ASSESSMENT AND EXERCISE SPECIFICATIONS

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS (NAEP) IN GEOGRAPHY

Used for the 1994, 2001, and 2010 NAEP Geography Assessments

June 1991

Developed Under Contract Number RN91073001 for the National Assessment Governing Board by the Council of Chief State School Officers, National Council for Geographic Education, National Council for the Social Studies, and the American Institutes for Research

What is the Nation's Report Card?

THE NATION'S REPORT CARD, the National Assessment of Educational Progress (NAEP), is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. Since 1969, assessments have been conducted periodically in reading, mathematics, science, writing, history, geography, and other fields. By making objective information on student performance available to policymakers at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement is collected under this program. NAEP guarantees the privacy of individual students and their families.

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In 1988, Congress created the National Assessment Governing Board (NAGB) to formulate policy guidelines for NAEP. The board is responsible for selecting the subject areas to be assessed, which may include adding to those specified by Congress; identifying appropriate achievement goals for each age and grade; developing assessment objectives; developing test specifications; designing the assessment methodology; developing guidelines and standards for data analysis and for reporting and disseminating results; developing standards and procedures for interstate, regional, and national comparisons; improving the form and use of the National Assessment; and ensuring that all items selected for use in the National Assessment are free from racial, cultural, gender or regional bias.

The National Assessment Governing Board

Geography Assessment and Exercise Specifications

for the

1994 National Assessment of Educational Progress

NAEP Geography Consensus Project

Developed under contract number RN91073001 by the Council of Chief State School Officers with the National Council for Geographic Education and the National Council for the Social Studies and the American Institutes for Research, for the National Assessment Governing Board.

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For further information, contact
The National Assessment Governing Board
(202) 357-6938

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INTRODUCTION

The mission of Geography education is to foster the development of citizens who can apply the knowledge and skills of geography in real-life situations. The 1994 NAEP assessment in Geography will examine students' ability to use a spatial perspective to understand the arrangement and interaction of people and places over Earth's surface.

The assessment will test students' knowledge of geography using a variety of stimulus materials, including text, graphics, data, maps, charts, photographs, and manipulable materials. Different response modes will be combined with all of the above stimuli in developing items. The response modes are single correct option multiple choice items; written open-ended exercises, both short answer and extended response; production exercises, such as adding information to printed maps, designing and drawing different types of maps, and charting or graphing data; and a combination of a written response and a production item. The following pages present detailed specifications for the overall assessment and for the exercises (items).

An Item Writers' Guide setting forth basic rules for good item construction for all item formats is to be provided by the test development contractor. The Guide should include criteria for developing items using a combination of response modes and stimulus materials, and must conform to the specifications set forth in this document, the NAGB Policy on Cognitive Item Development and Review, and any formatting requirements of NAEP.

This document is divided into two sections: Assessment Specifications, and Exercise Specifications. The Assessment Specifications provide an overall description of the construction, review, and scoring of the assessment. The Exercise Specifications detail the construction of the exercises in terms of format and content.

ASSESSMENT SPECIFICATIONS

Assessment Construction

Dimensions of Assessment

The 1994 NAEP Geography assessment stresses conceptual understanding of key content areas, as well as the application of geographic knowledge and skills. The assessment will be constructed on two dimensions: geographic content and cognitive processes. Summary paragraphs of these dimensions, and the distribution of assessment exercises across the dimensions are given below.

The distribution of exercises across the dimensions will be described in terms of "proportion of the exercise pool", but such proportions are not intended to refer simply to the proportions of the total number of exercises in a given category. Simple proportions of exercises are problematic because single exercises may vary widely in the amount of time they require and the amount of information they yield (especially across, but also within, formats). Therefore, in this document, specifications of "proportion of the exercise pool" correspond to proportion of total student time at a particular grade level that would be required if the entire grade-level pool could be administered to a single individual, tempered by the understanding that the statistical efficiency of different exercise formats may vary. It should *not* be taken to refer strictly to numbers of exercises in different categories.

The Content Dimension

The publication of the 1984 *Guidelines for Geographic Education — Elementary and Secondary Schools*[1] provided teachers with an instructional framework for the teaching and learning of geography. The Guidelines uses five themes to organize the content of geography. The Five Themes are:

Location - refers to the absolute location, usually determined by use of latitude and longitude coordinates, and relative location (such as 'near to', or 'a short drive from'), of places and people on Earth. Before any geographic analysis or higher order thinking can take place, it is essential to know the location of the place one is trying to understand.

Place - refers to describable physical and human characteristics of particular places. All places on Earth have distinctive tangible and intangible characteristics that give them meaning and character and distinguish them from other places. Using observation and description, the Themes of Location and Place set the stage for further geographic analysis.

Human/Environment Interaction - refers to how people interact with particular places. All places on Earth have advantages and disadvantages for human settlement. This theme encourages the study of the modification and transformation of environments by human and physical causes and the effects of physical features on the lives of people.

Movement - refers to people interacting with each other on Earth. Humans occupy places unevenly on Earth, but they interact with each other through the transportation of commodities and through travel, trade, information flows, and political events. This theme also concentrates on the patterns of human migration and the movement of ideas from one place to another.

Regions - refers to a basic unit of geographic study. A region is an area that displays a coherent unity in terms of specific criteria, such as a governmental unit, a language group, or a landform type. Regions are human constructs, and they can be mapped and analyzed.

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[1] *Guidelines for Geographic Education — Elementary and Secondary Schools,* Joint Committee on Geographic Education of the National Council for Geographic Education and the Association of American Geographers, 1984.

The three content areas of the NAEP 1994 Geography Assessment, "Space and Place," "Environment and Society," and "Spatial Dynamics and Connections," draw upon these five themes. Just as the Guidelines serve to organize geography content for *instruction*, the three content areas organize geography content for *assessment*.

Space and Place will be assessed by examining students' knowledge and understanding of geographic information relating to particular places on Earth, spatial patterns on Earth's surface, and the physical and human processes that shape those patterns.

Basic to all geographic concern is the nature of space and place. The spatial perspective helps students see the patterns and arrangements that characterize Earth's space. Patterns that are illustrated on maps come from observation of both natural features, such as landforms, and of human features, such as farms and cities.

Students should be able to distinguish between and understand the spatial distribution of physical and human characteristics. To do this, they should be able to locate significant features and places on Earth, recognize existing patterns in the distribution of features and places, and comprehend the reasons for the development and existence of these patterns. Examples include the distribution of climates, crop regions, factories owned by multi-national corporations, or sites where earthquakes occur.

Fourth grade students should have a foundation of basic knowledge of the human and physical world, including defining and understanding places and patterns, and the processes affecting the places and patterns. By the eighth grade, students should have a greater foundation of basic knowledge, and a more sophisticated sense of the location and general characteristics of places, of basic human and physical distribution patterns, and of the processes that create these patterns so that they have a working knowledge of the world. In the twelfth grade, students' foundation of knowledge and understanding of processes should be even greater than those of eighth grade students. The level of sophistication should be such that students can make practical applications of geography to everyday life, preparing

them to live in an increasingly complex, technologically innovative, and economically competitive world.

Environment and Society will be assessed by testing students' knowledge and understanding of the interactions between the environment and society, and how people adapt to, depend on, are affected by, and modify the natural environment.

Students should be able to analyze the cost-benefit ratio of environmental modification, describing and explaining how the alteration of the balance of nature can bring economic prosperity, but can also create environmental dilemmas and crises. For example, planting trees to reduce erosion from winds may have positive consequences. Other modifications, such as locating a landfill over a groundwater source, may have negative consequences.

This content area also examines students' understanding of the different interpretations of environmental issues that are dependent upon different people's perspectives. A river dammed as a reservoir for flood control and multi-purpose use may also flood animal communities and affect down-river water supplies. Understanding the nature, scale, and ramifications of environmental transformation is fundamental in geography education. Finally, students will be assessed on their understanding of how natural hazards and disasters such as tornados, earthquakes, floods and hurricanes, are a cause and have an effect on people's choices of where to live.

Fourth grade students should have been introduced to the processes that form Earth's surface, environmental issues and their effects, and how natural hazards affect where and how people live. By eighth grade, students should understand how humans depend upon, adapt to, and change their environment, and be able to analyze environmental problems, and be aware of the natural systems that cause natural disasters and hazards. Twelfth graders should be able to do all of the above with an increased level of sophistication, based on a greater knowledge base and exposure to contemporary environmental issues.

Spatial Dynamics and Connections examines students' competence in geography as it relates to regional variation and connections among people and places.

Geography's spatial perspective helps students understand the dynamics of connections among people and places. These connections are influenced by a wide variety of factors that characterize modern life, including advances in communications, transportation, and trade relationships; cultural and economic diversity; political change and tensions; human migration, travel, and tourism; the diffusion of ideas, technological innovations, and disease epidemics.

The assessment will probe students' understanding of the uneven distribution of resources, and how this contributes both to the movement of people, and to patterns of warfare and trade. The assessment will also examine students' awareness of the characteristics of human diversity and how that diversity shapes places and regions, and the global interdependence that characterizes the modern world.

Fourth grade students should be able to define and compare human characteristics among different places and use concepts of culture to understand human diversity, connections, and conflict. By eighth grade, students should be able to understand the concepts involved in both local and global interactions of individuals and cultures, and be able to apply their knowledge of cultural and economic diversity to personal as well as societal issues and decisions. By twelfth grade, students should be able to synthesize geographic knowledge previously learned, acquire new concepts related to spatial aspects of geopolitics, economics, and human characteristics, and apply them to understanding the conflicts and compromises that characterize contemporary issues.

Table 1 shows the intended distribution of the total item pool across the content areas for each of the three grades to be assessed.

Table 1
Distribution of Exercise Pool across Content Areas:
Grades Four, Eight, and Twelve

	Content Area		
Grade Level	Space and Place	Environment and Society	Spatial Dynamics and Connections
Grade Four	40%	30%	30%
Grade Eight	40%	30%	30%
Grade Twelve	40%	30%	30%

The Cognitive Dimension

Three areas will be assessed within the cognitive domain: 1) Knowing; 2) Understanding; and 3) Applying. All three areas will be used to test the students' ability to perform mental tasks and operations at different levels, as they work with the content that is appropriate to their grade levels.

Knowing includes the abilities to observe and recall information. While it is particularly important to assess these abilities in the lower grades, all students in all three grades need to have a solid foundation of knowledge to draw upon when faced with the task of understanding and analyzing more complex issues.

Some examples of the types of questions asked within this category are, "Where is the world's largest tropical rain forest?" "What mineral resources are often extracted by strip mining?" and, "What factors stimulate human migrations?"

Understanding involves attributing meaning and context to information. While the foundation of knowledge that is accumulated at the different grade levels is essential as a basis for

higher-order thinking, it is also trivial without context and meaning, and this is true for all students.

Some examples of the types of questions asked within this category are, "Why are tropical rain forests located near the equator?" "Explain the effects of strip mining and shaft mining on the landscape." and, "Discuss the motivations of modern day Mexicans and Cubans immigrating to the U.S."

Applying involves the higher-order thinking processes of classifying, hypothesizing, using inductive and deductive reasoning, and forming problem-solving models. These are critical thinking skills that all fourth, eighth, and twelfth grade students should be capable of using at a developmentally appropriate level.

Some examples of the types of questions asked within this category are, "Support the conclusion that tropical rain forests promote wide species variation." "How can both economic and environmental interests be reconciled in an area of strip mining?" and, "Explain the settlement and employment patterns of Cuban and Mexican immigrants in the southern U.S."

Table 2 shows the recommended grade level distribution of the total item pool across the three cognitive areas.

Table 2
Distribution of Exercise Pool across Cognitive Areas:
Grades Four, Eight, and Twelve

	Cognitive Area		
Grade Level	Knowing	Understanding	Applying*
Grade Four	45%	30%	25%
Grade Eight	40%	30%	30%
Grade Twelve	30%	30%	40%

Applying* = a range of higher-order thinking skills

Geography's Tools, Analytical Concepts and Skills

In order to perform tasks in any of the cognitive areas, as well as to properly express content knowledge, the student of geography needs to be able to use several tools, analytical concepts, and geographic skills. Tools are two- and three-dimensional items to which a student refers for information about a geographic area. Analytic concepts include Scale, Change, Diversity, Models, and Systems, and are an integral part of geographic content. Geographic skills include observing and asking geographic questions, reading and making maps, and using and understanding geographic tools.

Students' use and understanding of tools, analytical concepts, and geographic skills will be indirectly assessed in the 1994 NAEP Geography Assessment; no scores will be generated for them. Detailed descriptions of the tools, concepts, and skills are found in the Exercise Specifications.

Allocation of Testing Time

The total examination time (length of test sitting) for each student will be 50 minutes. For

fourth graders, and for most eighth and twelfth grade students, the length of time will be broken up into two blocks of 25 minutes duration.

Some 8th and 12th grade students being assessed will be given a block of items (exercises) devoted to an in-depth examination of a single problem or topic. Possibilities might include questions on acid rain, major immigration patterns, or the relationship between unequal distribution of resources and economic patterns.

These in-depth examinations will be scheduled for the full 50 minutes of testing time, and should include a few multiple-choice and short-answer response formats, as well as an extended response item. There must be no interdependency of these questions in the sense that being able to answer one question correctly depends on already having answered some other question correctly. In other words, in order to avoid compounding errors, a new question must not require using an answer from a previous item to obtain the correct answer to the new question. These blocks of exercises examining a topic in depth must remain intact.

The recommendation for blocks of exercises examining a topic in depth is made with the recognition that block items may have some scaling intricacies that preclude the estimation of either scores or plausible values for all students relying exclusively on the IRT methods ETS has developed in the course of earlier NAEP assessments. The Planning Committee encourages consideration of alternatives to the estimation of scores or posterior score distributions for each examinee, but takes no position on the question of whether such scores or plausible values should necessarily be obtained. (In no case would such scores be reported for individuals.)

Achievement Level Descriptions

Preliminary descriptions of the three NAEP achievement levels for Geography were conceptualized by the Planning Committee. The Committee defined what constitutes Basic, Proficient, and Advanced levels of achievement in geography at each grade level in terms

of student knowledge and behavior. These preliminary, content-based, behavioral descriptions encompass both the content and cognitive domains of the assessment, and will be used as input into the achievement level setting for the 1994 Geography Assessment. Detailed descriptions of the achievement levels can be found in the Exercise Specifications.

Review Process and Criteria

Geography Expert Review

In order to ensure the development of exercises that adequately represent the content domain and exhibit proper psychometric characteristics, as well as to construct an item pool that will facilitate assessment scoring relative to the three achievement levels, it is important that review by recognized experts in the field, competent in test construction and relevant content areas, be incorporated during the test development process. Therefore, the development, field testing, and selection of the assessment items will be monitored by an item development panel consisting of members of the National Assessment Governing Board's Subject Area Committee #1; the Geography Consensus Planning and Steering Committees; and geographers, teachers, geography educators, and other subject area experts. Consistency between the consensus documents and the item pool will be maintained by having a minimum of 20% of the membership of the consensus Planning Committee serve on the panel.

After the test items have been developed, the item development panel will review the item pool at each grade level to judge the items for congruence with the Specifications document on criteria such as grade level appropriateness, technical accuracy, content validity, variety of item format, and appropriateness of classification labels that reference the items to the assessment dimensions they purport to measure. In addition, reviewers will insure that the item pool is balanced with respect to both the content and cognitive dimensions, and that it is representative of the content described in the achievement level definitions.

Exercises will be reviewed again after field testing, as part of the process of selecting the

items that will appear in the operational assessment. Exercises with poor discrimination parameters will be considered for elimination at this point, as well as any items that statistical evaluation reveals to be technically flawed. However, items (exercises) will not be eliminated *solely* because of their level of difficulty. A comprehensive range of item difficulties is to be maintained, and items will not be ruled out because they are too easy or too hard. Items with poor discrimination that appear otherwise technically sound may be retained if necessary to assure balance and coverage with respect to content and cognitive dimensions.

Bias Review

All items will be screened for evidence of cultural bias or lack of ethnic and gender sensitivity, and will be subjected to Differential Item Functioning (DIF) analyses following accepted psychometric practices. If after close scrutiny an item appears to be a valid measure of appropriate geographic content, and, if no plausible explanation for the DIF is apparent, the item will be retained.

Scoring

General Criteria

The assessment will be designed to facilitate reporting using *quantitative scales* and *narrative descriptions* of typical exercise solutions by students.

Quantitative scales will be defined *within*, not across, age/grade levels. An overall posterior score distribution will be estimated for each student, and the distribution of plausible values drawn from these individual-level distributions will be reported for each age/grade level and for demographic subgroups, in accordance with standard NAEP procedures. Sufficient exercises will be included in the assessment to assure the precision necessary to report results on three separate content subscales for the nation as a whole. If possible, area subscales will be reported for the cognitive dimension as well.

For reporting of subgroup performance, it may be necessary to form weighted composites of these subscales in order to attain sufficient precision. If such a combination of scale scores is used, reports of overall score distributions should make clear that they are a composite of separate subscales.

Exercise Types

Every item (exercise) is composed of a kind of stimulus and a type of response. Acceptable stimuli include text, graphic/pictorial material, manipulable items, and any combination of the above. Response modes include multiple-choice, written open-ended (both short answer and extended response), production items, and a combination of a written/production response. All of the stimuli and response modes should be combined for use in the development of all the above scores and scales.

Scoring of Constructed Response Exercises

Scoring protocols (rubrics) should be created *a priori* for constructed response items, which include both short and extended response written exercises, and production items. These rubrics should be modified appropriately after field testing. Scores should be assigned within the rubrics of complex items to reflect the quality of the responses, and each point on the scoring rubric should contain specific criteria for the desired response at each level. An appropriate IRT model for polytomous exercise response data should be used in scoring the open-ended items to accommodate a range of possible scores, e.g., 0 to 4, rather than just assigning a right or wrong score.

Score Reporting

No method of reporting of NAEP results has been optimal for all purposes. Consequently, multiple methods of reporting results are recommended. In particular, as stated above, scale scores should be supplemented with narrative descriptions for individual illustrative items or clusters of items. Detailed recommendations for reporting are presented in a separate document written by the Planning Committee.

EXERCISE SPECIFICATIONS

General Characteristics of Exercise Development

All exercises should test only the content included in the detailed content specifications. Exercises should focus on the key concepts, principles, and skills at the appropriate grade level and should avoid testing obscure or esoteric material. In addition, the item pool should be developed in such a way as to ensure that the content described in the achievement level definitions given below is reflected at each grade level.

Achievement Level Descriptions

Achievement levels describe how well students should perform on the content and thinking levels required by the assessment. They evaluate the quality of the outcomes of students' education in geography, at grades four, eight, and twelve, as measured by NAEP. Three achievement levels—**Basic, Proficient, and Advanced**—have been defined for each grade level.

Basic denotes *partial* mastery of the knowledge and thinking skills, but performance that is fundamental for adequate work in grades 4, 8, and 12. **Proficient** represents solid academic performance and competency over challenging subject matter. If a majority of students performed at the this level on this assessment, the Consensus Committees believe students would have learned enough geography to be competent students and productive citizens. **Advanced** performance on this assessment represents performance that is equal to that expected of top students in other industrialized nations, and is defined by the Consensus Committees as world class for the first time in NAEP's history.

Item writers should avail themselves of materials from the United Kingdom, Canada, Australia, and the International Baccalaureate (an international curriculum taught in a number of quality schools throughout the U.S. and the world) assembled by the Planning and Steering Committees, in order to familiarize themselves with expectations held for advanced students elsewhere. This concern for world class achievement reflects the

geography community's belief that geography must be as rigorously taught in the United States as it is in other nations that depend upon their citizens' knowledge of the world to compete in world economic markets, understand other cultures, and protect environmental quality.

The following preliminary achievement level descriptions for the 1994 NAEP Geography Assessment assume that every higher performance level incorporates and builds upon the preceding levels.

Fourth Grade Basic

Students should be able to use words and/or diagrams to define basic geographic vocabulary; identify personal behaviors, responsibilities and perspectives related to the environment and describe some environmental and cultural issues in their community; use visual tools to access information; identify major geographic features on maps and globes; be able to read and draw simple maps, map keys and legends; demonstrate how people depend upon, use, and adapt to the environment; give examples of the movement of people, goods, services, and ideas from one place to another. In addition to demonstrating an understanding of how people are alike and different, they should demonstrate knowledge of the ways people depend on each other.

Fourth Grade Proficient

Students should be able to use fundamental geographic knowledge and vocabulary to identify basic geographic patterns and processes; describe an environmental or cultural issue from more than one perspective; read and interpret information from photographs, maps and globes, aerial photography and satellite images. They should be able to use number and letter grids to plot specific locations; understand relative location terms; sketch simple maps as well as describe and/or draw landscapes they have observed or studied. Proficient students should be able to illustrate ways people depend upon, adapt to, and modify the environment; describe and/or illustrate geographic aspects of a region using fundamental geographic vocabulary and give reasons for current human migration; discuss the impact a

location has upon cultural similarities and differences; and be able to demonstrate how an event in one location can have an impact upon another location.

Fourth Grade Advanced

Students should be able to use basic geographic knowledge and vocabulary to describe global patterns and processes; describe ways individuals can protect and enhance environmental quality; describe how modifications to the environment have positive and negative consequences; explain differing perspectives that apply to local environmental or cultural issues; demonstrate an understanding of forces that result in migration, changing demographics, and boundary changes. They should be able to solve simple problems by applying information learned through working with aerial and other photographs, maps and globes, atlases, news media and computers. They should be able to construct models and sketch and label maps of their own state, the U.S.A. and the world, use them to describe and compare differences, similarities, and patterns of change in landscapes, and be able to predict the impact a change in one location can have on another. Finally, they should be able to demonstrate a knowledge of the ways individuals and groups contribute to society.

Eighth Grade Basic

Students should possess fundamental knowledge and vocabulary of concepts relating to patterns, relationships, distance, direction, scale, boundary, site, and situation; solve basic locational questions using latitude and longitude; interpret basic map scales; identify continents, oceans, and selected countries and cities; respond accurately to descriptive questions using information obtained by use of geographic models and/or translate that information into words; explain the difference between maps and globes; and find a wide range of information using an atlas or almanac. Students should be able to recognize and illustrate the relationships that exist between humans and their environments, and provide evidence showing how a physical habitat can influence human activity. They should be able to define a region and identify its distinguishing characteristics. Finally, they should be able to demonstrate how the interaction that takes place between and among regions is related to the movement of people, goods, services, and ideas.

Eighth Grade Proficient

Students should possess a fundamental geographic vocabulary and understand geography's analytical concepts; solve locational questions requiring integration of information from two or more sources; compare information presented at different scales; identify a wide variety of physical and cultural features and describe regional patterns; respond accurately to interpretive questions using geography's tools and translate that information into patterns; identify differences in map projections and select proper projections for various purposes; and develop a case study working with geography's analytical concepts. In addition, students should be able to describe the physical and cultural characteristics of places, and explain how places change due to human activity; explain and illustrate how the concept of regions can be used as a strategy for organizing and understanding Earth's surface; and analyze and interpret databases and case studies as well as use information from maps to describe the role that regions play in influencing trade and migration patterns, and cultural and political interaction.

Eighth Grade Advanced

Students should have a command of extensive geographic knowledge, analytical concepts, and vocabulary; be able to analyze spatial phenomena using a variety of sources with information presented on a variety of scales and show the relationships between them; and use case studies for spatial analysis and to develop maps and other graphics. Students should be able to identify patterns of climate, vegetation, and population across Earth's surface and interpret the relationships between and among these patterns; and use one category of a map or aerial photograph to predict other features of a place, such as vegetation based on climate, or population density based on topographic features. Students should also be able to relate the concept of region to specific places and explain how regions change over time due to a variety of factors. They should be able to profile a region of their own design using geographic concepts, tools, and skills.

Twelfth Grade Basic

Students should possess a knowledge of concepts and terms commonly used in physical and

human geography as well as skills employing units of measurement and scale applicable when solving simple locational problems using maps and globes. They should be able to read maps; provide examples of plains, plateaus, hills, and mountains; and locate continents, major bodies of water, and selected countries and cities. They should be able to interpret geographic data found in charts, tables, cartograms, and graphs; know the nature of and be able to identify several basic types of map projections; understand the basic physical structure of the planet; explain and apply concepts such as continental drift and plate tectonics; and describe geography's analytical concepts using case studies. Students should have a comprehensive understanding of spatial relationships including the ability to recognize patterns that exist across Earth in terms of phenomena including climate regions, time zones, population distributions, availability or resources, vegetation zones, and transportation and communication networks. They should be able to develop data bases about specific places and provide a simple analysis about their importance.

Twelfth Grade Proficient

Students should have an extensive understanding and knowledge of the concepts and terminology of physical and human geography. They should be able to use geographic concepts to analyze spatial phenomena and to discuss economic, political, and social factors that define and interpret space. They should be able to do this through the interpretation of maps and other tools, through the analysis of case studies, the utilization of data bases, and the selection of appropriate research materials. Students should be able to design their own maps based on descriptive data; describe the physical and cultural attributes of major world regions; relate the spatial distribution of population to economic and environmental factors; report both historical and contemporary events within a geographic framework using tools such as special purpose maps, and primary and secondary source materials.

Twelfth Grade Advanced

Students should possess a comprehensive understanding of geographic knowledge and concepts; apply this knowledge to case studies; formulate hypotheses and test geographic models that demonstrate complex relationships between physical and human phenomena;

apply a wide range of map skills; develop maps using fundamental cartographic principles including translating narratives about places and events into graphic representations. Students should also be able to undertake sophisticated analysis from aerial photographs, satellite imagery, or other visuals. Advanced students should be able to develop criteria assessing issues relating to human spatial organization and environmental stability, and through research skills and the application of critical thinking strategies, identify alternative solutions. They should be able to compile data bases from disparate pieces of information, and from this data develop generalizations and speculations about outcomes when data change.

Exercise Format Specifications

For the 1994 NAEP Geography Assessment, each exercise will contain a specific stimulus selected from a variety of materials, and one of five response modes.

Stimulus Material

In the development of all types of test items, it is important to control the stimulus tightly. The authors must formulate clearly in their own minds the nature of the task to be performed by the examinee, (i.e., the kind of operation the student is intended to carry out); define the materials on which the operation is to be carried out; and incorporate into the exercise a clear statement of the task to be performed. This statement must include the situation or setting the students are to be given and what they are to do.

Stimulus material must be varied and can include text; maps and map outlines; charts and graphs; aerial, satellite and other photographs; material generated by Geographic Information Systems (GIS); atlases; and manipulable items. Manipulative materials may include flexible cardboard rulers, and, because not every classroom is equipped with a globe, hard surface globes. Up to 25% of the time spent by all three grades may include the use of these manipulables. In addition, the stimulus material must be generated to allow for a

variety of student responses, including production items such as maps, charts, and graphs, as well as written responses.

For development of stimulus materials, authors can utilize atlases and almanacs for students such as the *Doubleday Children's Atlas*, the *World Atlas for Students*, *Guide to Places of the World* (Reader's Digest), and Childcraft's *Whole Wide World*; text taken from periodicals such as *National Geographic*, *Journal of Geography*, *Animal Kingdom*, *Zoonooz*, *Discover*, *Focus*, *World*, *World Eagle*, *World Newsmap*, *Science Digest*; and newspapers, encyclopedias, news magazines, or any other relevant material commonly found in schools.

It is as important for the item writers to consider the amount of data projected by a particular stimulus, as it is to select the appropriate type of stimulus. Therefore the following qualifications apply to the selection of appropriate stimulus materials:

- Maps should be grade-level appropriate in terms of quantity of detail and abstraction of concepts.

- Maps and data generated from the United States, the world, and hypothetical locations may be used. The amount of world data to be used should increase proportionately by grade level, such that fourth graders have more U.S. than world examples, while twelfth graders have items with more world data than U.S. data. There are no grade level specifications regarding the use of hypothetical locations.

- At least 75% of all multiple choice items should refer to a graphic or to a combination of text and graphic as a stimulus.

- The volume of prose for all three grades should be controlled to avoid confounding reading ability with geography

understanding. This is especially true for the fourth grade, where the reading of text passages should be kept to a minimum.

- Climographs, cartograms and GIS' should not be used as stimuli at the fourth grade level.

Response Modes

The five response modes to be used are: multiple choice exercises; written open-ended exercises, both short answer and extended response; production exercises, and a combination of a written response and a production exercise. Multiple-choice exercises will be of the conventional single correct option format with four options. Short written answer items require a response varying in length from one or two words or phrases to several sentences; extended response items require the student to write one or more paragraphs. Production exercises will require the students to fill in information on map outlines, design and construct maps, create charts and draw graphs.

Given the scope of objectives, it is recommended that 50% of total student time is to be spent on multiple-choice exercises. The remaining 50% of test time will be devoted to constructed response exercises: a combination of short answer, extended response, and production exercises, in proportions specified below.

To avoid an exercise-format effect, it is desirable to use all formats to test each of the content areas being measured. To ensure a more authentic assessment for students, there should be a combination of exercise response formats in each individual test booklet. In order to prevent students from becoming confused when faced with multiple item formats, clear directions must be given at the beginning of each test booklet. In addition, at the beginning of the assessment, students should be guided through relevant sample item formats by the test administrators using carefully scripted directions.

Multiple-Choice Items

Good multiple choice items can be constructed to probe students' ability to analyze and evaluate facts and concepts in geography, and to assess their geographic skill levels, as well as to probe recall and comprehension.

Multiple choice items have the following requirements for item options:

- There must be only one clearly identifiable correct option for each question; if valid arguments can be made for more than one option, the item is unacceptable.

- The correct option must be a concise answer that will satisfy any qualified judge as being an adequate short answer to the question. The response must not answer more than the stem question asks.

- Distractors should appeal to some kind of misinterpretation, predisposition, unsound reasoning or casual reading.

- Distractors should be plausible and homogeneous. Options that are obviously wrong or silly effectively reduce the number of possible correct answers and, thus, reduce the validity of the item. Sources of good distractors include common misinterpretations and errors in reasoning, statements that are true but that are not correct answers to the questions posed in the item stems, statements that are either too broad or too narrow to be correct, and carefully worded incorrect statements that may sound plausible to the uncritical thinker.

- Distractors must be written with as much care and precision as the correct option so that all alternatives are equally attractive to a student who guesses. Each option should be a separate and distinctly different response to the stem. Responses should not overlap or include other responses. "All of these," or "None of these," should never be used as an option.

- Both the stem and the options should be as brief and straightforward as possible. All options should be parallel in point of view and grammatical structure and similar in length. The stem should include any words that otherwise would have to be repeated in each option.

Constructed Response Exercises

Constructed response exercises, or open-ended items requiring written and/or drawn responses, can provide insights into students' abilities to communicate about geography. Specifically, these items can be used to probe students' abilities to disseminate geographic knowledge, expand their conceptual understanding of geographic phenomena, and explain their (geographic) reasoning behind offered solutions to real life problems. These exercises—written short answer, written extended response, and production exercises—will require hand scoring with trained raters using *a priori* scoring protocols.

Written Responses

Short-answer responses require the student to write as little as a word or two, or as much as several sentences. Extended written response exercises require the student to write one or more paragraphs. The proportion of student time devoted to extended response formats relative to time spent on short-answer exercises should be commensurate with the grade level; that is, twelfth graders will spend the most time on extended response exercises, while fourth graders will spend less time.

For extended response items, students can be asked to read and interpret maps, generate maps from textual material and/or draw conclusions from maps they read or generate. For

example, at the twelfth grade level, an exercise could be devised that contained text and a series of maps showing air currents that carry industrial pollution material over vast distances from where it originates. Students could be asked to read the text, interpret the maps, and offer their own solutions with respect to the problem of acid rain, either generally or for a specified area.

The stimulus for all items should be defined (scaffolded) to identify the elements that constitute a satisfactory response, indicating to the student how the exercise will be scored. All response modes can be used for all three grades with the following qualifications:

- There should be few extended written response items in the fourth grade.

- No 8th grade student should be given more than 1 extended written response item per block.

- The pool of items should require a greater proportion of time spent on extended written response items for twelfth graders than for eighth graders.

Production Exercises

Up to 20% of the test item time that is used for constructed response will be devoted to exercises requiring students to respond by writing or drawing on a map outline, or generating a chart, graph, or map. The stimulus material used as a source for these production exercises can be text or photographs; other charts, graphs, or maps; or manipulable items.

Table 4 presents a graphic version of the above specifications:

Table 4
Application of Response Modes to Stimulus Materials

Response Modes		Stimulus Materials			
		Graphic/Pictorial Charts, graphs, photographs, climographs cartograms, GIS's, map outlines of U.S., the world, and hypothetical countries	**Text** Short passages, longer passages	**Manipulables** Hard surface globes, flexible rulers	**Combination** Text, graphics, manipulables
	Grade Specifications for Stimulus Materials:	4th will use more U.S. & hypothetical maps, some world maps; 8th will use all three, w/ greater emphasis on world; 12th will use mostly world; 4th will not use climographs, cartograms; the complexity of maps should be commensurate with grade level.	Length of text passages should be commensurate with grade level.	Up to 25% of the item pool may include manipulables for all three grades.	
Grade Specifications for Response Mode: Few extended written response in 4th grade; greater amount of extended written response in 12th grade than in 8th grade; no 8th grade student should have to answer more than one extended response item per block.	**Multiple Choice** (conventional single correct option format with four options)	At least 75% of multiple choice items should refer to a graphic stimulus along with text.	The other 25% of multiple choice items can use any stimuli or combination of stimuli.		
	Constructed Response: **Short Written Answer**	Length varies from one or two words, to several sentences. Can use any stimulus material.			
	Extended Written Response	Length can be one or more paragraphs. Can use any stimulus materials.			
	Production	Includes figure drawing, map design and construction, coloring in/labeling of map outlines, generating charts and graphs. Up to 20% of response mode for all three grades can include a production of some sort. Can use any stimulus material.			
	Combination	Includes short answer or extended response, and production exercises. Can use any stimulus material.			

Content Specifications

The Content Specifications contain detailed definitions, by grade level, of all the content to be assessed in the three content areas, as well as grade level definitions of the three cognitive areas to be assessed.

Content Areas

Allowable content for the 1994 NAEP Geography Assessment is presented, by grade level, in Appendix A. The overall content outline is identical across all of the grades: a Roman numeral denotes the content area, capital letters demarcate the topics, and Arabic numerals are used to number the subtopics. Educational objectives are preceded by lower-case letters and differ from grade to grade. It is important to note that occasionally, educational objectives in different content areas may appear similar. This is due to the integrative nature of the discipline, and it will be the responsibility of the test development contractor to ensure the appropriateness of the classification labels that reference the items to the content areas they purport to measure. Even though within-grade scaling is to be used, a limited number of exercises may be used at more than one grade level if appropriate.

Figure 1 illustrates how specific educational objectives within a content area vary across grade levels. All fourth grade objectives may be tested at eighth and twelfth grades; all eighth grade objectives may be tested at twelfth grade.

Figure 1: Example of One Content Outline Across Grade Levels

III. Space and Place D. Fundamental Place Location 1. Place locations related to the physical features and patterns of the natural environment		
4th Grade a. Students can locate and label continents and oceans on a globe and world map.	**8th Grade** a. Students can locate and label selected natural regions such as major mountain ranges and deserts on a world map.	**12th Grade** a. Students can locate and label selected physical features such as a continental divide, a rift valley, and the drainage basin of the Amazon River on a world map.

Cognitive Areas

In the 1994 NAEP Geography Assessment, exercises will sample student abilities in three cognitive areas: 1) Knowing; 2) Understanding; and 3) Applying.

Knowing consists of being able to observe and recall information. By responding to the questions, "What is it?" and "Where is it?," students can demonstrate the foundation of information that they may subsequently draw upon in order to analyze and solve problems.

Assessment exercises in this category should probe students' knowledge of the content and organizational structures of geography—those facts, concepts, generalizations, principles, and theories that are relevant to developing a spatial perspective on the world. For example, students performing in this cognitive area should be able to observe different elements of the landscape and answer questions by recalling the name of a place or a resource indigenous to a particular country, or by finding information about the trading patterns among several countries.

Understanding means that students can attribute meaning to what has been observed, explain an event, and respond to the questions, "Why is it there?," "How did it get there?" and "What is its significance?" Meaning involves a sense of context, and this, in turn, requires an ability to comprehend, to see connections between diverse bits of information, and to use that information to explain existing patterns and processes on Earth.

Assessment of students' understanding of geography includes an examination of their ability to apply facts, skills, and concepts to respond to a geographical question. For example, a student may understand the concept of differential heating and cooling of air over land and water well enough to explain what is occurring in the atmosphere to cause this phenomenon. Understanding this concept, students can determine why coastal locations in subtropical latitudes experience on-shore winds during the day and off-shore winds at night.

Applying involves a range of higher-level thinking processes. In order to answer the question, "How can knowledge and understanding be used to solve geographic problems?," students should be able to classify, hypothesize, use inductive and deductive reasoning, and form problem-solving models. By linking the knowledge and understanding of the discipline to real-life situations, they can develop a comprehensive understanding of a problem enroute to proposing a viable solution.

The assessment of students' proficiency in applying their higher-level thinking skills involves testing them on their ability to use geographic information in formulating solutions to contemporary local, national, and international issues. Students might be asked to prepare a specialized trade route, give reasons for location decisions, analyze population trends, and hypothesize about diffusion patterns. Examples of contemporary issues are the spread of diseases like AIDS or cholera, patterns of international trade, acid rain, or the suitability of different waste disposal programs to the needs of a particular urban center.

Geography's Tools, Analytical Concepts, and Skills

Assessment exercises (items) cannot examine students' knowledge, understanding, and application of geographical content without asking them to use certain geographical skills and tools, and understand certain geographical concepts. As mentioned above, there will be no scores attached to the assessment of these tools, concepts, and skills; they are not to be considered a dimension of the assessment and will not be tested *per se.* Rather, they are useful for directing the item writer towards the development of exercises that more accurately reflect the content of geography.

Tools

Tools are two- and three-dimensional references to which a student refers for information about a geographic area. They include maps, map projections, and thematic maps; atlases; globes and other three-dimensional models; aerial and other photographs, satellite images, remotely sensed imagery, and, in the eighth and twelfth grades, climographs, cartograms, geographic information systems (GIS's), and other computer applications. These tools offer perspectives of a place and its characteristics, such that students may derive information from them that can enhance their spatial perspective and their understanding of geographic methods.

Analytical Concepts

In developing the assessment, item writers should keep in mind that the study of geography also requires certain analytical concepts that are fundamental to geographic inquiry, and that run through the content of Geography. Students must understand these concepts—Scale, Change, Diversity, Models, and Systems—in order to explain and describe spatial patterns and processes as well as human interactions with the environment. Since the content of geography is inextricably tied to these concepts, singly or in combination, all test items will incorporate at least one of them.

Scale refers to relative measurements or dimensions along a continuum from micro to macro and from local to global, and to the effects of spatial size on events. It includes the

recognition of comparative size, the understanding that explanations at different scales may provide different answers, and the ability to determine selected spatial patterns by charting population distributions at local, state, and national scales.

Change reflects the sequencing of events over time. Some examples are cyclic phenomena, such as Sun-Earth relationships, and non-cyclic phenomena, such as evolution; and changing perceptions about subjects such as resource appraisal (petroleum), political boundaries (the Soviet Union), and sequent occupance (how a cultural landscape changes over time).

Diversity refers to the variety of natural environments and peoples on Earth. The world's ecosystems require diverse life forms to maintain balance and health; natural diversity provides people with food sources, raw materials for industry, medicines, energy, and natural purifying and recycling processes and agents that sustain Earth. Human communities are enriched and strengthened (or sometimes confused and threatened) by cultural diversity and contact between cultures. Cultural diversity, and its study through examination of geographic origins and characteristics of diverse cultures on Earth, clarifies students' perceptions as to how different cultures contribute to life in America and to life in other nations.

Models represent the underlying structure of events, and may be conceptual, such as descriptions, drawings, and diagrams (e.g. the hydrologic cycle, most maps), or physical imitations of a real object, such as scale models, topographical maps or globes. They are used to understand and explain complex relationships, filter information, and identify and explain important processes and elements of environments, cultures, and environment/society interactions.

Systems organize the understanding of events into part/whole relationships. Systems have interrelated inputs, outputs, flows, interactions, boundaries, patterns, and processes; occur on many scales; and may be static and unchanging or in balance through dynamic equilibrium. They include ecosystems, weather systems, transportation networks, communications systems, urban infrastructures, and systems of global ocean currents.

Geographic Skills

Geography's tools and analytical concepts require that students have the necessary skills in order to use them. Fourth grade skills include:

- observing
- asking geographic questions
- acquiring geographic information from primary and secondary sources
- making/reading maps and models
- reading and using graphic representations such as globes, satellite images, and aerial photography
- presenting, analyzing, synthesizing, and evaluating geographic information

Eighth and twelfth grade skills include all the skills found in fourth grade, plus:

- comprehension and use of statistical methods
- understanding and employing geographic information systems (GIS), and other computer applications;
- developing and testing geographic generalizations

As with the tools and analytical concepts, students' skill levels will be indirectly assessed in responding to test exercises, and there will be no scores generated for these skills.

APPENDIX A
Content Outlines

Fourth Grade Content Outline - Content Area I

I. Space and Place

A. Fundamental Place Location

1. Physical features and patterns of the environment such as major landforms, bodies of water, climate and vegetation regions.

a. locate and label continents on a globe or world map.

b. locate and label oceans on a globe or world map.

c. locate and label significant mountain ranges, seas, lakes, rivers, deserts, and vegetation zones on a globe or world map.

d. locate and label significant mountain ranges, seas, lakes, rivers, deserts, and vegetation zones on a map of North America.

e. locate and label the poles, hemispheres, tropics, and Arctic and Antarctic Circles on a globe or map.

f. locate and label the Equator, the Prime Meridian and the International Date Line on a globe or map.

g. locate and label hot and cold regions on a world map.

2. Features and patterns of the human environment such as urban centers, farming regions, and political divisions.

a. locate and label major countries in North America on a map.

b. locate and label major cities in North America on a map.

c. locate and label farming regions, industrial regions, and national parks on a map of North America.

d. locate and label major world regions, such as Latin America, on a map.

e. locate and label major countries, such as China, France, and Brazil, on a world map.

B. Fundamental Geographic Concepts and Methods

1. Concepts such as absolute and relative location, proximity, separation, direction, region, density, and dispersion, and methods used to describe and analyze spatial patterns.

a. identify cultural and natural characteristics of a region.

b. analyze the similarities and differences among places.

c. define distance, direction, neighbor, place.

d. know the characteristics of a map (title, legend, scale, direction).

e. compare and contrast a map and a globe.

f. compare and contrast an aerial photograph and a satellite image.

g. use a map to solve a geographic problem such as plotting a route between two places.

h. from a story, sketch a map that illustrates geographic facts in the story.

i. choose between/among maps, charts, and graphs to select the best means to solve problems, for example the best tool to gauge relative size of an area, the population distribution of a classroom, or the most time-saving method to get from point A to point B.

j. choose between maps and globes to select the best means to solve problems, i.e. which is best to find out the shape of Earth; which is best to see all of Earth at once.

2. Basic spatial units of measurement such as distance and area.

a. use a graphic scale to compute the shortest distance between two points on a simple map.

b. evaluate maps of the same area drawn at different scales to decide which is the best to answer particular questions.

c. use bar graphs, line graphs, and circle graphs with fractions (not percentages) to report information and make inferences on monthly rainfall, change in population over time, etc.

d. measure distances on simple maps using scales in miles/km, feet, cm., etc.

e. discuss alternative measures of distance, such as time and dollar cost.

f. interpret symbols used on maps.

3. Absolute location systems such as alpha-numeric grids, and relative location terms such as "near to" or "distant from."

a. use a number-letter grid to specify and plot locations on a simple map.

b. use great circle routes to measure distances on a globe.

c. use relative location terms to describe where objects and people are located in a photograph.

d. understand that an address or room number describes the exact location of a place.

e. describe the relative location of a place using cardinal directions.

f. describe the relative location of a place using intermediate directions.

g. use a neighborhood map to suggest reasons for the relative location of a public building, an airport, a cemetery, etc.

h. recognize that every place has an absolute location (global address).

C. Fundamental Physical Geography

1. Major spatial features and patterns in the natural environment such as those relating to climate, oceans, soils, landforms, and vegetation.

a. use bar graphs showing temperature and precipitation to describe the climate of a place.

b. define or draw landforms such as mountains, hills, valleys, plateaus and plains.

c. recognize the difference between oceans and seas, lakes and rivers.

d. know the difference between fertile and infertile soils.

e. distinguish natural from human-made features on the landscape.

f. use photographs to make inferences about and compare physical landscapes, such as wet/dry, cold/ warm, flat/mountainous.

g. distinguish between weather and climate.

h. know that air temperature and precipitation are important components of weather and climate.

i. know that changes in atmospheric conditions (air temperature, wind, precipitation) are an important part of natural events such as storms, blizzards, hurricanes, and tornados and droughts.

j. use photos to distinguish between terrestrial ecosystems (deserts, grasslands, forests) and aquatic ecosystems (freshwater lakes, rivers, ponds and saltwater oceans, estuaries, coastal wetlands, coral reefs).

2. Major processes, such as atmospheric circulation, weathering and erosion, ocean currents, plate tectonics, and vulcanism that shape patterns in the natural environment.

a. understand that seasons are opposite in the northern and southern hemispheres.

b. understand that it is daytime in some places on Earth, while it is nighttime in others.

c. identify major types of erosion, such as ice, wind, water.

d. understand that Earth rotates on its axis and revolves around the Sun.

e. understand the relationship between floods and snow melt, and floods and rainfall.

f. describe the volcanic and earthquake processes.

g. describe erosion and understand the interrelationship between processes—that the presence of vegetation decreases soil erosion during floods.

h. explain how air, water, and climate help support life on Earth.

i. describe how life on Earth depends on energy from the sun in the form of light and heat.

j. recognize the relationship between climate and vegetation regions.

k. know the basic processes of mountain building, erosion, and deposition.

D. Fundamental Human Geography

1. Major spatial features and patterns in the cultural environment such as language, religion, agriculture, and economic, political and demographic regions.

a. know and apply basic vocabulary related to the human environment: language, religion, culture, population, migration, goods, services.

b. compare and contrast city/suburb/town, urban/ rural, farm/factory/shopping center, agriculture/ industry.

c. describe the interrelating factors that define the nature of human landscapes, such as a city, a farming area, or a business area in a community.

d. draw and/or describe the spatial pattern of a place or an area, such as a city or farm.

e. identify characteristics that human beings add to the landscape (transportation systems, cities/towns/farms, business, and residential districts).

f. use maps to explain the nature and distribution of cultural patterns (mining areas, urban/rural, movement of goods).

g. explain why most of the world's peoples live near water.

h. use maps to point out different political units such as town, city, state, country (political system).

2. Major processes, such as settlement, migration, trade, technological development, and landscape transformation.

a. use a series of maps from different time periods to describe, explain and predict the development of a community.

b. identify the processes that shape patterns of human movement, such as time of day, traffic patterns, travel patterns and selection of where to travel.

c. understand how patterns and processes in human geography are interrelated in settlement patterns, such as the growth of a city's population may lead to urban spread; place names are related to historic settlement patterns or national heroes.

d. understand how patterns and processes in human geography are interrelated in the world, such as the growth in the number of immigrants often leads to an increasing number of minority groups in a country.

e. use photos to identify different types of neighborhoods, such as commercial and residential, in a city (urban systems).

f. use photos to identify different types of economic activities such as automobile production plant, shopping mall, convenience store, gas station, trucking company (economic system).

g. use maps and photos to describe different types of transportation modes (road networks, railways, ports, airports).

Fourth Grade Content Outline - Content Area II

II. Environment and Society

A. Unity

1. Earth's natural systems, such as the hydrosphere, lithosphere, biosphere, and atmosphere, and their interactions.

a. define and describe natural systems.

b. explain the hydrologic cycle.

2. Earth's human systems such as urban, agricultural, political, economic, and transportive, and their interactions.

a. describe an urban system and an agricultural system.

b. use maps to identify interrelated elements of human systems such as roads and shopping malls.

c. use maps or photos of a community to identify different areas of human interactions, such as between home, school, and business district.

d. use photos to identify different types of crops and food sources such as fruit orchards, vegetable gardens, dairy farm, livestock grazing areas (agricultural system).

3. Interactions between natural and human systems, such as a forest and a recreational area.

a. cite interactive elements of natural and human systems.

b. use photos to distinguish between elements of natural systems and human systems, and landscapes, such as rivers, mountains, roads, and skyscrapers.

c. identify how streams, rivers, and lakes are altered by humans.

d. explain how transportation relates to landforms.

e. understand ways that human and natural geographic patterns and processes interrelate, for example, hurricanes and coastal storms cause flooding; earthquakes may lead to evacuating people; people name places for physical features such as Rock Falls or Cape Cod; differing perceptions may eradicate/preserve natural vegetation or wildlife; mining and other primary land use involves direct interaction with natural resources.

4. Changes in one system lead to changes within the system and in other systems, such as the impact El Niño has on commercial fishing or the effects of drought on forest fires.

a. describe examples of how changes in rainfall can affect crop production.

b. describe how a change in rainfall or temperature may affect the climate of an area.

c. describe how changes of precipitation affects rivers, lakes, and groundwater.

d. know that changes can occur between natural and human systems, such as lack of rainfall diminishes grain production, earthquakes destroy human settlements.

e. know that change in one human system leads to changes in other human systems, such as the closing of a large automobile factory causes unemployment, which leads to population loss in a city, or a political decision to not raise taxes for road building.

f. point out interdependence of plant communities and animal communities.

g. know that change in one natural system leads to changes in other natural systems, such as erosional changes on land brought about by water or ice.

5. Changes in a system have may have an impact on a variety of scales, from local, to regional, to global, such as the eruption of Mount Pinatubo in the Philippines on the world's climate.

a. explain ways in which a major storm alters the life of both individuals and their community.

b. explain how a new road through the community has encouraged development along its path and contributed to change in the natural environment.

c. know that some environmental changes may have global consequences for natural and human systems, for example, cutting down tropical rainforests reduces species diversity and contributes to climatic change.

d. understand that climate change can influence different parts of the world in different ways, such as expansion of agriculture in some areas, decrease of agriculture in others, or increase of snowfall in some areas, decrease of snowfall in other areas.

e. explain how a single environmental change in one region brings about change in the character of another region, such as elimination of sardine catches in an offshore fishing area changes job distribution in a seacoast community and eating habits in different locations.

B. Limits

1. The environment's limits in absorbing the impact of human activity such as the impact of the imported Mediterranean fruit flies on California's produce production or over-hunting on the elephant population and tourism industry of Kenya.

a. locate and describe habitats of endangered species.

b. describe ways that people try to protect environments, for example, set aside wilderness areas, establish parks, prohibit destruction of historic buildings, protect endangered species of plants and animals, require pollution control devices on factories and on cars.

c. identify environmental issues that require social action, for example, cleaning a polluted river, stopping illegal dumping on land and at sea, requiring car pooling to reduce congestion and air pollution.

d. know that there are alternative solutions to environmental problems.

2. Human adaptations to, or modifications of, the environment are influenced by the characteristics of specific environments, such as weather and climate, landscape features, and natural resources.

a. describe human adaptations based upon climatic characteristics such as clothing, types of housing, heating, and cooling.

3. Positive and negative consequences of human changes to the environment—over-grazing and plowing arid land may temporarily increase food production but over time will contribute to desertification.

a. cite examples that show how human activities such as producing energy for heating or dumping trash in landfills have both positive and negative consequences.

b. identify examples of technologies that have changed the environment (automobile—road systems, pollutants, shopping malls; flood control devices—land reclamation, recreational water bodies).

c. predict effects a specific change in agricultural technology will have upon an area (a desert is irrigated—crop production, a swamp area is drained—crop production).

d. evaluate behaviors such as recycling or reducing consumption as ways to save resources and reduce negative effects on environments.

4. Human systems affected by the characteristics of natural systems such as weather, plate tectonics, and vulcanism.

a. identify examples of events such as earthquakes, floods, droughts, and hurricanes that can be destructive to humans, flora, and fauna.

C. Implications of Technology

1. Use of technology results in changes to the environment both intended and unintended—transporting oil or chemicals by ship or rail, for example, can harm the environment if an accident occurs.

a. cite examples of technologies that have changed the environment in areas such as energy, transportation, and communications.

b. understand that use of technology can produce hazardous materials that enter the environment (pollution of air, water, land by chemicals).

c. explain how a new road through the community has encouraged development along its path and contributed to change in the natural environment.

2. Positive and negative consequences of the uses of technology on environment and society, such as automobiles enhancing human mobility while car exhaust decreases air quality.

a. cite types and uses of different technologies, such as factories, hydroelectric dams, and power lines, and describe their effects on the local community.

b. explain that some technologies have been developed in order to enjoy the environment (boating, skiing, snowmobiles, recreational uses of water bodies).

c. differentiate among positive and negative consequences of using a certain technology (automobile—reduce travel time, increase air pollution, provide manufacturing jobs, increase deaths by accidents).

d. explain that use of technology expands the number of products people can use while also cause increasing amounts of waste.

e. know that use of technology influences material standard of living and quality of life in a society.

f. know that increasing use of technology can endanger some plant and animal species (draining wetlands, use of pesticides, overfishing).

D. Perspectives

1. People's perception of the same environment differ as their interests differ: a developer and an environmentalist may view the use of forest land at the edge of a city very differently; a farmer and an urban dweller may perceive the construction of a chemical fertilizer plant outside of town very differently.

a. describe an environmental issue in their community from more than one perspective.

b. describe ways in which people view similar environments differently (cities as safe and unsafe places, forests as peaceful or as frightening, snow and ice as dangerous or as recreational).

c. recognize that people hold differing perspectives about resources, e.g, deer as food, as a needed element in the forest ecosystem, or as a nuisance when the deer eat crops.

2. People's perceptions of environmental modification change over time.

a. compare how people in 1890 and 1990 perceived industrial activity in the United States.

b. identify ways that personal and group behaviors have changed over time regarding environmental problems, such as less littering, carpool day, recycling.

Fourth Grade Content Outline - Content Area III

III. Spatial Dynamics and Connections

A. Spatial Dynamics

1. The organization and identity of regions, such as a neighborhood, a metropolitan area, or the American midwest are affected by a variety of factors.

a. list characteristics that define a region in the United States.

b. identify cultural and natural characteristics of a region, such as of a school, community, or state.

c. identify the physical and human elements that characterize a specific region, such as crop production, plains, and manufacturing.

d. use maps to point out regions of the world where political changes have occurred, such as the former Soviet Union, Eastern Europe, etc.

e. describe ways that the interests of one region may differ from the interests of other regions.

f. understand that the same area can be part of more than one region, such as a state, nation, or continent.

2. Relationships between and among places are affected by factors such as relative distance.

a. provide examples to show that the frequency of spatial interaction usually declines with distance.

b. understand that phenomena such as towns, stores, land use, and roads, are arrayed in space with regularity, for example, neighborhood stores serve smaller areas than regional shopping centers.

c. understand that frequency of contact among people is influenced by accessibility.

d. understand that people travel different distances for different functions, such as grocery shopping or major league baseball.

3. Concepts of specialization and comparative advantage affect the location of economic activities such as U.S. specialization in commercial airplane production, which gives it a comparative advantage over other nations.

a. describe how people make a living in different places and regions.

b. list products which people need daily, and use a map to identify regions where the products are made or grown.

c. provide examples of goods and services produced in particular regions, such as tourism or agricultural production.

d. demonstrate an understanding of the concepts of specialization by explaining why certain products, such as canned or frozen food products, or chocolate, are produced in particular locations.

e. explain that spatial interactions between regions and nations is caused by regional specialization in the production of goods and services, such as automobiles or spices, or tourism.

f. identify factors in their local community that influence the location of certain economic activities, such as an airport, museum, or sports stadium.

g. understand that some locations can provide certain products or services at lower costs than others.

h. understand and illustrate ways that the location of an economic activity can affect its likelihood of success.

4. Diverse cultures shape the characteristics of places and regions such as ways in which American grid cities differ from Islamic cities or ways in which various cultures construct housing.

a. list the various cultural groups in a community and cite evidence of their presence in the landscape, such as signs or architecture.

b. identify other parts of the world where cultural values, behavior, and perceptions, differ from those in the U.S.

c. give examples of cultural change in a region and trace that change to the region of its origin.

B. Connections

1. Concepts related to connections between people, places, and regions, such as systems and networks.

a. demonstrate knowledge of a geographic system such as a school or town, as a set of mutually dependent parts that work together to perform a function.

b. use simple, two dimensional maps to identify various networks, and structures that tie together various points within a region and with other regions, for example highways, telephone lines, and pipelines.

c. describe and analyze patterns of movements within and between communities.

d. understand the concept of supply and demand as it relates to connections between places.

e. demonstrate understanding of the concepts of accessibility and inaccessibility by identifying accessible and inaccessible places on a map.

f. use maps to describe patterns of trade.

g. explain how they are connected to other parts of the world by using maps to trace the route of items commonly used at home and/or in school.

h. illustrate possible impacts of broken connections in a functioning geographic system, for example, closing a highway for repair, breaks in utility service due to natural events such as earthquakes and storms.

i. demonstrate knowledge of a geographic system as a set of mutually dependent parts that work together to perform a function, such as the distribution of goods and services.

2. Changes in information systems, communication networks, and transportation technologies increase connections such as in the building of supertankers or in the completion of the Trans-Alaska pipeline.

a. identify and describe lifestyle characteristics of particular regions.

b. demonstrate a basic understanding of how technological change contributes to connections between people and places.

c. look at maps from different periods of time and point out changes in the transportation systems.

d. demonstrate understanding of local ties to distant situations and events, such as phone calls from out-of-state relatives, or TV programs from Disney World.
e. demonstrate how technological change contributes to spatial interactions within and between regions.

3. Distinct patterns of function in urban, suburban, and rural regions, such as land use and service requirements.

a. identify the characteristics of urban, suburban, and rural areas.

b. distinguish between urban, suburban, and rural regions in terms of population density, life style, economic activities, modes of transportation, etc.

c. illustrate the hierarchical nature of various functions within regions, for example city governance, public utilities, or transportation networks.

d. identify ways that urban and rural regions differ and are similar from place to place in the U. S., including the lifestyles of people.

e. describe how a person's life may be influenced by one's connections with the world.

4. Geographic factors contribute to conflict and cooperation in social, political, and economic settings on a variety of scales, such as neighborhood youth and their perception of a local park as their territory, or the varying national claims on seabed resources.

a. describe how economic and geopolitical changes in one part of the world can affect people in distant places.

b. define interdependence, conflict, and cooperation, and give examples of each among places.

c. describe ways that global events, such as the Gulf War, touched their communities.

d. demonstrate an understanding of the relationship between local and individual action (recycling, tree planting) and solutions to societal and global problems (depletion of resources, deforestation).

5. Trans-regional organizations—alliances, cartels, and formal international organizations—formed to address common issues and to modify spatial characteristics such as the creation of the Organization of Petroleum Exporting Countries (OPEC) to influence the international price of petroleum or the European Community (EC) to reduce the impact of national borders.

a. demonstrate an awareness of organized responses to global, social, and environmental issues.

b. identify some major multi-national organizations, such as the U.N., Scouts, and McDonald's.

c. demonstrate an awareness of organized responses to global interconnectedness caused by both social (United Nations, OPEC, Girl Scouts) and environmental needs (Earth Day).

C. Movement

1. Natural and cultural phenomena spread by diffusion throughout the world, such as coffee, cocaine and capitalism.

a. cite examples of characteristics, such as foods, languages, and religions, that have spread from one culture to another.

b. identify ways people, ideas, goods, and services move, and the patterns these movements make.

c. understand and evaluate ways that the spread of new ideas, ways of doing things, or objects (including animals and vegetation) to a region affects that region.

d. show how diffusion affects various outcomes (new games, cures for a disease, new fashions or music).

e. identify aspects of young people's lives that have been shaped by the diffusion of ideas or products from other regions, such as Nintendo or Taco Bell.

2. Voluntary and involuntary human migration patterns such as Russian Jews to Israel, or Mexican workers to the U.S.

a. cite examples of general routes of human migration over time.

b. distinguish between voluntary and involuntary migrations and give examples of both, such as Africans to North and South America in the slave trade.

c. know that words such as travel, migration, immigration, and commute describe movement.

d. use maps to trace the movement of families from one neighborhood to another.

e. describe reasons why people move.

f. describe the difference between daily and long-term movements, such as commuting to work vs. moving to a new residence.

g. relate migrations to economic opportunities and failures, such as Gold Rush, Dust Bowl, migrant workers.

3. Unequal distribution of resources generates trade and shapes economic patterns such as U.S. export of lumber to—and import of electronics from—Japan.

a. describe the difference between exports and imports and give examples of each.

b. map the location of natural resources, such as fossil fuels and forest resources.

c. understand that people, goods, services, and information flow from place to place.

d. make and interpret simple maps showing the location of places upon which people depend, such as the source of power and location of fuel source, the source of fresh milk or bananas, the source of school bus or automobile, where sneakers come from, etc.

e. describe why humans trade goods, services, and ideas over long distances.

f. identify products that were produced outside the United States.

D. Living Conditions

1. Standards of living relate to regional economic differences and relationships such as cities to farms, the Rust Belt to the Sun Belt, or the U.S. to Canada and Mexico.

a. define and describe the geographic characteristics that influence living conditions.

b. understand that relationships exist between places and regions that affect the quality of life in both, such as access to water, trade, connections to other places.

c. understand the relationship between resources and standard of living, such as modern roads and access to health care.

d. describe the impact of a lack of jobs on a region.

e. identify reasons why people in a place have a relatively high or low standard of living.

f. know why changes in a person's location can affect prospects for particular kinds of employment.

g. identify how certain types of jobs are tied to specific locations, such as coal mining, dairy farming, and commercial fishing.

Eighth Grade Content Outline - Content Area I
(includes all fourth grade objectives)

I. Space and Place

A. Fundamental Place Location

1. Physical features and patterns of the environment such as major landforms, bodies of water, climate and vegetation regions.

a. locate and label selected natural regions on a world map such as major mountain ranges, deserts, and forests.

b. locate and label major water bodies on a globe or world map: seas, gulfs, lakes, and bays.

c. locate and label major physical features on a U.S. map, such as the Ozark plateau, Atlantic coastal plain, Great Basin, etc.

2. Features and patterns of the human environment such as urban centers, farming regions, and political divisions.

a. locate and label selected countries in the world of historical and current importance.

b. locate and label selected cities in the world of historical and current importance.

c. identify and label major cultural features of the USA, such as Appalachia, Cajun country, etc.

B. Fundamental Geographic Concepts and Methods

1. Concepts such as absolute and relative location, proximity, separation, direction, region, density, and dispersion, and methods used to describe and analyze spatial patterns.

a. draw boundaries around regions, describe their characteristics, and explain the regional criteria selected.

b. define terms such as distance, direction, and place.

c. explain the difference between absolute and relative location.

d. use a map and specified criteria to select the best location for particular land uses such as a new sports stadium or a sanitary landfill.

e. describe a mapped pattern (dot map) in terms of its density and distribution.

f. utilize field observations and various tools to solve geographic problems.

g. use geographic reference materials (atlases, gazetteers) to solve problems.

h. use an aerial photograph to draw a map.

i. understand thematic maps and use them to solve geographic problems.

j. explain the diffusion of people, ideas, and things, such as how fashions spread.

k. identify the advantages and disadvantages of using maps and globes.

l. identify the essential properties of a map—title, scale, legend, projection, direction indicator, location indicators, date, source, author.

m. explain how aerial photographs, satellite images, and other technological advances have increased information about the distribution of people, goods, and physical phenomena across Earth.

2. Basic spatial units of measurement such as distance and area.

a. use alternative units of measure (miles/km., time, cost, etc.) to compute and compare the distance between places.

b. measure distances and area on maps using fractional, graphic, and word scales.

c. understand relationships between maps at different scales.

d. use appropriate units of measurement (local relief and elevation in feet above sea-level, distance in time/miles/cost).

e. interpret data about the same place using maps at different scales.

f. apply terms appropriate to measurement, such as latitude, longitude, miles, kilometers, feet, centimeters, great circle, etc., in the analysis of maps and globes.

g. describe the highest and lowest points in an area using a contour map.

3. Absolute location systems such as latitude-longitude and alpha-numeric grids, and relative location terms such as "near to" or "distant from."

a. use latitude and longitude to specify and plot locations on a world map.

b. use a variety of locational systems in simple problem-solving situations, such as determining absolute location in degrees.

c. solve problems using a time zone map, calculating time in hours east and west of the Prime Meridian, explaining the function of the International Dateline, etc.

C. Fundamental Physical Geography

1. Major spatial features and patterns in the natural environment such as those relating to climate, oceans, soils, landforms, and vegetation.

a. compare the characteristics of major physical regions shown on a world map.

b. identify and label the location of various physical regions, such as the Great Plains of North America, the Andes mountain range, the plateau in Iran, etc.

c. understand basic terms related to the lithosphere such as relief and elevation.

d. understand basic terms related to the hydrosphere, such as source/mouth of rivers, currents, waves, and sea level.

e. understand basic terms related to the atmosphere, such as evaporation, condensation, precipitation, and prevailing winds.

f. understand basic terms related to the biosphere, such as prairie, savanna, tundra, soil humus, and depth.

g. specify factors that define the nature of physical regions (landform regions are defined by shape and elevation of the land; climate regions are defined by temperature and precipitation characteristics; natural vegetation regions by plants that grow there; wildlife regions by animals that have adapted).

h. compare and contrast the characteristics of natural regions, such as mountains/plains, forests/deserts, savanna/tundra, wet/dry or hot/moderate/cold climates.

i. explain how the shapes and boundaries of physical regions can change.

j. understand the relationships among weather, climate, temperature, and precipitation.

2. Major processes, such as atmospheric circulation, weathering and erosion, ocean currents, plate tectonics, and vulcanism that shape patterns in the natural environment.

a. use vocabulary such as core, mantle, and crust to describe the structure of Earth.

b. describe how Earth's interior forces affect its surface features (plate tectonics, continental drift, etc.).

c. interpret or sketch a model to show the components and processes in the formation of features on Earth's surface such as plains, hills, plateaus, and mountains.

d. explain how the atmosphere makes life on Earth possible.

e. use a world map to describe the characteristics of ocean currents.

f. describe how seasonal cycles relate to Sun-Earth relationships.

g. describe how latitude, altitude, and proximity to land and water influence the characteristics of climates.

h. explain the relationship between vegetation zones and world climate patterns.

i. understand the processes of rotation and revolution, and the importance of Earth's 23½ degree tilt.

j. explain the atmospheric processes of continental air masses, fronts, evaporation, condensation, and precipitation.

k. explain the relationships between rainfall, streams, and river flow and other hydrospheric processes.

l. explain stream erosion and deposition, the formation and effects of mountain and continental glaciers, wind erosion and deposition, and other processes in the lithosphere.

m. explain processes in the biosphere, such as change in types of trees, to no trees, as elevation or latitude increases.

n. understand the relationships between processes that shape the atmosphere, biosphere, lithosphere, and hydrosphere, such as precipitation runs off into streams, run-off could erode soil, silt can clog a river, etc.

o. describe Earth as a set of large, moving plates.

p. explain and differentiate among the atmospheric processes of winds, rain, snow, hail, sleet, fog, and clouds.

q. define glaciers and understand the interrelationship between processes, for example, glaciers occurred during the Ice Ages when climatic patterns changed.

r. understand the interrelationship between processes, such as between temperature and amount of precipitation affecting plants and wildlife.

D. Fundamental Human Geography

1. Major spatial features and patterns in the cultural environment such as language, religion, agriculture, and economic, political, and demographic regions.

a. identify the location of key culture regions such as Western Europe, Southwest Asia, Pacific Rim, Caribbean Basin, etc.

b. explain the uneven population distribution across Earth.

c. use data bases (computerized or non-computerized) displayed on tables, graphs, and maps to make inferences about population trends.

d. identify factors affecting population density, such as technology, place characteristics, etc.

e. apply the concepts of cultural geography to regions, such as dialect, ethnicity, race, central business districts, residential, recreational, commercial, industrial, tourism, birth and death rates, diffusion, refugees/migrants, developed/developing.

f. describe similarities and differences among regions, such as ethnic neighborhoods, central business districts, depressed areas, Rust or Sun belt.

g. recognize how selected regions are similar and how they are different.

h. explain the nature and distribution of cultural patterns such as world religions/languages, demographic and economic patterns, land use patterns, developed/developing regions and countries.

i. identify factors that affect patterns of human population growth, such as war, famine, drought, migration, etc.

j. explain relationships among patterns in human geography, such as shopping centers that serve suburban populations, density and central business districts, distribution of ethnic groups and ethnic business places, regional differences in voting patterns.

k. locate culture regions such as New England, the Middle West, and the Southwest on a U.S. map.

2. Major processes, such as settlement, migration, trade, technological development, and landscape formation.

a. interpret or sketch a model to show how push and pull factors affect population migrations to and within the U.S.

b. explain how language, religion, and political philosophy influence the development of culture regions.

c. explain the relationship between the development of agriculture and the growth of cities.

d. identify the relationship between industrialization and technology, and the growth of cities.

e. analyze the processes that shape cultural patterns, cause trends in population growth, and/or influence travel destinations; for example, the discovery of coal and oil in western Pennsylvania led to the development of the industrial area around Pittsburgh.

f. understand that patterns in human geography are interrelated, for example, with improvements in transportation, innovations and diseases spread more easily and rapidly.

g. analyze the ways that human and natural geographic patterns and processes interrelate, for example, as natural areas are developed, original ecosystems are altered; discovery of a medicinal plant in the tropical rainforest may alter life expectancy worldwide; acid rain; depletion of the ozone layer; Greenhouse effect; resources are culturally defined and differ over time and space.

Eighth Grade Content Outline - Content Area II
(includes all fourth grade objectives)

II. Environment and Society

A. Unity

1. Earth's natural systems such as the hydrosphere, lithosphere, biosphere, and atmosphere and their interactions.

a. provide examples of interactions in major earth systems.

b. describe Earth's lithosphere as a dynamic system that undergoes changes by building up in some areas (tectonic forces) and wearing down in others (gradational).

c. describe Earth's atmosphere as a dynamic system that undergoes changes of heating, cooling, and air movement that is driven by solar energy.

d. know that ecosystems are dependent upon energy from the sun.

e. understand the relationships between the hydrosphere and the atmosphere, such as the role of oceans in hurricane development.

f. know that movement of tectonic plates is related to earthquakes and mountain building.

g. identify examples of interactions of the parts of a natural system, such as hydrosphere (ocean, river, precipitation), atmosphere (wind, clouds).

h. use maps to locate and label elements of hydrosphere, lithosphere, atmosphere, and biosphere.

i. know that ecosystems are composed of elements from the hydrosphere, lithosphere, atmosphere, and biosphere (living and non-living elements).

2. Earth's human systems such as urban, agricultural, political, economic, and transportive, and their interactions.

a. describe an economic system that connects a resource base to a city, such as heating fuel or water supply.

b. compare and contrast interactions of human systems, such as those between agriculture and population.

c. use maps and photos to describe interactions between different types of human systems, such as urbanization and railroads.

3. Interaction between natural and human systems, such as a forest and a recreational area.

a. explain the impact of human excursions into fragile environments, such as motor vehicles in the tundra or in deserts.

b. understand that food chains, including humans, are a part of ecosystems.

c. use maps of semiarid climates to identify areas where desertification is occurring, such as overgrazed land.

4. Changes in one system lead to changes within the system and in other systems, such as the impact El Niño has on commercial fishing or the effects of drought on forest fires.

a. describe relationships that exist between systems such as climate and agriculture, or landforms and transportation, climate and vegetation.

b. understand how natural hazards affect settlement patterns, such as earthquakes and zoning, or avalanches and mountains.

c. describe the impact of urbanization on urban-rural temperature gradients.

5. Changes in a system have may have an impact on a variety of scales, from local, to regional, to global, such as the eruption of Mount Pinatubo in the Philippines on the world's climate.

a. explain the consequences of building a dam on a free flowing river in relation to wildlife habitats, vegetation cover, and to the control of flooding downstream.

b. relate the impact of population growth to living conditions such as air pollution in Mexico City or water supply to Los Angeles.

c. make inferences about changes that a change in transportation will have upon a city or region (high speed railroad connects distant locations, new highway changes flow of traffic).

B. Limits

1. The environment's limits in absorbing the impact of human activity, such as the impact of the imported Mediterranean fruit flies on California's produce production or over-hunting on the elephant population and tourism industry of Kenya.

a. illustrate how human activity can influence the survival of other species.

b. explain how human attempts to handle waste has resulted in damage to the environment.

2. Human adaptations to, or modifications of, the environment are influenced by the characteristics of specific environments, such as weather and climate, landscape features, and natural resources.

a. describe and evaluate ways in which different societies adapt to, or modify, the environment, such as in terracing mountainous terrain and irrigating deserts.

b. provide examples of controlled environments in different climate areas, such as shopping malls and superdomes.

3. Positive and negative consequences of human changes to the environment, for example, overgrazing and plowing arid land may temporarily increase food production but will contribute to desertification over time.

a. identify examples of how complex alterations to the environment have both positive and negative consequences.

4. Human systems may be limited by the characteristics of natural systems such as weather, plate tectonics, and vulcanism.

a. Understand the limitations to coastline settlement as a result of tidal, storm, and erosional processes.

b. recognize the limiting characteristics of ground water as a renewable resource, such as mining of ground water in arid and semiarid lands.

C. Implications of Technology

1. Use of technology results in changes to the environment both intended and unintended—transporting oil or chemicals by ship or rail, for example, can harm the environment if an accident occurs.

a. explain how development and use of technology has expanded human ability to obtain resources from previously inaccessible locations.

b. explain the positive and negative effects of technology in reclaiming deserts, drilling for oil off-shore, and building subterranean energy pipeline systems.

2. Positive and negative consequences of the uses of technology on environment and society, such as automobiles enhancing human mobility while car exhaust decreases air quality.

a. list types and uses of different technologies and describe potential impacts on environments and society, such as old industrial factories, hydroelectric dams, power lines, transportation of bulk petroleum.

b. describe how technologies have positive and negative effects, such as the invention of automobiles, chain saws, bulldozers, and energy pipelines.

D. Perspectives

1. People's perception of the same environment differ as their experiences and interests differ: a developer and an environmentalist may view the use of forest land at the edge of a city differently, for example a farmer and an urban dweller may perceive the construction of a chemical fertilizer plant outside of town differently.

a. relate individual and group backgrounds and experiences to the perception of the physical qualities of a particular environment, for example, people who move to New England from northern Canada perceive the climate to be milder than those who come from Florida.

b. relate individual and group backgrounds and experiences to the perception of specific cultural environments, for example, people who move to cities from rural areas may find cities confusing, distressing, exciting; people who move to rural areas from cities may find rural areas boring, quiet, peaceful.

c. identify cultural factors that influence environmental perceptions, for example, people who grow up in small tribal groups and are dependent on natural products of a rainforest view the rainforest differently from city dwellers who want rare woods for furniture, or cattle ranchers who want grazing land.

d. explain how different people's use of similar environments reflects different perspectives.

e. know that tropical rainforests can be perceived in different ways, such as a source of lumber and natural products, an area to clear for farms and ranches, or an area to preserve for biodiversity and cultural diversity.

f. know that the use of environments is a complex issue involving many decisions by people with different perspectives.

g. understand the concept of stewardship and that people may apply stewardship in different ways.

h. describe who gains and who loses when certain environmental use choices are made, such as a new road through farmland or old neighborhood, a new reservoir in farming valley, a new hydroelectric dam on a river, a rule requiring pollution control devices on factories and cars.

2. People's perceptions of environmental modification change over time.

a. describe and evaluate ways in which technology has changed people's lives over time, such as automobile and travel, air conditioning and living in hot places.

b. explain why some people may see an environmental modification as an improvement, while others of a different generation may see it as a detriment, for example, a new expressway improves transportation but destroys an old neighborhood, new housing tracts provide modern housing but farmland is lost.

c. explain what has caused the change in the general reaction to belching smokestacks, piles of coal, and massive factory complexes between the 1920's and today.

d. compare and contrast past and present photos/maps/aerial photos to describe environmental changes over time and how they were/are viewed, such as urban uses replacing rural/farming uses, coastal development replacing wetlands and sand dunes.

Eighth Grade Content Outline - Content Area III
(includes all fourth grade objectives)

III. Spatial Dynamics and Connections

A. Spatial Dynamics

1. The organization and identity of regions, such as a neighborhood, a metropolitan area, or the American midwest.

a. identify ways in which a state's commonly accepted regional identity has a cultural and economic significance.

b. compare and contrast a variety of world distribution maps to develop hypotheses on relationships between human and physical phenomena.

c. describe the factors that contributed to the process of suburbanization following World War II and its impact on American life.

d. compare maps and explain the relationship between cultural and physical boundaries, such as places where mountains, rivers, etc. are used for boundary lines.

e. trace the ethnic and social evolution of urban areas, such as changing neighborhoods.

f. explain how regional boundaries and identities change over time.

g. explain how different cultural regions differ from one another.

2. Relationships between and among places are affected by factors such as relative distance.

a. identify and explain spatial hierarchies and patterns such as those associated with shopping in a neighborhood store as opposed to a regional shopping center.

b. use maps of agricultural land use in a variety of regions to draw conclusions about distance from market, value of product, and agricultural production.

c. use simple graphing and mapping skills to observe regularities in the distribution of phenomena in space.

d. understand that various functions develop in relation to what is around them, for example, small towns tend not to have multiple pro-sports teams.

e. understand ways that accessibility (how easy or difficult it is to overcome the barrier of the time or the space (distance) separating places) affects the nature of places and people.

3. Concepts of specialization and comparative advantage affect the location of economic activities such as U.S. specialization in commercial airplane production, which gives it a comparative advantage over other nations.

a. describe the relationships between natural resources, transportation, labor, and other inputs in the location of economic activities.

b. list raw materials and manufactured goods which are imported and which are vital to people in selected countries.

c. suggest reasons why products from one area are purchased in another.

d. list factors that attract business and industry (including "foreign" owned) to a particular location, such as the availability of inexpensive labor, proximity to raw materials, transportation linkages, low taxes.

e. evaluate ways that a region can improve its ability to attract new economic activities.

f. give examples of factors that make countries and regions strong or weak.

4. Diverse cultures shape the characteristics of places and regions such as ways in which American grid cities differ from Islamic cities or ways in which various cultures construct housing.

a. identify and describe values, attitudes, and perceptions of people as revealed in various modes of expression such as poems, songs, dances, stories, paintings, and photographs.

b. describe how human behavior with respect to land use reflects cultural values.

c. compare and contrast cultures, identifying similarities and differences.

B. Connections

1. Concepts related to connections between people, places, and regions, such as systems and networks.

a. sketch and show the interplay between two parts of a system such as the highway system that connects a locale to the rest of a state.

b. describe how "discovery" or "development" of a resource in a location might affect that site's connections with other areas.

c. use maps of networks and structures that tie together a region and connect it with other regions (highways, telephone lines, pipelines) to answer questions about sources, destinations, and directions of flows.

d. analyze maps to determine the major linkages among nations and how technology influences these linkages.

e. explain how people are connected to the rest of the world by using maps, graphs, and charts to trace the routes of ideas, customs, language, etc.

f. understand that connections of one sort, such as communication, usually reinforce connections of other sorts, such as trade.

2. Changes in information systems, communication networks, and transportation technologies increase connections such as in the building of supertankers or in the completion of the Trans-Alaska pipeline.

a. explain how transportation and communication have changed over time, and the effects of these changes on interaction among places and regions.

b. describe potential impacts of possible new changes in transportation and communication.

3. Distinct patterns of function in urban, suburban, and rural regions, such as land use and service requirements.

a. explain the interconnections between an urban area and its hinterland.

b. understand that cities specialize in function and that larger cities tend to have more diversified economies than smaller cities.

c. explain why certain activities concentrate in urban areas and others tend to be in exurban or rural areas.

d. describe changes in an area as it is transformed from rural to urban.

e. analyze the structure of urban places, identify different sectors (zones of different housing with distance from the center), and give examples of the function and interrelationship of each.

4. Geographic factors contribute to conflict and cooperation in social, political, and economic settings on a variety of scales, such as neighborhood youth and their perception of a local park as their territory, or the varying national claims on seabed resources.

a. analyze how regional differences, such as resources and religions, affect prospects for conflict and cooperation.

b. label world maps to show the location of major conflicts.

c. compare and evaluate aspects of regional cooperation from various perspectives.

d. list factors which contribute to conflict within and between nations (economic competition for scarce resources, boundary disputes, cultural differences, control of strategic locations, etc.).

e. describe why, in a given case, people may have divergent views, such as a wildlife preservation society vs. the timber industry.

f. evaluate how relative location shapes prospects for regional cooperation, such as the European community, the U. S., Canada, and Mexico.

g. analyze how regional differences affect prospects for conflict and cooperation.

5. Trans-regional organizations—alliances, cartels, and formal international organizations—formed to address common issues and to modify spatial characteristics such as the creation of the Organization of Petroleum Exporting Countries (OPEC) to influence the international price of petroleum or the European Community (EC) to reduce the impact of national borders.

a. identify international and regional organizations and alliances, and relate them to global issues.

b. identify reasons for membership in a trans-regional organization.

C. Movement

1. Natural and cultural phenomena spread by diffusion throughout the world, such as coffee, cocaine and capitalism.

a. give examples of ways that concepts, practices, or substances spread from person to person and from place to place.

b. identify ways that diffusion takes place, for example, people relocate and ideas diffuse, disease spreads, Congress passes a law.

c. describe the diffusion of plants, products, clothing styles, inventions, information, or ideas throughout the world through narrative, diagrams, or maps.

d. identify examples of cultural diffusion resulting from population movements.

e. describe examples of phenomena that have diffused at different rates and suggest reasons for differences.

f. explain why certain aspects of U.S. culture, such as movies and rock music, have spread to other parts of the world more extensively than other aspects of U.S. culture.

g. describe ways in which humans borrow and loan cultural characteristics and the factors that affect this generally two-way process.

2. Voluntary and involuntary human migration patterns such as Russian Jews to Israel, or Mexican workers to the U.S.

a. give examples and trace routes of human migrations, both large and small in scale, and suggest how these affect areas.

b. compare maps and charts to show how immigration patterns have changed over time.

c. understand the complex reasons for voluntary migration and suggest factors that affect the decision, such as push/pull factors, economic improvement, change in life cycle or family status, to flee disasters, personal, political, and religious freedom, etc.

d. give examples and trace routes of voluntary, involuntary, and impelled migrations, (those that are voluntary, but strongly advised), for example, Africans to North and South America in slave trade; convicts to Australian penal colonies; communities relocated because of urban development, construction projects, dams, etc.

e. suggest reasons for internal migrations in selected countries, such as rural to urban, economic, droughts, environmental perception, population growth, etc.

f. explain barriers to migration, for example physical barriers, such as natural features, poor transportation, etc.; or economic barriers, such as cost of travel, cultural factors, and political barriers.

g. use maps, charts, and graphs to trace migration patterns within the United States over time.

h. provide examples of push factors and pull factors in given cases of human migration.

3. Unequal distribution of resources generates trade and shapes economic patterns such as U.S. export of lumber to—and import of electronics from—Japan.

a. describe and explain the consequences for a region if trade networks shut down, even temporarily.

b. understand that people, goods and services, and information move from places of production to places of demand, and that a tendency exists for flows to run from places of abundance (wealth, population density, etc.) to areas of effective demand (other wealthy, densely populated, vigorous places).

c. analyze maps to determine the major linkages among nations and regions.

d. compile and construct flow charts and maps which illustrate where imported products are manufactured and their probable route to their market location.

e. compare the population of an area with the availability of resources in that area.

f. identify products that the United States exports to other countries.

D. Living Conditions

1. Standards of living relate to regional economic differences and relationships such as cities to farms, the Rust Belt to the Sun Belt, or the U.S. to Canada and Mexico.

a. trace changes in spatial patterns caused by economic change and explain how such changes affect regions.

b. understand that relationships exist between places that affect ways of life, such as acid rain, natural disasters in one region leading to refugees flowing into another, etc.

c. define economic wealth using a variety of criteria.

d. analyze potential causes of unemployment in a region.

e. define and describe the indicators of quality of life in a place.

f. compare living conditions in different regions of the world.

g. identify and account for global patterns that affect changes in the standard of living in different places at different times.

h. describe specific examples of how changes in connections have changed peoples lifestyles.

i. understand that quality of life is a relative, not an absolute, concept.

j. understand how actions by decision makers can affect quality of life in multiple areas.

k. describe how changes over time shape living conditions, such as the changes in Cuba since the demise of the Soviet Union or the changes in Berlin since the wall was removed.

Twelfth Grade Content Outline - Content Area I
(includes all fourth and eighth grade objectives)

I. Space and Place

A. Fundamental Place Location

1. Physical features and patterns of the environment such as major landforms, bodies of water, climate and vegetation regions.

a. locate and label selected physical features on a world or continental scale map, such as major continental divides, rift valleys, drainage basins of major rivers, lakes.

2. Features and patterns of the human environment such as urban centers, farming regions, and political divisions.

a. locate and label on a map cultural patterns such as major population centers including megalopolises; well-known cultural features such as the Great Wall of China; and members of major political, economic, religious, and ethnic groupings.

B. Fundamental Geographic Concepts and Methods

1. Concepts such as absolute and relative location, proximity, separation, direction, region, density, and dispersion, and methods used to describe and analyze spatial patterns.

a. identify criteria and choose appropriate maps to make complex location decisions, such as identifying potential markets for a particular product.

b. apply terms such as core periphery, contiguous, etc.

c. use/evaluate field observations and varied tools, such as cartograms and network diagrams, to solve geographic problems.

d. distinguish the fundamental geographic perspective, i.e., the spatial perspective involving ideas of space, graphics, and visualization, from others, such as historical or literary. For example: use a table with data showing agricultural production by state during 1970, 1980, and 1990 to answer questions about how a geographer might look at the data; use a newspaper article about an event to cite spatial facts and inferences in the article.

e. use geographic reference materials (may include use of on-line data bases in research studies and future assessments) to solve problems.

f. evaluate strengths and limitations of various geographic tools, such as maps vs. aerial photographs vs. cartograms vs. satellite images, to depict geographic information and to solve selected problems.

g. compare a variety of map projections and evaluate their utility to depict information or to solve a problem.

2. Basic spatial units of measurement such as distance and area.

a. measure distances and area on maps, globes and aerial photographs using fractional, graphic, and word scales.

b. describe geographic phenomena using appropriate units of measurement, such as distance, area, elevation, flow, temperature, amount of rainfall, and barometric pressure.

c. make conversions among different units of measurement, such as miles to kilometers and Fahrenheit to centigrade.

3. Absolute location systems such as latitude-longitude and alpha-numeric grids, and relative location terms such as "near to" or "distant from."

a. explain and apply the relationship between degrees of longitude and time zones.

b. solve problems that demonstrate understanding of the International Date line.

C. Fundamental Physical Geography

1. Major spatial features and patterns in the natural environment such as those relating to climate, oceans, soils, landforms, and vegetation.

a. define boundaries of various climate regions and explain their characteristics.

b. know and understand basic concepts related to the lithosphere, such as mesa, butte, moraine, dune, floodplain, bluff, drainage pattern, foothills, piedmont, folded, faulted, and volcanic mountains.

c. know and understand basic concepts related to the atmosphere, such as jet stream, tropical convergence zone, evaporation, condensation, precipitation, prevailing winds.

d. know and understand basic concepts related to the hydrosphere, such as groundwater, aquifer, ocean currents.

e. know and understand basic concepts related to the biosphere, such as ecosystem, biome, prairie, savanna, tundra, biodiversity, limiting factors, leaching.

f. describe/sketch major spatial patterns related to ocean currents, major river systems, landform regions including glaciated lakes and coastal regions, climate regions, natural vegetation regions, soil regions, regions with mineral deposits.

g. explain the interrelationships among and between physical patterns, such as relate climate, soils, and vegetation patterns; elevation and climate patterns.

2. Major processes, such as atmospheric circulation, weathering and erosion, ocean currents, plate tectonics, and vulcanism that shape patterns in the natural environment.

a. cite probable causes and effects of natural events and relate them to long-term patterns such as earthquakes, volcanic eruptions, floods, hurricanes, and El Niño.

b. explain the effects of Earth/Sun/Moon relationships, for example, ways that solar energy drives all natural systems, such as aphelion and perihelion, equinoxes and solstices, eclipses, gravity/tides, and time zones.

c. explain the processes that affect the atmosphere, such as atmospheric circulation, orographic, frontal, and convectional precipitation, desertification, El Niño, the Ice Ages; urban heat island effect; micro-climates.

d. explain the processes that affect the hydrosphere, such as hydrologic cycle, ocean currents, and wave action; tides.

e. explain the processes that affect the lithosphere, such as the tectonic building processes of vulcanism, folding and faulting; continental drift; processes that degrade landforms such as weathering and erosion; agents of erosion; slope equilibrium.

f. explain the processes that affect the biosphere, such as temperature, precipitation; wildlife; soil.

g. explain how temperature and/or rainfall affect the evolution of landforms.

h. explain the relationships between regional climates and processes that operate the hydrologic cycle.

i. assess changes that affect the salt water/fresh water interface.

j. describe relationships between soils and sub-surface rock layers or temperature and rainfall characteristics of tropical rainy climates.

k. relate changes in habitat to changing wildlife patterns.

l. assess the impact of a natural disaster on the lithosphere, biosphere, atmosphere, and hydrosphere.

D. Fundamental Human Geography

1. Major spatial features and patterns in the cultural environment such as language, religion, agriculture, and economic, political, and demographic regions.

a. define and chart selected demographic indicators such as birth and death rates, population increases, population doubling time, emigration and immigration patterns, population characteristics, and gross national product per capita, and evaluate the strengths and limitations of the indicators selected to answer particular questions.

b. apply basic concepts related to economic patterns, such as multi-national corporations.

c. apply basic concepts related to land use patterns, such as intensive/ extensive agriculture.

d. apply basic concepts related to urbanization, such as megalopolis, infrastructure.

e. evaluate strengths and limitations of indicators to answer geographic questions, such as per capita GNP as an indicator of people's income in a country; spatial averaging as in the population density of a country; effects of the Chernobyl explosion on Europe and Asia.

f. explain the nature and distribution of cultural patterns, such as the role of ethnic, racial and gender, trade, demographic, transportation/communication networks, market or voting patterns, geopolitical, land use, natural resources, hunger, tourism/recreation, technological development.

g. explain the relationships among patterns in human geography, such as the developed and developing world in terms of patterns of trade, demography, agriculture, tourism, transportation/communication networks, health, industrialization, etc.; relationships between the technology and the developed and developing worlds; land use and population density; land value and land use; demographic characteristics and market patterns.

2. Major processes, such as settlement, migration, trade, technological development, and landscape transformation.

a. form and test hypotheses to explain urban patterns such as population growth and decline, urban sprawl, and urban decay.

b. analyze the processes that shape cultural patterns, such as changes in geopolitical relationships or trade relationships, causes for economic, political or religious alliances, decline/improvement in education or access to health care; dependence on other places for resources, markets, or labor; aging infrastructures; historic factors.

c. analyze ways that human processes interrelate, such as technological advances and increased agricultural yield or faster communications or longer life expectancies; population growth and urban sprawl; an aging population and the growth of related social services or retirement communities; presence of cheap labor or tax incentives as an impetus to manufacture in a place; political changes, job availability, or war as causes for changes in settlement patterns.

Twelfth Grade Content Outline - Content Area II
(includes all fourth and eighth grade objectives)

II. Environment and Society

A. Unity

1. Earth's natural systems, such as hydrosphere, lithosphere, biosphere, and atmosphere, and their interactions.

   a. explain ways in which major changes in the atmospheric system have effects on precipitation, stream flow, and flood frequency.

   b. explain the relationship between tectonic activity and erosion.

2. Earth's human systems such as urban, agricultural, political, economic, and transportive, and their interactions.

   a. develop a model of an economic system that connects a resource base to a city.

   b. explain the relationships that must exist between agricultural production and transportation if agriculture in a given place is to thrive.

3. Interactions between natural and human systems, such as a forest and a recreational area.

   a. explain the motivations that are required to shift a natural system (such as grasslands) into a human system (such as a suburban tract development).

   b. formulate a set of rules and regulations that would be necessary in a new national park (forest land) to preserve the virgin character of the area.

   c. analyze ways that human and natural geographic patterns and processes interrelate; for example, population pressures and deforestation, desertification and brackish drinking water, climate as an attraction for settlement, natural disasters as causes for resettlement; depletion of an energy source and exploration as well as research for a replacement.

4. Changes in one system lead to changes within the system, and in other systems, such as the impact El Niño has on commercial fishing or the effects of drought on forest fires.

a. explain the effects a specific change in one system can have on another system such as the impact of organic fertilizers on groundwater quality.

b. predict changes in human systems that would occur if temperatures or precipitation in an area drastically changed.

5. Changes in a system have may have an impact on a variety of scales, from local, to regional, to global, such as the eruption of Mount Pinatubo in the Philippines on the world's climate.

a. evaluate possible global environmental change as a result of technological innovations such as the installation of nuclear power plants to generate energy.

b. explain the possible impact of a nationwide mandatory recycling program in the U.S.

B. Limits

1. The environment's limits in absorbing the impact of human activity, such as the impact of the imported Mediterranean fruit flies on California's produce production or over-hunting on the elephant population and tourism industry of Kenya.

a. explain why the biodiversity of flora and fauna is decreasing because of human use of the environment.

b. describe ways to ameliorate environmental damage, such as land reclamation after strip mining; halting desertification by watershed management and using suitable plant species; soil management through no-till techniques, crop rotation, contour plowing, strip cropping; and reducing urban blight by improving housing and services.

2. Human adaptations to, or modifications of, the environment are influenced by the characteristics of specific environments, such as weather and climate, landscape features, and natural resources.

a. describe and evaluate ways the carrying capacity of a particular region depends upon many interrelated factors, such as the availability of natural resources, climatic characteristics, topographic features, and population density.

b. compare and contrast the development of housing tracts in dry areas, such as southern Arizona, to those in Georgia, to determine similarities and differences in impact on the environment.

3. Positive and negative consequences of human changes to the environment—over-grazing and plowing arid land may temporarily increase food production but over time will contribute to desertification.

a. demonstrate how the limits of human knowledge of natural systems complicate decision-making, such as determining the cause and effect relationships of acid rain.

b. identify the possible ways that Midwestern farmers could justify their use of agricultural chemicals in the production of crops.

4. Human systems affected by the characteristics of natural systems such as weather, plate tectonics, and vulcanism.

a. evaluate the effectiveness of human attempts to limit damage from natural system events and explain ways in which people who live in naturally hazardous areas adapt to their environment.

b. explain the relationship between population concentrations and the natural characteristics of a given place.

C. Implications of Technology

1. Use of technology results in changes to the environment both intended and unintended—transporting oil or chemicals by ship or rail, for example, can harm the environment if an accident occurs.

a. provide examples of how the characteristics of environments such as climate, economics, and politics in one or more regions of the world influences the ways in which technologies are used in that region.

b. provide examples of ways that the natural environment influences the kind of technology that is used in an area, such as machinery in Siberia.

2. Positive and negative consequences of the uses of technology on environment and society such as automobiles enhancing human mobility but car exhaust decreasing air quality.

a. explain the impact of strip mining on an area, for example, enhanced access to subterranean resources; increased soil erosion, water contamination, and habitat destruction.

b. explain ways that improvements in transport systems in the 20th century have enhanced human existence.

D. Perspectives

1. People's perception of the same environment differ as their experiences and interests differ, such as a developer and an environmentalist may view the use of forest land at the edge of a city differently; a farmer and an urban dweller may perceive the construction of a chemical fertilizer plant outside of town differently.

a. evaluate examples of different viewpoints on the value of environmental modification on a regional to global scale.

b. explain how the use of the environment, such as use of the seabed, offshore oil drilling, fishing rights, airport flight patterns, control of air pollution, water pollution, and solid waste disposal, is influenced by compromises achieved through political and economic actions of groups with different perspective and values.

c. describe ways in which ethics and values affect the use of environments.

d. hypothesize how people who use environments in different ways might also perceive the value of environments in similar ways (farmer—economic gain and agricultural stewardship, land developer—economic gain and meeting fundamental housing needs, hunting and fishing camp owner—economic gain and meeting recreational needs of urban dwellers).

e. describe how a particular use of an environment may be more acceptable to people in one political entity than in another political entity (specialized offshore fishing, extensive use of rivers for irrigation and industries, clearing tropical rainforests).

f. explain how economic concepts influence individual and group perspectives on land use and the nature of the environment (economic freedom, interdependence, externality effects, productivity).

g. compare and contrast belief systems of different cultures and analyze how they are related to use of environments (food preferences and diet—extent of livestock grazing or grain growing).

h. identify examples of differing environmental perceptions.

i. associate political, economic, and social values to distinctive concepts of environmental use, such as conservation, exploitation, multiple use, and managed development.

j. explain ways that local decision-making about land use can have long term effects on environmental quality, such as urban sprawl, industrial development, forest clearing, loss of agricultural land to urban use, placement of landfills, incinerators, and toxic waste sites.

k. evaluate the role of leisure time in influencing modifications to communities and environments, such as clearing slopes for ski areas, developing residential areas next to golf courses, building hotels/resorts on barrier islands, developing hiking/biking trails through urban areas, and building second homes in mountains and near water bodies.

l. describe and analyze how personal and societal choices influence local, regional and global environments; for example, use of an automobile rather than mass transit and use of recyclable rather than single use products.

m. use maps and supporting data to suggest how one or more similar or differing views of land use are displayed (location of industrial zone on flood plain, location of residential areas on high ground, location of hotel/resort development directly on coastal islands).

2. People's perceptions of environmental modification change over time, such as perceptions of industrial smokestacks of the 1920's versus the 1990's, or the use of forest resources in the 19th and 20th centuries.

a. compare possible reactions to an economic activity that poses a health risk.

b. explain why environmental perception may change over time.

c. identify examples of compromises that have taken place over time between groups with different perspectives and values toward environmental change, such as changing routes of highways to minimize neighborhood or natural environmental destruction, limiting the draining of wetlands to protect ecosystem, reducing industrial pollution to save fishing areas, and planning housing developments to preserve open space.

d. understand that products which were once considered to be safe have been found to harm the environment in their manufacture, use or disposal (DDT, CFC's).

e. differentiate between quality of life and standard of living and how perceptions of these have changed over time. (Standard of living refers to our consumption of goods, which may or may not make us happier or healthier. Quality of life refers to our health and happiness, both related to the quality of our environment.)

f. understand that ideas and practices concerning environment and use of resources change throughout history. (In some cultures exploitation of natural resources was acceptable when wilderness was vast and seemingly limitless. Today our conservation ethic reflects the realization that resources are finite.)

Twelfth Grade Content Outline - Content Area III
(includes all fourth and eighth grade objectives)

III. Spatial Dynamics and Connections

A. Spatial Dynamics

1. The organization and identity of regions such as a neighborhood, a metropolitan area, or the American midwest are affected by a variety of factors.

   a. discuss ways in which regional economic and cultural vitality can change through the discovery of natural resources or the development of new transport technologies.

   b. analyze and compare regional networks in the same or different regions.

   c. analyze the spatial relationships between population, production, transportation, and land use.

   d. analyze the distribution of phenomena in space, such as towns, stores, land use, and roads.

   e. use a variety of maps to determine the relationship between physical and cultural boundaries.

   f. analyze why human-made features were built in a particular area and determine their impact on settlement patterns in an area.

2. Relationships between and among places are affected by factors such as relative distance.

   a. use maps of agricultural land use in a variety of regions to draw conclusions about distance from market, value of product, and agricultural production.

   b. identify and explain hierarchies in spatial patterns, such as those associated with shopping behavior and in movement, such as international migration vs. a daily journey to work.

   c. understand that spatial interaction systems are influenced by the factors of complementarity (which depends on areal differentiation resulting in a supply in one place meeting a specific demand in another place, the intervening opportunities between places, and transferability measured in time and money costs).

d. describe and map changes brought about in urban population distribution patterns as a result of the automobile, such as road networks, suburban growth, and shopping malls.

3. Concepts of specialization and comparative advantage affect the location of economic activities such as U.S. specialization in commercial airplane production, which gives it a comparative advantage over other nations.

a. evaluate the comparative success of competing regions in the world economy.

b. analyze reasons for the relative economic health of regions.

c. recognize the relationship between national economic prosperity and global economic status.

d. use an understanding of specialization and comparative advantage to predict the best location for a given activity.

e. describe the economic base of a city and explain how this affects its character, nature, growth pattern, and future.

f. analyze current trends in the relocation of American industry and explain the processes in operation, such as the development of maquiladoras in Mexico, the movement of high-tech jobs and business off-shore, etc.

g. evaluate the comparative success of competing regions in the world economy.

h. use case studies to analyze factors that attract foreign-owned businesses to the U.S.

4. Diverse cultures shape the characteristics of places and regions such as ways in which American grid cities differ from Islamic cities or ways in which various cultures construct housing.

a. cite the cultural, economic, and political consequences of boundaries.

b. evaluate major impacts of contacts between cultures.

c. compare and contrast urban areas in developed nations with those of developing nations.

d. analyze various cultural patterns and explain how many of these customs have been influenced by the environment.

e. analyze cultural change in terms of acculturation, assimilation, and amalgamation.

B. Connections

1. Concepts related to connections between people, places, and regions, such as systems and networks.

a. illustrate the interconnections between different systems, such as population growth and food supply.

b. apply an understanding of spatial interaction to predict potential economic activities for regions.

c. discuss ways that spatial interaction contributes to economic and political stability and instability.

d. understand the relationship between technology and accessibility and the (positive and negative) effects of accessibility on previously inaccessible regions, such as rain forest deforestation, loss of Indian cultures, etc.

e. identify ways that immigrants remain connected to their native regions.

f. analyze and explain the major patterns of connections in today's world, such as large urban areas with each other and industrialized countries with each other.

2. Changes in information systems, communication networks, and transportation technologies increase connections such as in the building of supertankers or in the completion of the Trans-Alaska pipeline.

a. speculate how changes in transportation and communication technologies may affect links between a community and the rest of the world.

b. identify points of significance in a conflict between two communities and represent the different points of view involved.

c. evaluate the importance of transportation networks, information flows, and other connections as factors contributing to the level of economic development in different places.

d. evaluate various courses of action that might be taken if a given system becomes out of balance, such as reduced capacity vs. increased traffic in a freeway system.

e. describe and map changes brought about in urban population distribution patterns as a result of the automobile, such as road networks, suburban growth, and shopping malls.

f. evaluate the global impact of past and potential changes in transportation and communication.

3. Distinct patterns of function in urban, suburban, and rural regions, such as land use and service requirements.

a. analyze and explain land value patterns in urban, suburban, and rural areas.

b. distinguish between urban, suburban, and rural areas in terms of population density, life-style, economic activities, modes of transportation etc.

c. know several models of urban land use.

d. compare and contrast urban and suburban land use and contemporary growth patterns to predict future trends in American settlement patterns, such as central business districts, one or many, sprawl, multiple nuclei cities, ring cities, edge cities, strip development, etc.

e. analyze effects of population growth on urban sprawl and the rise of the metropolitan areas.

4. Geographic factors contribute to conflict and cooperation in social, political, and economic settings on a variety of scales, such as neighborhood youth and their perception of a local park as their territory, or the varying national claims on seabed resources.

a. use a case study to work with examples of conflict and cooperation on a geographic topic and evaluate issues cited in the study from multiple perspectives.

b. analyze international conflicts, both contemporary and historical, and explain them in terms of the factors that contribute to tension and conflict within and between nations.

c. evaluate the relative significance of different geographic factors in the overall level of conflict or cooperation between parties in a given situation.

d. assess how personal contact networks affect prospects for cooperation among regions.

e. identify the causes of boundary conflicts and other examples of tension between culture groups and evaluate different alternatives for resolving them.

f. use a case study to work with examples of conflict and cooperation on a geographic topic and evaluate issues cited in the study from multiple perspectives.

g. describe typical kinds of tensions and conflicts along a boundary between distinctively different cultural regions.

h. use maps, graphs, and charts to explain how changes around the world affect our relationship with different countries.

i. identify main issues in a conflict and suggest ways that these relate to different perspectives.

j. explain why developing countries may feel that their interests are not fully represented in world affairs.

5. Trans-regional organizations—alliances, cartels, and formal international organizations—formed to address common issues and to modify spatial characteristics such as the creation of the Organization of Petroleum Exporting Countries (OPEC) to influence the international price of petroleum or the European Community (EC) to reduce the impact of national borders.

a. identify changes over time in the nature of international partnerships and alliances.

b. evaluate the effectiveness of given trans-regional organizations, using provided readings.

C. Movement

1. Natural and cultural phenomena spread by diffusion throughout the world, such as coffee, cocaine, and capitalism.

a. analyze and give examples of factors that affect the rate and extent of diffusion, such as population densities, distance, language, means of communication, economic systems, and political ideologies.

b. describe and analyze the impact of diffusion on cultures today and in the past, such as Colombian contacts.

c. use maps which show the diffusion of ideas, products, and capital to develop generalizations regarding their interconnectedness and resulting patterns.

d. identify and categorize factors that facilitate or impede diffusion of a given phenomenon.

e. explain why many phenomena, from clothing styles to shopping malls, diffuse first from city to city and then from city to surrounding region.

2. Voluntary and involuntary human migration patterns such as Russian Jews to Israel, or Mexican workers to the U.S.

a. analyze causes and consequences of migration for particular individuals and groups, such as refugees, ethnic groups, or specially skilled workers.

b. develop maps, charts, and/or graphs to explain the global changes that have occurred in immigration.

c. analyze and discuss current world migration patterns, distinguishing between those that are voluntary, involuntary, and impelled.

d. identify and account for global patterns that have caused major movements of people from one region to another at different times, such as mercantilism, imperialism, industrial revolution, etc.

e. apply generalizations about the decision to migrate and migration theory; for example, apply the generalization that migrants tend to be attracted to areas where the language, religion, and the racial or ethnic background of the inhabitants is similar to their own, to analyze case studies of voluntary and involuntary migration at a variety of scales, such as personal to mass.

f. apply an understanding of the reasons for internal migrations to analyze case studies on migration in and between developed and developing nations.

g. evaluate patterns of migration and indicate the likelihood and causes of future changes in those patterns.

h. assess benefits and costs of possible migrations to seek job opportunities.

3. Unequal distribution of resources generates trade and shapes economic patterns such as U.S. export of lumber to—and import of electronics from—Japan.

a. compare and contrast economic trends influenced by differential resource distribution within and among regions.

b. predict likely patterns of interaction based on population size, gross national product, centers of idea generation such as universities and scientific research centers, etc.

c. construct flow charts or use and interpret maps to illustrate the direction and scale of trade among and between places, such as iron ore, chromium, rice, wheat, and illegal drugs.

d. evaluate alternative border arrangements and their potential impact on trading patterns, such as the Nine Nations of North America.

e. assess challenges that must be met by the U.S. in increasing exports relative to imports.

D. Living Conditions

1. Standards of living relate to regional economic differences and relationships such as cities to farms, the Rust Belt to the Sun Belt, or the U.S. to Canada and Mexico.

a. analyze current economic and employment indicators, trace the resulting spatial patterns, and apply this to decisions about career choice.

b. discuss current trends in urban affairs, such as the continuing erosion of the urban economic base and consequent decline in inner-cities, the rapid out-migration, the restructuring of a central-city population base, etc.

c. trace change in political status, standards of living, and population distribution in a variety of locations, and identify the dynamic spatial relations that led to the change; for example, the Green Revolution introduced by the U.S. effected change in the standard of living in the Philippines, the decline in the standard of living and population (thus political status) in regions suffering economic depression due to increasing foreign economic competition, etc.

d. define economic wealth using a variety of criteria and display this in graphs and maps to observe the relationship between resources, job prospects, and regional economic well-being in an international context.

e. analyze development challenges and prospects for regions.

f. evaluate a case study of the changes in living conditions in a particular place and interpret the causes and effects of the changes over time.

g. identify short and long term variations in the well-being of populations in several countries suggesting future changes which may occur and the implications for the populations and the countries.

h. develop maps, charts, and/or graphs to explain how catastrophes in one part of the world have an impact on other areas of the world.

i. analyze the opinions of opposing groups related to geographic (social, political, economic, and environmental) issues and evaluate them.