States following the settlement of the original 13 colonies, which resulted in the current political boundaries.
- Identify from memory and describe the major climate and vegetation regions of the United States.

2. Mental maps can change and become more accurate with direct experience (such as travel) and indirect experience (such as media exposure and looking at other maps)

Therefore, the student is able to:

A. Identify from memory with increasing detail and accuracy mental maps of a place or region, as exemplified by being able to

- Identify from memory the locations of major cities in the student's state with accuracy in both the scale and locations.
- Identify from memory the locations and boundaries of all adjacent states and major cities in those states.
- Identify from memory the locations of major transportation routes in the state.

12th GRADE

the student knows and understands:

Developing Mental Maps

1. The locations, characteristics, patterns, and relationships of physical and human systems are the basis for mental maps at local to global scales

Therefore, the student is able to:

A. Identify from memory and explain the locations, characteristics, patterns, and relationships among human and physical systems, as exemplified by being able to

- Identify the pattern of human settlement in the world from memory and explain the common physical characteristics where the majority of settlements occur.
- Identify the locations from memory and explain the connections between major transportation networks and population centers.
- Identify the locations from memory of historical world civilizations and explain how cultural markers or examples still remain from the past (e.g., Roman place names in Europe, structures or architectural styles, spread of English language through the British empire).

2. Mental maps can change through experience and iterative self-reflection

Therefore, the student is able to:

A. Explain the development of completeness and accuracy in the student's mental map of places and regions, as exemplified by being able to

- Explain how a new experience or encounter in an unfamiliar location resulted in added details or accuracy of the student's mental map of that place.
- Explain how the study of maps for game playing added details and accuracy to the student's mental map of a place or region.
- Explain how using a GPS or Web-based mapping application can aid in the development of a more complete and accurate mental map of places and regions.

Essential Element: The World in Spatial Terms

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4th GRADE

the student knows and understands:

Using Mental Maps

3. Mental maps are used to answer geographic questions about locations and characteristics of places and regions

Therefore, the student is able to:

A. Identify from memory locations and geographic characteristics to answer geographic questions, as exemplified by being able to

- Identify from memory the location and geographic characteristics of the most significant intersection near the student's home or school to answer geographic questions (e.g., What types of buildings are located at an important intersection near your home or school? What are the major landmarks used to help someone locate your home or school?).
- Identify from memory the locations of landmarks in the school building and on the school grounds to answer geographic questions (e.g., Where is the closest fire exit to the classroom? What is the shortest route to the nurse's office? Where is the most popular playground equipment located?).
- Identify from memory the map of North America to answer geographic questions (e.g., What are the countries to the north and south of the United States? Which state is located at the easternmost point of the United States? Which state is at the geographic center of the continental United States?).

Individual Perceptions Shape Mental Maps

4. Individuals may have different mental maps of places and regions

Therefore, the student is able to:

A. Describe how an individual's views and understandings of places and regions differ, as expressed by his or her mental map, as exemplified by being able to

- Identify and describe differences in students' sketch maps of their community, including differences in details on their maps, scale, labels, location of features, etc.
- Describe differences in students' understandings of a story or setting of a book based on the details in their mental maps.
- Describe the differences in students' views of a popular community attraction based on the details in their mental maps.

8th GRADE

the student knows and understands:

Using Mental Maps

3. Mental maps are used to answer geographic questions about locations, characteristics, and patterns of places and regions

Therefore, the student is able to:

A. Identify from memory and describe the locations, characteristics, and patterns of places and regions to answer geographic questions, as exemplified by being able to

- Identify from memory and describe the patterns of coastal population density and place characteristics to explain why people may choose to live where they do in the world.
- Identify from memory and describe the features that may have resulted in a change of route or engineering innovations in building the first US transcontinental railroad.
- Identify from memory the distribution, pattern, and characteristics of major world deserts and mountain ranges that can be barriers to travel or settlement.

Individual Perceptions Shape Mental Maps

4. Mental maps are shaped by individual perceptions of people, places, regions, and environments

Therefore, the student is able to:

A. Compare the mental maps of individuals to identify common factors that influence spatial understanding, perceptions, and preferences, as exemplified by being able to

- Compare mental maps of the state sketched by students to identify examples of spatial understanding such as scale on the maps.
- Compare mental maps sketched by students of the location or region of a historical event to identify the different perceptions students may have from the same information presented in the classroom.
- Compare the details in mental maps sketched by students of their most preferred and least preferred state in which to live.

12th GRADE

the student knows and understands:

Using Mental Maps

3. Mental maps are used to answer geographic questions about locations, characteristics, patterns, and relationships of places and regions

Therefore, the student is able to:

A. Identify from memory and explain the locations, characteristics, patterns, and relationships of places and regions to answer geographic questions, as exemplified by being able to

- Identify from memory the locations and significant details that would inform a possible solution to a community-based environmental issue including an explanation of relationships or patterns in the details.
- Identify from memory the pattern of world population and explain the relationship of population settlement to land features and available renewable resources.
- Identify from memory the location of strategic choke points in shipping routes that are most likely to influence the route of trade goods in the future and explain the relationships between the United States and other countries controlling these strategic locations.

Individual Perceptions Shape Mental Maps

4. Changing perceptions reshape mental maps of people, places, regions, and environments

Therefore, the student is able to:

A. Compare an individual's mental map before and after a geographic event or experience, as exemplified by being able to

- Compare students' mental maps created before and after a school or family trip to identify changes in the details and accuracy of the maps.
- Compare students' mental maps created before and after the study of world regions that are most likely to experience political change or restructuring.
- Compare students' mental maps before and after studying a current news event to identify how additional information translates into changes in understanding of the location.

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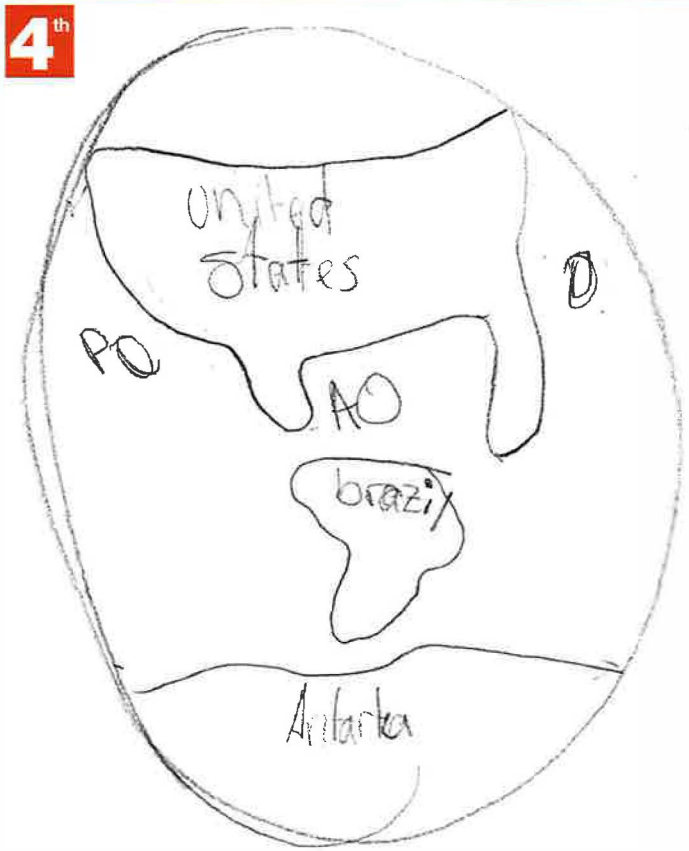

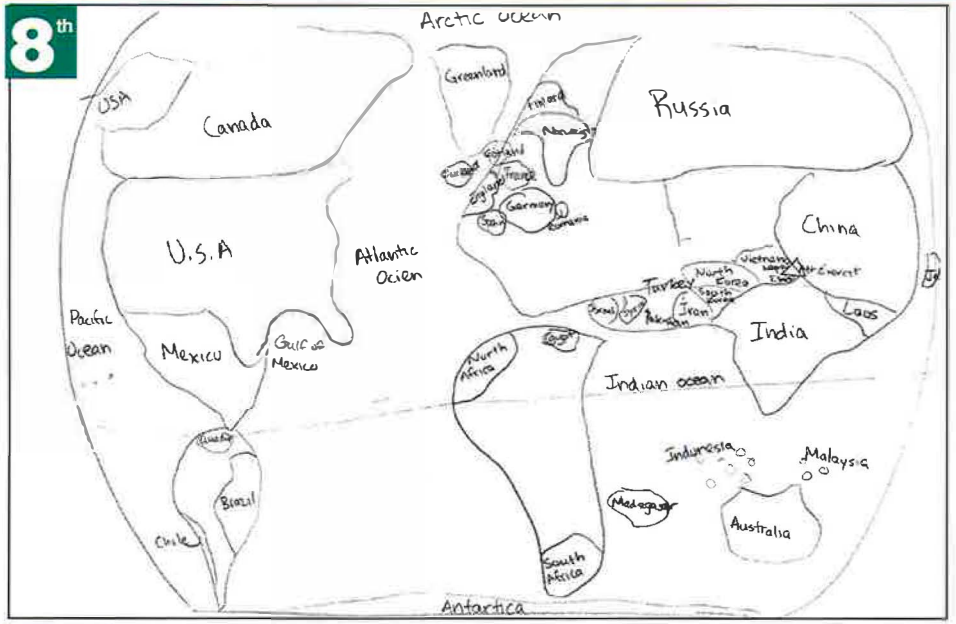

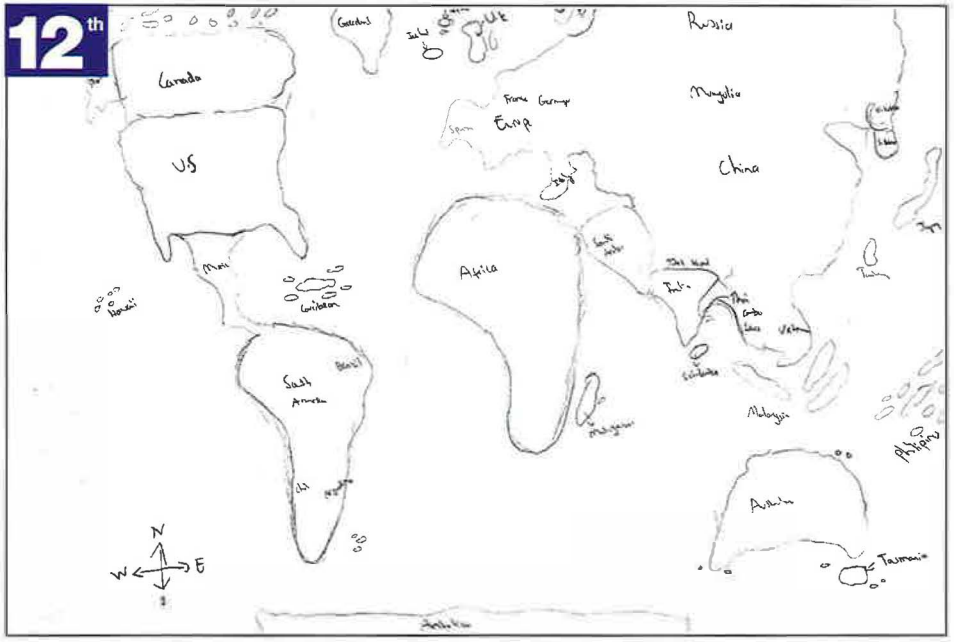

Asking students to sketch mental maps of the world can illustrate the level of detail and accuracy in their spatial perceptions of the world. These mental map examples were drawn by 4th grade (above), 8th grade (top right), and 12th grade (lower right) students.

Image credit: Mental Maps. (2012). (Unpublished student work). Denver Public Schools, Denver, Colorado.