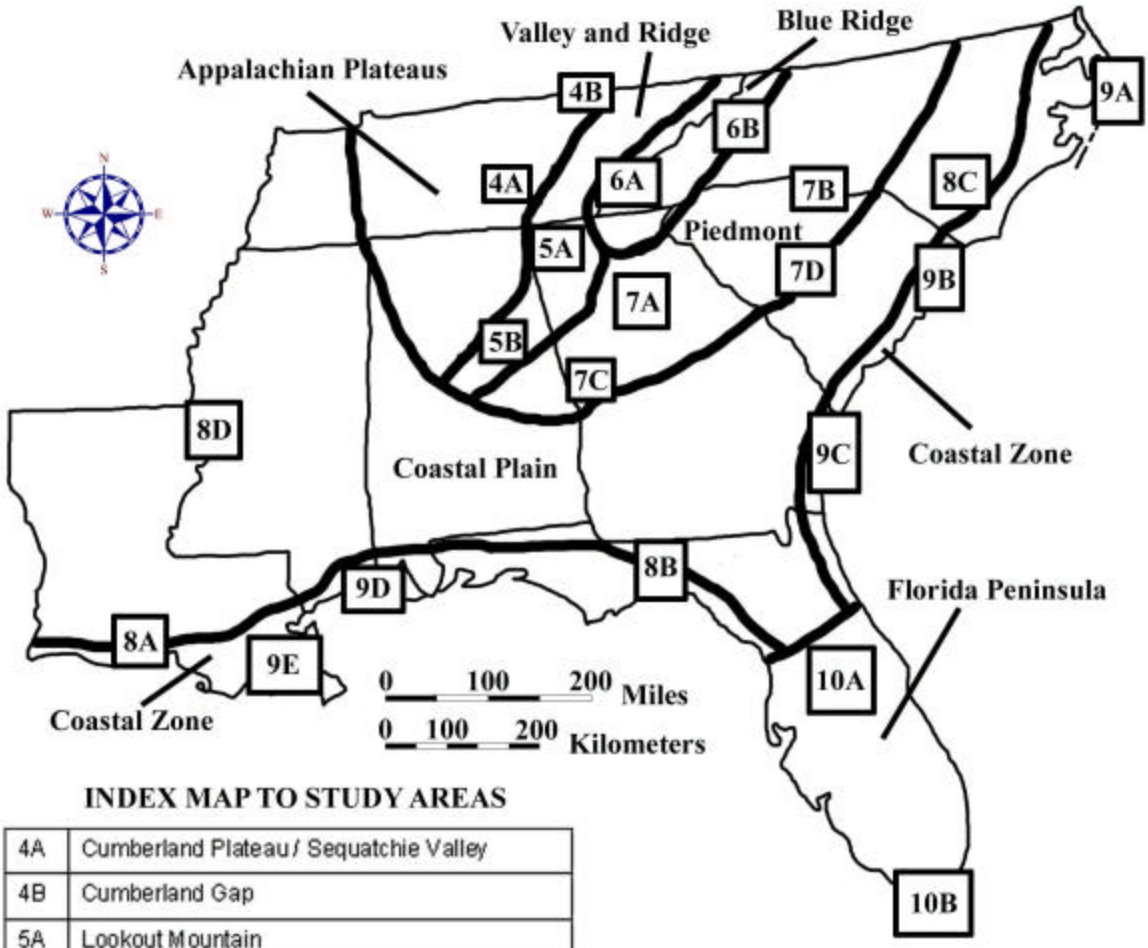
CHAPTER 1

HOW TO USE SE MAPS



INDEX MAP TO STUDY AREAS

4A	Cumberland Plateau / Sequatchie Valley		
4B	Cumberland Gap		
5A	Lookout Mountain		
5B	Birmingham	8C	Carolina Bays
6A	Great Smoky Mountains	8D	Mississippi River Alluvial Plain
6B	Blue Ridge Front	9A	Outer Banks
7A	Metropolitan Atlanta	9B	Grand Strand
7B	Kings Mountain Belt	9C	Georgia Coastal Corridor
7C	Pine Mountain Belt	9D	Mississippi Gulf Coast
7D	Columbia	9E	New Orleans to the Gulf of Mexico
8A	Louisiana Salt Domes	10A	Central Peninsula
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GLOSSARY

THE SE MAPS CONCEPT

A Conceptual Understanding

SouthEastern Maps and Aerial Photographic Systems (SE MAPS) is specifically designed to create an awareness among students of the diversity of our region's landforms, natural vegetation, abundant wildlife, recreational facilities, lakes and river systems, and land usage. The materials provide a framework based on the geological setting so that students can perceive the relationships among our historical developments, economic trends, environmental concerns, cultural diversity, and current land use policy. Ultimately it is hoped that using SE MAPS will lead students to the realization that they must assume responsibility for proper conservation practices which will allow for future use and enjoyment of our nation's resources. The inherent natural and cultural variety within the Southeastern United States makes this region an intriguing place to live, a place which, if its resources are wisely used, will be enjoyed for generations to come.

The Southeastern United States contains majestic mountain chains, rolling hills and wide valleys, extensive river deltas, waterfalls, swamps and other wetlands, sandy beaches and barrier islands, and rocks over a billion years old as well as land that was once part of another continent. The area's cultural heritage embraces Native American legends, short-lived Spanish settlements, land grants from kings, pirating escapades along the coastline, Scotch-Irish and Cajun ballads reminiscent of their homeland, stories and traditions brought to this country by African Americans, and the ravaging impact of two major wars. Economic progress in the area has been influenced by the rise and fall of the rice empire, alteration of landscapes by hurricanes, the demise of 'King Cotton' as the dominant agricultural crop, the recent shift from textiles to other industries, and an invasion of summer tourists along the coast. Such diversity in landforms, historical development and culture is hard to match anywhere in the world. To fully understand and appreciate how the landscape has helped shape historical events, customs, folklore, land use, economic trends, and environmental concerns, all students growing up in the Southeastern United States should be able to make connections among the following:

- Geologic events that have produced the seven major landform regions;
- Economic trends that have resulted in land use diversity in relation to the region's industries, agriculture, and tourism;
- Historical events, regional customs, stories, and folk tales that have reflected the region's cultural diversity;
- Mathematical applications that have been used to solve problems involving the organization of data, graphic representation of numerical facts, and estimation;
- Environmental concerns that have been the focus of national efforts to encourage citizens to appreciate, use wisely, and preserve the region's unique resources.

It is with this premise in mind that SE MAPS was developed for our future lawmakers, business executives, farmers, factory workers, educators, builders, industrialists, homemakers, and all other citizens who need to develop an appreciation and understanding of the land on which they live and work.

Interdisciplinary Objectives

The study of landscapes and landforms naturally lends itself to discussions of the peoples and cultures that inhabit those regions. Infrared aerial photographs, satellite imagery, and topographic maps all show cultural as well as physical features. One objective of SE MAPS is to provide a common framework, through use of shared cartographic products, by which students can use different disciplinary approaches to investigate topics in regional studies under a common theme. For example, a unit of study focusing on the Gulf Coast of the United States could involve scientific topics of hurricanes and delta formation; historical topics of early exploration and settlement; language arts concepts of folklore and literature (*e.g.* Longfellow's "Evangeline"); and mathematical topics of measurement, estimation, and statistical analysis.

SE MAPS seeks to bridge the gap between subjects or disciplines while recognizing the fact that teachers in all disciplines are assigned certain curriculum standards they have to meet. By cross-referencing individual concepts to specific content standards, SE MAPS activities enable students in different classes to meet their individual curriculum requirements while engaging in an integrated approach to problem solving and critical thinking using a common set of instructional materials.

Performance Task Objectives

Each SE MAPS thematic activity consists of several related performance tasks, or questions, for students to answer. These tasks are designed to be age appropriate, hands-on, inquiry exercises in which students utilize the indicated cartographic products to answer both factual and open ended questions. Many of the tasks require drawing lines or tracing features on laminated maps or images with a wipe-off pen. Such visually oriented activity helps reinforce concepts that have been presented to the class verbally or in other learning formats. Enrichment questions require students to use additional sources of information not usually available in the classroom. Such activity strengthens the research objectives of all disciplines as expressed in published curriculum standards documents.

Many of the performance tasks contain multiple questions or parts. Some suggest dividing classes into several different groups, several of which may be asked to solve a problem using a different strategy or approach. Question segments are usually sequenced in order of difficulty, so that every level of student is able to complete their assigned portion of the task successfully. Almost all performance tasks are independent of others to provide maximum flexibility for classroom use.

Importance of Cartographic Products

The study of landscapes and landforms can easily deteriorate into a memorization marathon of different categorizations and classifications of geographic features. Students may end up with a wealth of descriptive terminology, but very little else. The use of remotely sensed images not only provides a new perspective regarding the earth's surface, but also provides a vehicle by which students can construct a much more accurate mental image of the world in which they live. An aerial view allows students to observe entire stream drainage networks rather than a single meander bend and trace the geometric patterns of characteristic features such as faults and land use regions.

SE MAPS utilizes a diverse collection of aerial photographic and satellite imagery, other remotely sensed data, topographic maps, and computerized special purpose mapping products gleaned from a variety of sources. Special 3-D anaglyph maps add a new perspective to the interpretation of topographic maps and contour lines. The cartographic products were carefully chosen to provide different spatial perspectives, in a variety of map scales, featuring unique geological and geographical features focusing on the seven designated major landform regions, Appalachian Plateaus, Valley and Ridge, Blue Ridge, Piedmont, Coastal Plain, Coastal Zone, and Florida Peninsula.

All maps and images used in SE MAPS have been mosaiced, cropped, or otherwise customized in order to correspond more closely to the stated objectives of the student activities. Labels and special features have been added and/or subtracted to make the products easier to read and use. Many activities call for students to identify patterns on maps and images and relate form to function. Others focus on inquiry strategies by introducing questions that can be addressed using first-hand observational data and scientific reasoning skills. The maps and images used in SE MAPS are visually attractive and appealing to students, providing additional motivation for increased classroom effort.

Performance Based Assessment

Assessment of classroom learning is no longer concerned primarily with success in memorizing facts and regurgitating definitions. Modern performance based assessment techniques focus on demonstrating student competency in actually doing real science, or real math, or real work in any other subject. Alternative evaluation instruments such as portfolios, interviews, open-ended responses, concept maps, Venn Diagrams, and computer simulations all can play an important role in providing detailed information about student progress in meeting the assignmed science curriculum standards for that course. The SE MAPS performance tasks incorporate all of these variations. Many of these new formats cannot be machine-scored, but must be personally evaluated by teachers, or other real people, using strict scoring criteria or rubrics. It is important that students be able to demonstrate their knowledge and skills in multiple ways to create their own answers and solutions to problems.

Good assessment instruments strike a balance between testing higher order thinking skills and testing basic knowledge and comprehension. Literacy requires the ability to communicate personal experiences to others. Unless there is a shared vocabulary, true communication is impossible. Unless there is discovery and experience to report, communication will serve no purpose. SE MAPS lists performance objectives for each study area and includes sample assessment rubrics to aid teachers in designing testing instruments that are truly performance based. The number of scientific terms is kept to a minimum, but fundamental vocabulary is incorporated into the text whenever possible. Many of the SE MAPS performance tasks are intentionally similar in style and context to questions found on many state standardized achievement tests.

Connections with Curriculum Initiatives

Various state curriculum standards and subject area frameworks were reviewed by development teams in several Southeastern states as they designed student activities for their assigned study areas. Published national curriculum standards in science, social studies, and geography were also consulted. The ultimate goal of all of these initiatives is to stress the unifying concepts in all disciplines that can place individual topics and processes into a common frame of reference associating form and function or cause and effect. The common emphasis on depth as opposed to breadth of content coverage is likewise reflected in SE MAPS activities.

Research has shown that inquiry based hands-on activities are the most effective approach to conveying to students the basic concepts promoted by the various content standards documents. Such activities are also instrumental in nourishing the development of critical thinking and problem solving skills as well as fostering the development of abstract reasoning. SE MAPS can serve as a stand-alone unit addressing content and process standards in several disciplines. It can also be integrated with other programs or textbooks to complement existing curriculum emphases and standards. Either way, the SE MAPS materials serve to enhance classroom studies by providing opportunities to apply thematic concepts to local geographic areas which are familiar to students.

Major Organizing Themes (Facets)

Chapter 3 of the SE MAPS Teaching Manual provides a regional overview of the Southeastern United States. It introduces such basic concepts as drainage basins, transportation routes, and land use patterns that are common to all landform regions. Performance tasks in this chapter involve work with large-format regional base maps and other specialty maps. The overview chapter also focuses on comparing and contrasting characteristic landscape features and natural resource distributions among different landform regions. The remaining chapters each highlight one of the seven major geographic divisions referred to as physiographic provinces by most geologists and geographers. For the purposes of SE MAPS, these provinces are defined as Appalachian Plateaus, Valley and Ridge, Blue Ridge, Piedmont, Coastal Plain, Coastal Zone, and Florida Peninsula.

Within each of these chapters, from two to five individual study areas were selected to be the focal points for detailed student activities. A total of 21 of these local study areas are distributed throughout the eight Southeastern states that participated in the development of SE MAPS. Each study area emphasizes from two to four conceptual themes that provide a framework for both the background information as well as the student activities assigned to that section. Some of these themes address historical concerns, others focus more on science. All of the themes promote in-depth study of the interactions between geographic diversity and human activity.

Each of the local study areas was chosen not only for its unique landscape features or historical significance, but also for its statewide renown and its accessibility for student field trips. It was also required that an area's outstanding features be clearly visible from an infrared aerial photograph or other similar product of remote sensing technology, so that students could locate features and perform spatial analyses in and around the site.

Finding the Lessons You Want

Each chapter contains a detailed Table of Contents that lists by page number all topics covered in the backgound information sections and the student activities. The page numbering system indicates the chapter number, followed by a hyphen, followed by the individual page of interest, *e.g.* page 1-5, representing the fifth page of the first chapter. Within the sections dealing with local study area information and activities, designations include both the chapter and the letter corresponding to that study site, *e.g.* page 4A-6. Figures are labeled in sequence. For example, Figure 4B-3 is the third figure found in Section 4B, the section featuring Cumberland Gap.

Locating specific background information, or student activity performance tasks that relate to a particular curriculum standard or topic, requires the use of the correlation matrices embodied in the first chapter. Although more detailed correlations may be, or may become, available at the state level, these matrices provide a quick reference for matching SE MAPS topics to specific national curriculum standards. It was not feasible to include references to specific state standards in this publication because the eight different states mandate such different content coverage at different grade levels. A one-to-one correspondence between individual standards and SE MAPS activities is neither intended or implied. Several activities may cover the same standard, while other standards are not linked at all. The following table indicates which important instructional themes are assigned to each study area.

STUDY AREA	IMPORTANT INSTRUCTIONAL THEMES
3A	major landform regions; drainage basins and watersheds
3B	geological history; distribution of geological resources
3C	erosion and deposition; structural geology and topography
3D	elevation patterns and landscapes; climate and agriculture
3E	transportation systems; establishment of political boundary lines
3F	place names and geography; ethnic diversity and settlement patterns
4A	karst topography; structural control on topography; pumped storage
4B	Cumberland Escarpment; Middlesboro Basin; Wilderness Road
5A	valley and ridge topography; De Soto's travels
5B	mining activities and environmental consequences; steel industry
6A	windows and thrust sheets, historic landslides and floods; pollution
6B	faults, peneplains, and escarpments; Blue Ridge Parkway
7A	exfoliation domes; urbanization; Soapstone Ridge archeology
7B	transportation corridor; battlefield site; mining and land restoration
7C	structural geology; land use changes; Warm Springs and FDR
7D	Fall Line zone; Civil War battlefield; mill village life; urbanization
8A	petroleum geology; salinity and vegetation; cultural land divisions
8B	karst topography; springs and the groundwater table; paleoindians
8C	origin of Carolina Bays; soils, land use, and environmental issues
8D	river and floodplain features; settlements and agriculture, Civil War
9A	inlet migration; beach ridges; historical settlements and land use
9B	ancient beach ridges; seafloor bathymetry; tourism and land use
9C	sea island geology; rice culture; commerce in port of Savannah
9D	barrier island geology; effects of hurricanes
9E	geology on the delta; New Orleans history and culture; water issues
10A	comparison of Gulf and Atlantic coast; phosphate industry; tourism
10B	Florida Keys; Everglades water management; history and land use

Use of Icons

All performance tasks in SE MAPS are labeled by icons representing five categories:

 the sun represents 'science',

 the computer represents 'mathematics',

 the book represents 'social studies',

 the pen-in-hand represents 'language arts', and

 the airplane represents an 'overview' or 'interdisciplinary' task.

These icons, covering all four major middle school academic disciplines, are used to identify the main emphasis area reflected in each performance task question. Overview icons indicate general tasks which relate primarily to locating landscape features or sites of historically significant events on maps and/or lithograph images. Overview tasks set the stage for the discipline-specific questions that follow in the activity. Each activity in SE MAPS consists of one power thinking question, five different performance tasks, and two enrichment tasks. Some enrichment questions have more than one icon assigned to them, indicating that the task has components based on two or more academic disciplines. Teachers should decide ahead of time in which subject class that task will be assigned. Multi-icon questions should not be broken up for use in different classes. In general, overview questions should be assigned prior to any discipline-specific exercises.

Using Activities to Make Regional Connections

The study and interpretation of various cartographic products can provide a unique perspective on both nature and human society. Cartography is concerned with exploring the spatial dimension of the human experience. An understanding of both geological and geographical processes and patterns and their implications for human use of the land is critical if society is to solve its present and future environmental problems. SE MAPS contains student activities highlighting many of today's most important and complex environmental issues, not only in the Southeast, but nationwide. Some of these issues appear time and time again in many different study area activities, and include:

- over-commercialization and over-development versus wilderness preservation
- pros and cons of constructing reservoirs, dams, and power projects
- prevention of erosion as land is developed or farmed or mined
- remediation of contamination from point source and non-point source pollution
- water treatment and waste disposal problems of urbanized areas
- groundwater pollution and collapse features in Karst Topography areas
- dredging of harbors and causes and effects of increased sediment load in rivers
- pros and cons of constructing groins, jetties, and seawalls along beaches
- conservation of natural resources, clearcutting, petroleum and coal availability
- acid rain, acid mine drainage and environmental restoration of mining areas
- wetlands depletion, loss of habitat for threatened and endangered species

Section Organization and Layout of Teaching Manual

INDEX MAP: A regional map shows the locations of the study areas and highlights sites covered in the chapter.

TABLE OF CONTENTS: The sequence of topics, figures, and activities, along with page numbers, is listed in table form.

BACKGROUND INFORMATION: A summary of interesting geological, historical, cultural, economic, and environmental information is provided for each landform region. Although this material is written specifically for the teacher, as a resource, selected portions of the material may be presented to students to stimulate greater interest, comprehension, and appreciation for a particular study area. Figures and diagrams enrich the narrative while stories, history vignettes, and folk tales are boxed for emphasis. Words that appear in the glossary are printed in bold type. The background material has been subdivided into three categories: Description of Landforms, Drainage Patterns, and Geological Processes; Influence of Topography on Historical Events and Cultural Trends; and Natural Resources, Land Use, and Environmental Concerns.

GLOSSARY TERMS: The first occurrence of each glossary word is bolded in each chapter of the text. A full glossary of important terms is located at the end of Chapter 1.

PLACES TO VISIT: Field trip suggestions for enhancing and personalizing study area objectives are outlined, including a listing of phone numbers, websites, and other contact information. Many of these places offer educational programs and/or guided tours.

REFERENCES AND RESOURCES: A listing of various print references and other media resources, including videotapes, websites, and computer software is provided.

RATIONALE: Reasons are outlined for selecting each study area and justifying the significance of that location to the region.

PERFORMANCE OBJECTIVES: Major learning outcomes are stated in behavioral terms. Performance Objectives reflect the themes and subject content of each study area.

ASSESSMENT RUBRICS: Examples of ways to assess student mastery of the concepts covered in this section of SE MAPS are presented.

NEWSPAPER ARTICLE: Each study area includes a recent newspaper article which highlights important features of the site in unique ways. This adds timely human interest as well as providing additional information about landscape and other features.

STUDY AREA DESCRIPTION: Additional information is provided about the specific locales represented by the various cartographic products assigned to the local study area.

ACTIVITIES: A grouping of student inquiry questions having a common theme or topic. Each activity contains a power thinking exercise, materials list, five performance task questions and two enrichment questions.

POWER THINKING ACTIVITY: An open ended problem solving scenario, which requires the use of one or more cartographic products, that is introduced at the beginning of each student activity section. This hands-on activity is designed to focus on the specific geographical setting of the study area thereby stimulating student interest and awareness of the unique features of this region.

MATERIALS: Cartographic products and other supplies needed for the activities are listed in table format.

PERFORMANCE TASKS: Questions grounded in a variety of instructional inquiry strategies that direct students through focused exercises related to the specific landform region and study area. All performance tasks require the use of one or more of the cartographic products assigned to that study area and each is coded by icon for a particular academic discipline. Most tasks are subdivided into individual questions which are appropriate for cooperative learning groups to perform. Activities may be either teacher-directed or self-paced depending on the student's level of competence and the teacher's lesson objectives.

ENRICHMENT: Additional follow-up studies challenge students to reach beyond the original performance tasks and use of cartographic products by focusing on extended concepts related to the study area. These questions stress continued application of newly learned concepts in a problem solving format. Processes of analysis and synthesis are emphasized in both individual and group research projects.

Matrices connecting SE MAPS to National Standards

SE MAPS curriculum materials reflect the major emphases set forth by recent national and state curriculum initiatives. The following five matrices outline connections between each of the four discipline-based national standards documents and SE MAPS themes. The fifth matrix correlates SE MAPS with the National Geography Standards.

Many states have recently adopted their own local standards and curriculum frameworks to guide the local teaching process. While many of those state standards documents were consulted during the development of the SE MAPS curriculum materials, a strict alignment with all of those standards was considered beyond the scope of this project. In some states, SE MAPS themes fit more closely with ninth grade standards, in others they align better with eighth grade standards. Individual teachers must take responsibility for choosing topics and activities that best match the curriculum they are required to follow within their own school district and state.

MATRIX #1 – SE MAPS CORRELATION TO SCIENCE STANDARDS

CONTENT STANDARDS 5-8 / SE MAPS CHAPTER	1	2	3	4	5	6	7	8	9	10
A: SCIENCE AS INQUIRY										
- abilities necessary to do scientific inquiry	■	■	■	■	■	■	■	■	■	■
- identify questions answered through investigation			■	■	■	■	■	■	■	■
- design and conduct a scientific investigation			■	■	■	■	■	■	■	■
- use appropriate tools and techniques to analyze data	■	■	■	■	■	■	■	■	■	■
- develop descriptions and models using evidence		■	■	■	■	■	■	■	■	■
- think critically and logically to make relationships	■	■	■	■	■	■	■	■	■	■
- recognize and analyze alternative explanations			■	■	■	■	■	■	■	■
- communicate scientific procedures and explanations			■	■	■	■	■	■	■	■
- use mathematics in all aspects of scientific inquiry			■	■	■	■	■	■	■	■
- understandings about scientific inquiry	■	■	■	■	■	■	■	■	■	■
B: PHYSICAL SCIENCE										
- properties and changes of properties in matter		■	■						■	
- motions and forces		■	■						■	
- transfer of energy		■	■				■		■	
C: LIFE SCIENCE										
- structure and function in living systems						■		■	■	■
- reproduction and heredity										
- regulation and behavior									■	
- populations and ecosystems				■		■		■	■	■
- diversity and adaptations of organisms			■	■	■	■	■	■	■	■
D: EARTH SCIENCE										
- structure of earth system			■	■	■	■	■	■	■	■
- earth's history			■	■	■	■	■	■	■	■
- earth in the solar system		■	■						■	
E: SCIENCE AND TECHNOLOGY										
- abilities of technological design	■	■	■	■	■	■	■	■	■	■
- identify appropriate problems for technological design			■	■	■	■	■	■	■	■
- design a solution or product			■	■	■	■	■	■	■	■
- implement a proposed design										
- evaluate completed technological designs or products			■	■	■	■	■	■	■	■
- communicate process of technological design			■	■	■	■	■	■	■	■
- understanding about science and technology	■	■	■	■	■	■	■	■	■	■
F: SCIENCE IN PERSONAL / SOCIAL PERSPECTIVE										
- personal health				■	■		■		■	■
- populations, resources and environment	■	■	■	■	■	■	■	■	■	■
- natural hazards			■	■	■	■	■	■	■	■
- risks and benefits			■	■	■	■	■	■	■	■
- science and technology in society	■	■	■	■	■	■	■	■	■	■
G: HISTORY AND NATURE OF SCIENCE										
- science as a human endeavor	■	■	■	■	■	■	■	■	■	■
- nature of science	■	■	■	■	■	■	■	■	■	■
- history of science		■	■				■	■	■	■

Standards paraphrased from "National Science Education Standards" NRC, 1996

MATRIX #2 – SE MAPS CORRELATION TO MATHEMATICS STANDARDS

CONTENT STANDARDS 6-8	SE MAPS CHAPTER 1	2	3	4	5	6	7	8	9	10
A: NUMBERS AND OPERATIONS										
- understand numbers, ways of representing numbers										
- understand meanings of operations										
- compute fluently and make reasonable estimates										
B: ALGEBRA										
- understand patterns, relations, and functions										
- represent and analyze mathematical situations										
- use mathematical models to represent relationships										
- analyze change in various contexts										
C: GEOMETRY										
- analyze characteristics & properties of geometric shape										
- specify locations and describe spatial relationships										
- apply transformations and use symmetry to analyze										
- use visualization, spatial reasoning, and modeling										
D: MEASUREMENT										
- understand measurable attributes of objects and units										
- apply appropriate techniques, tools, and formulas										
E: DATA ANALYSIS AND PROBABILITY										
- formulate questions that can be addressed with data										
- select and use appropriate statistical measures										
- develop and evaluate inferences and predictions										
- understand and apply basic concepts of probability										
F: PROBLEM SOLVING										
- build new mathematical knowledge by problem solving										
- solve problems in mathematics and in other contexts										
- apply and adapt a variety of appropriate strategies										
- monitor and reflect on the process of problem solving										
G: REASONING AND PROOF										
- recognize reasoning and proof as fundamental aspects										
- make and investigate mathematical conjectures										
- develop & evaluate mathematical arguments and proofs										
- select and use various types of reasoning and proofs										
H: COMMUNICATION										
- organize and consolidate mathematical thinking										
- communicate mathematical thinking coherently										
- analyze and evaluate mathematical thinking & strategy										
- use language of mathematics to express ideas precisely										
I: CONNECTIONS										
- recognize & use connections among mathematical ideas										
- understand how mathematical ideas interconnect										
- recognize and apply mathematics in [other] contexts										
J: REPRESENTATION										
- create and use representations to organize [and] record										
- select, apply, and translate to solve problems										
- use representations to model and interpret phenomena										

Standards paraphrased from "Principles and Standards for School Mathematics" NCTM, 2000

MATRIX #3 – SE MAPS CORRELATION TO LANGUAGE ARTS STANDARDS

CONTENT STANDARDS	SE MAPS CHAPTER	1	2	3	4	5	6	7	8	9	10
A: READING											
1. students read wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world				■	■	■	■	■	■	■	■
2. students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions of human experience				■	■	■	■	■	■	■	■
B: LANGUAGE USE, VARIATION & CONVENTION											
3. students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts				■	■	■	■	■	■	■	■
4. students adjust their use of spoken, written, and visual language to communicate effectively with a variety of audiences and for different purposes				■	■	■	■	■	■	■	■
C: CREATING TEXTS											
5. students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different groups				■	■	■	■	■	■	■	■
6. students apply knowledge of language structure, language conventions, media techniques, figurative language and genre to create, critique and discuss text				■	■	■	■	■	■	■	■
D: RESEARCH AND INQUIRY											
7. students conduct research on issues and interests by generating ideas and questions, and by posing problems; they gather, evaluate, and synthesize data				■	■	■	■	■	■	■	■
8. students use a variety of technological and informational resources to gather and synthesize information and create and communicate knowledge			■	■	■	■	■	■	■	■	■
E: MULTI-CULTURAL RESOURCES											
9. students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, and geographic regions		■		■	■	■	■	■	■	■	■
10. students whose first language is not English make use of their first language to develop competency in the English language arts and other content areas											
F: LITERACY HAS SOCIAL & PERSONAL ASPECTS											
11. students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities				■	■	■	■	■	■	■	■
12. students use spoken, written, and visual language to accomplish their own purposes (learning, enjoyment)											

Standards paraphrased from "Standards for the English Language Arts" NCTE & IRA, 1996

MATRIX #4 – SE MAPS CORRELATION TO SOCIAL STUDIES STANDARDS

EXPECTATIONS (middle grades) SE MAPS CHAPTER	1	2	3	4	5	6	7	8	9	10
I: CULTURE										
a. compare similarities and differences in group actions										
b. explain how experiences are interpreted differently										
d. explain why groups respond differently to change										
II: TIME, CONTINUITY, AND CHANGE										
b. identify and use concepts of chronology, causality										
c. describe historical periods & patterns of change										
d. use processes important to reconstructing the past										
f. use facts and concepts to inform decision-making										
III: PEOPLE, PLACES, AND ENVIRONMENTS										
a. elaborate mental maps of locales, regions, and world										
b. interpret and use maps, globes, and photographs										
c. use tools such as aerial photographs, satellite images										
d. estimate distance, calculate scale, determine patterns										
e. describe varying landforms and geographic features										
f. describe physical system changes and patterns										
h. analyze physical and cultural patterns & interactions										
i. describe way historical events affected by geography										
IV: INDIVIDUAL DEVELOPMENT AND IDENTITY										
b. describe personal connections to place										
e. describe way regional & ethnic culture influence life										
h. work independently & cooperatively to achieve goal										
V: INDIVIDUALS, GROUPS, AND INSTITUTIONS										
c. describe interactions of people with institutions										
VI: POWER, AUTHORITY, AND GOVERNANCE										
f. explain conditions contribute to conflict, cooperation										
VII: PRODUCTION, DISTRIBUTION, AND USE										
b. describe role of supply & demand to production										
i. use economic concepts to explain development										
VIII: SCIENCE, TECHNOLOGY, AND SOCIETY										
a. describe influence of culture on technological choice										
c. describe how values influenced by new technology										
IX: GLOBAL CONNECTIONS										
b. analyze conflict and cooperation among groups										
d. explore causes and consequences of global issues										
X: CIVIC IDEALS AND PRACTICES										
c. analyze and apply information about public issues										
g. analyze influence of diverse public opinion on policy										

Standards paraphrased from "Curriculum Standards for Social Studies" NCSS Bulletin 89, 1994

MATRIX #5 – SE MAPS CORRELATION TO GEOGRAPHY STANDARDS

GEOGRAPHY STANDARDS 5-8	SE MAPS CHAPTER 1	2	3	4	5	6	7	8	9	10
A: THE WORLD IN SPATIAL TERMS										
1. use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective	■	■	■	■	■	■	■	■	■	■
2. use mental maps to organize information about people, places, and environments in a spatial context			■	■	■	■	■	■	■	■
3. analyze the spatial organization of people, places, and environments on earth's surface	■	■	■	■	■	■	■	■	■	■
B: PLACES AND REGIONS										
4. the physical and human characteristics of places		■	■	■	■	■	■	■	■	■
5. that people create regions to interpret earth's complexity			■	■	■	■	■	■	■	■
6. culture and experience influence people's perception of places and regions			■	■	■	■	■	■	■	■
C: PHYSICAL SYSTEMS										
7. the physical processes that shape the patterns of earth's surface			■	■	■	■	■	■	■	■
8. the characteristics and spatial distribution of ecosystems on earth's surface			■	■	■	■	■	■	■	■
D: HUMAN SYSTEMS										
9. the characteristics, distribution, and migration of human populations on earth's surface			■	■	■	■	■	■	■	■
10. the characteristics, distribution, and complexity of earth's cultural mosaics			■	■	■	■	■	■	■	■
11. the patterns and networks of economic interdependence on earth's surface			■	■	■	■	■	■	■	■
12. the processes, patterns, and functions of human settlement			■	■	■	■	■	■	■	■
13. the forces of cooperation and conflict among people influence the division and control of earth's surface			■	■	■	■	■	■	■	■
E: ENVIRONMENT AND SOCIETY										
14. human actions modify the physical environment		■	■	■	■	■	■	■	■	■
15. physical systems affect human systems	■	■	■	■	■	■	■	■	■	■
16. the changes that occur in the meaning, use, distribution, and importance of resources		■	■	■	■	■	■	■	■	■
F: THE USES OF GEOGRAPHY										
17. apply geography to interpret the past		■	■	■	■	■	■	■	■	■
18. apply geography to interpret the present and plan for the future	■	■	■	■	■	■	■	■	■	■

Standards paraphrased from "National Geography Standards" Geog. Ed. Stand. Proj. 1994

Teaching Level, Time, and Scheduling Suggestions

The SE MAPS curriculum materials were developed as a middle school project, yet the scope of the materials is flexible enough to be useful at many other levels of a school's instructional program. Middle school teachers will find the SE MAPS materials particularly valuable as part of an interdisciplinary program that lends itself readily to team teaching across the curriculum. Using this model for the team teaching approach, where science, mathematics, social studies, and language arts teachers plan their lessons together with a common theme; students easily recognize the connections that interrelate these disciplines. Upper elementary level teachers in self-contained classrooms also find this approach useful. Student activities are diverse enough in coverage and difficulty to provide adequate levels of success for remedial students as well as gifted classes.

While depth of understanding is critical to student learning, it is important not to overwhelm your students with too many new materials or concepts all at once. Keep coverage simple at first, until everyone is familiar with the map products and has developed the appropriate map reading skills. A few overview activities widely spaced will allow students to become acclimated to the precepts of SE MAPS before an in-depth study is begun. Use the Power Thinking Activities to introduce different topics or sections of the curriculum. These activities will give students a "big picture" of the region and will give them the opportunity to become comfortable with the cartographic products which go with that area. Make sure students are successful with basic concepts and procedures before moving on to in-depth studies or other lessons.

Recall that the heart and soul of the SE MAPS program are the cartographic products. The more the students work directly with the maps and imagery, the more involved they will become with the materials and the more they will realize the goals of the curriculum. Try to use the maps as often as possible when working with regional stories, Southeastern history and geography, and various environmental concepts in science and math. At first, it may be helpful to make a special effort to focus on study areas or features located close to your school, so that students will be able to connect these features and concepts with their own lives.

Some schools incorporate large portions of SE MAPS into their course of study and may spend several weeks to months concentrating on various study areas and themes. Other teachers use the materials more as an extension to existing unit plans and insert selected activities several times during the year for only one or two days at a time. SE MAPS covers far more material than could ever be completed in any one class, so most performance tasks were designed to be used effectively as stand-alone activities. Each performance task is able to be completed in one fifty-minute class period or less.

Prior Content Knowledge and Skills Requirements

Prior Earth Science Content Knowledge Requirements

A basic knowledge of the principles of geography and cartography is required for students to receive the full benefit of the SE MAPS curriculum materials. Some science teachers do not stress these concepts because they think it is not science. And conversely, many social studies teachers do not cover map interpretation because they think it is too "scientifically" oriented. It is important to know why certain land uses are connected to certain landform regions, and what environmental implications accompany that land use.

In many school systems, earth science is taught in the eighth grade. In others, earth science is part of an integrated science approach which covers the middle school years. An understanding of certain fundamental earth science principles will provide the student a much more enriching experience when working with the map and imagery products. Students should have at least a rudimentary understanding of the following concepts:

- Effect of weather and water in causing the disintegration of rocks to form soil
- Rock cycle
- Theory of plate tectonics and its application to continental drift
- Rates of various geologic processes and their relation to geologic time
- Major landscape features produced by various surficial processes
- Hydrologic cycle
- Causes of folding and faulting in the earth's crust
- Causes of earthquakes, volcanoes, landslides, and other natural disasters
- Dimensions, shape and behavior of the earth as a planet
- Effects of pollution on natural ecosystems

Most middle school earth science units contain a laboratory component. Without prior experience in "doing" science through laboratory work, students will likely have difficulty using their map observations to solve the investigative problems which are included in the SE MAPS activities. Students should be able to read topographic and highway maps, identify precise locations using latitude and longitude coordinates, and construct topographic profiles. They should master these three skills before beginning work on any of the SE MAPS units.

In addition to the specific skills listed above, students should have also developed some experience in the basic science process skills, such as observing, classifying, measuring, inferring, predicting, designing, and communicating. Familiarity with the Scientific Method of inquiry is important, including practice in formulating and testing hypotheses. Students will be presented with significant quantities of data from a variety of activities in SE MAPS. Prior laboratory experience will help them determine which data are relevant to the problem at hand and which are not.

Prior Social Studies Content Knowledge Requirements

To be able to effectively use the SE MAPS curriculum, social studies students need to have some basic knowledge of the geography of the United States and a command of basic map skills. They need to know the major river systems and mountain ranges of the Southeast, the major geographic landform regions and their characteristics, the location and significance of the Fall Line Zone, and the major cities of the region. If this information has not been previously introduced, it is suggested that the students be assigned the geography chapter in their United States history text, or other equivalent reading, prior to using SE MAPS. Once those basic concepts are mastered, the performance tasks and other activities provide sufficient historical information for students to complete them without requiring additional resources.

Social Studies Skills Used in SE MAPS

Map Skills

- Orient a map and identify direction
- Interpret meanings of infrared coloration on aerial photographs
- Use scale and estimate distance
- Compare maps and make inferences from them
- Identify specific locations and physical features
- Use latitude and longitude
- Interpret information from a contour map
- Interpret map symbols

Library Skills

- Use reference indexes to locate information
- Use the card catalog and/or a web-based catalog service

Social Studies Reasoning Skills

SE MAPS can be effectively utilized to increase students' ability to classify, interpret, summarize, synthesize, and evaluate information obtained from the aerial photographs, contour maps, and historical information that is provided in the Teaching Manual. Historical vignettes can be effectively utilized to motivate and stimulate interest in the SE MAPS study areas.

Teaching the Venn diagram for Comparing and Contrasting

There are four basic steps in using Venn diagrams to compare and contrast:

1. Determine what items you want to compare.
2. Select the characteristics of items on which you want to base your comparison.
3. Explain how items are similar and different based on the characteristics chosen.
4. Summarize how the items are different and how they are alike.

Prior Mathematical Content Knowledge Requirements

A basic knowledge of arithmetic operations is essential to the working of most of the mathematics activities in SE MAPS. Number sense, set theory, quantitative literacy, elementary geometry, and some problem solving experience are sufficient background for almost all performance tasks. Students are expected to use fractional and decimal numbers and to understand the concept of percentage. A few questions require simple algebraic manipulations. Questions requiring trigonometry and higher level algebra are designated as enrichment problems. Students must also have the ability to work with fractional and verbal scales, and be able to convert units of measure, for example from square feet or square miles to acres. A working knowledge of the principles of organizing data and representing it graphically should be attained before attempting most SE MAPS performance tasks.

Mathematics plays a pervasive role in the home, the workplace, and the world of everyday living. Problems in SE MAPS are real problems with real world applications: problems which help students understand the relevance of mathematical thinking to their own lives. Mathematical literacy enables a student to use exploration, conjecture, and logical reasoning to solve a variety of problems. From an interdisciplinary perspective, it also gives students practical experience in evaluating the cost effectiveness of projects and business activities related to other fields.

Basic

- Estimating values using a variety of techniques
- Practicing arithmetic skills
- Substituting numbers into formulae
- Using metric and English measurements and conversions
- Enhancing calculator skills
- Communicating mathematical information to others

Statistical

- Enhancing graphing skills (line graphs, circle graphs, bar graphs, etc.)
- Organizing data tables
- Determining measures of variability
- Estimating probabilities relative to sample size

Geometry

- Labeling coordinates using radial and Cartesian coordinate systems
- Estimating measurements of area, perimeter, volume, etc.
- Calculating dimensions of shapes using formulae
- Comparison of lines and other geometric shapes

Algebra

- Determining slope of lines or line segments
- Applying time, distance, and speed formulas

Prior Language Arts Content Knowledge Requirements

The performance tasks and other questions used in SE MAPS are written at a middle school level. Students should have a sufficient language arts background in vocabulary, spelling, sentence construction, and reading comprehension to function at that level. Students should have some experience in storytelling and developing their listening skills. They should have enough library experience to know how to recognize different genres of writing and speaking, and to be able to examine setting, plot, theme, and character in folktales, historical fiction, and fiction. Students should also be able to compare and contrast information and opinions from different sources.

Storytelling is one of the easiest and most natural ways to recount events and to access our common history. We do it all the time--every day. It's a shame that we don't use it more in the classroom. Embedded in storytelling are many features that, as teachers, we know to be critical to the development of language and the understanding of print. However, there are wider, and perhaps more important consequences of language that storytelling embraces. Story functions as a binding element in our culture. It brings people together for a shared purpose. In any community, a family or a classroom, stories are told and retold and events are related in many different ways. Virginia Hamilton, author of The People Could Fly, (American Black Folktales, New York: Alfred A. Knopf, 1985) says:

> *that we all live in a present-day America made up of polyethnic, culturally diverse communities. We live in parallel cultures. Certainly this is true of both our local communities and our classroom communities. Many of us teach in classrooms where three or four languages and numerous dialects are spoken. What better way to learn about the members of our classroom community and of our local community than through story?*

The stories in SE MAPS are a sampling of what's in your own back yard. Many of our folktales are based on fact but flavored with fiction. These tales are not meant to substitute for history but illuminate documented facts by demonstrating how people personalized events around them. The activities that accompany each story can be used as is, but don't hesitate to experiment, swap activities among stories, and best of all, let your students take the lead. If you've never had students tell stories before--take heart! Use this opportunity as an excellent excuse to try a little risk taking along with your students. We promise, you'll be glad that you did!

Learning a Story

1. Select a story that really appeals to you.
2. Read or listen to it several times.
3. Keep a note card with information about title, source, characters, story sequence, etc.
4. Don't try to memorize the story, just tell it from your heart by thinking of the pictures that the story creates in your mind. It's like learning to sing a song.

Recommended Formats for Interdisciplinary Instruction

When team teaching the materials, it is advisable to construct a flow chart ahead of time so each teacher in the team will know when and what topics other teachers are covering. Several of the pilot teachers for SE MAPS suggested having the science and social studies classes begin work with the maps using the overview activities identified by the symbol ✈ , then have the language arts and math classes follow with their designated activities. Once the groundwork has been laid, the math and language arts teachers will have an easier time introducing their topics. Also, other lesson materials should be interspersed with SE MAPS activities because students may tire of looking at maps all day long if all discipline groups work on them at the same time.

Schools not using the team approach will find certain SE MAPS activities appropriate for insertion into the traditional curriculum for content classes in science, math, language arts, and social studies, depending on the grade level and the specific curriculum standards that need to be addressed. Even if only one teacher in a school chooses to use the materials, students will pick up on the interdisciplinary character of the program and will be able to relate it to concepts studied in other classes. Most of the SE MAPS activities can be used as stand-alone exercises. As many or as few of these can be used as best fits the teacher's lesson plan. One or several of the twenty-one study areas and/or regional activities can be used either in whole or in part. Most performance tasks are designed to be completed in a traditional fifty minute class period, but these exercises can be easily modified to fit a block schedule as well.

Teaching Students with Diverse Backgrounds

The SE MAPS materials are particularly valuable to students who learn better visually than verbally. The ability to actually draw on the cartographic products with wipe-off pens lets even students with poor verbal and reading skills take a full part in the investigation. It is helpful to start out at a concrete, less abstract level until you are sure that all students in the class have grasped the fundamental concepts of the activity. Economically disadvantaged students, who may not have had the opportunity to travel widely, can gain important perspectives on the world outside their local neighborhood through close study of the aerial photographs, satellite images, and other remotely sensed data contained in SE MAPS.

Cultural diversity is a feature of American society which should be celebrated. SE MAPS includes a significant amount of material documenting Native American and African American contributions to the historical development of the Southeast, as well as highlighting cultural contributions of a variety of other immigrant groups, such as Scotch-Irish, Hispanic, and Cajun, which have had a significant impact in the development of local customs and traditions. Students investigate a variety of cultural dimensions to discover the patchwork of different traditions that make up their own ancestral heritage.

Constructivism and SE MAPS

The study of landscapes is primarily an attempt to answer questions about why different landform features are located where they are and how they interact with both natural and cultural settings. Most of these answers can be studied within the realm of science, but only if science is recognized as a process, not just a body of facts. The domains of science include the knowledge of science, the nature of science, and the process skills used to perform science. Concepts should be learned through active involvement with the subject matter. Hands-on, investigative learning is the best way for students to gain both confidence and competence in the pursuit of scientific inquiry. Success at problem solving also strengthens students' understanding and retention of concepts in other fields of study as well. Knowledge gained through direct student intellectual and conceptual involvement in the learning process will last longer and will lend itself to building a more useful mental construct about how the world really works.

All inquiry-based learning relies on the operation of constructivist principles, the fact that students, in the process of investigating natural phenomena, will create mental frameworks to explain what they observe. The ability to see things from a different perspective is an especially valuable component not only to scientific reasoning, but also to logical discourse in general and is useful in breaking down misconceptions that may have arisen from incomplete or misleading data. Remotely sensed images invite investigation into concepts of scale, patterns of change and other common themes that students need to internalize in order to make sense of the world around them. Such unifying concepts often provide a common framework relating form and function.

Research has shown that experiential learning provides the best pathway to conceptual understanding. Students who have flown frequently in commercial airplanes tend to have a much greater appreciation and understanding of spatial relationships on the ground because they have experienced this perspective first hand. The use of remotely sensed images provides a way for all students in a classroom to gain this same viewpoint to help them place and recognize landforms within a larger context.

Many national science curriculum initiatives include suggestions about how science should be taught. These include "making connections to other disciplines," "talking, writing, and communicating," and "making effective use of technology." The SE MAPS curriculum stresses all three of those recommendations. The interdisciplinary nature of the activities and performance tasks presents real world problems with real world solutions, rather than contrived questions, and invites collaboration among many subject areas. Both oral and written communication extends across the entire curriculum, not just in language arts performance tasks, but with most activities. Sharing results with other groups or other classes is standard procedure in most SE MAPS performance tasks. The cartographic products offer classes a chance to use state-of-the-art materials produced by sophisticated technology. Many activities and performance tasks relate directly to the technological aspects of these products, as well as to their analysis and interpretation.

Cooperative Learning Techniques with SE MAPS

Many of the performance tasks contained in the SE MAPS curriculum are designed for students working in cooperative learning groups. Teachers may structure positive interdependence by establishing mutual goals, joint rewards, shared resources, and assigned roles. When working well, students promote each other's learning by helping, sharing, and encouraging efforts to learn. Students explain, discuss, and teach what they know to their classmates. However, individual accountability is still important. Teachers may invoke this structure by giving individual tests to students or randomly selecting one group member to give the answer to a question. Social skills such as leadership, decision-making, trust-building, communication, and conflict management are an integral part of the success of the cooperative learning model. Teachers should monitor groups and give feedback to individual groups as well as to the class as a whole. There are many possible ways of assigning task roles to students. One of these is presented in Figure 1-1.

1. What you need to implement cooperative learning techniques.
   - Classroom seating should be arranged so students can work in Groups of 3-5
   - Students should be sitting around a table or desk
   - Every student must be able to face the front of the classroom when necessary
   - Students must have sufficient physical space between adjacent groups
   - Materials and activities must be suitable for cooperative learning techniques
   - Students' roles in their group must be clearly outlined
   - Teachers should become a **Guide on the Side**, instead of a **Sage on the Stage!**

2. Working in Cooperative Learning Groups: Students read materials together and answer the questions. In the typical model, one person is the READER, another the RECORDER, another the REPORTER, and the fourth student is the RUNNER. If there are five students in the group, that person may assume the role of CHECKER.
   - **READER** reads the group's material out loud to the group, carefully with expression, so that the group members can understand and remember it.
   - **RECORDER** writes answers in a legible form and records results of discussion.
   - **REPORTER** presents group's conclusion to the class after completion of activity.
   - **RUNNER** gets the materials or equipment needed by the group, keeps track of them and puts them carefully away at the end of the activity.
   - **CHECKER** (if needed) checks comprehension or learning of group members by asking them to explain or summarize concepts learned or discussed.

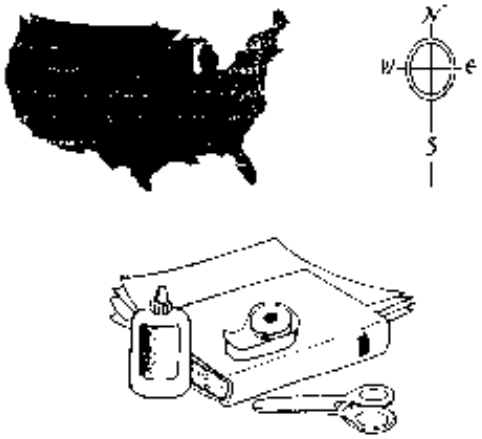
3. Jigsaw Approach: Each person reads and studies part of a selection, then teaches what he or she has learned to the other members of the group. Each then quizzes the group members until satisfied that everyone knows his or her part thoroughly.

4. Resource: (Johnson, David W., Johnson, Roger T., & Holubec, Edythe Johnson. (1991). Cooperation in the Classroom. Edina MN: Interaction Book Company.)

Figure 1-1: Suggested Cooperative Group Assignments

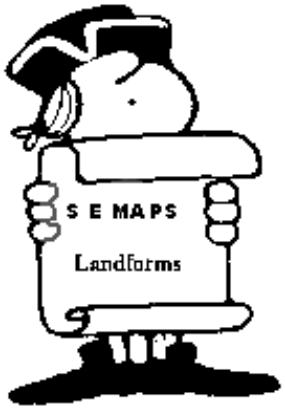
SE MAPS - Cooperative Group Job Cards

Maps & Materials Manager



Gathers all maps needed and also other supplies.

Reader



Read information from resources aloud to the group. Check to be sure everyone is listening.

Recorder & Checker

Fill out any forms. Write information as group members dictate. Check to be sure all members agree on your group's answer or information.

Map Marker

Use a wipe-off pen to mark locations, trace areas, identify features, etc. as instructed in the activities. Clean off the map when activity is completed.

SE MAPS and Learning Cycles

Most published learning cycle models consist of an exploration phase, a concept development phase, and a concept application phase. Some learning cycles document more than three stages, but all reflect the basic premise that students first must become engaged with the topic at hand by experimenting with or otherwise investigating real world phenomena. Once students have recorded their observations or collected experimental data, they are ready to analyze their results and begin to develop an understanding of the concepts that describe the behavior of the natural world. Teacher-led discussion should link vocabulary and additional content coverage to previously established concepts as well as expanding student comprehension in new directions. Finally, student assignments should encourage reflection and consideration of ways to implement or apply these newly learned concepts to different situations or circumstances.

All SE MAPS activities begin with open-ended "power thinking" exercises that encourage students to explore and become familiar with specific cartographic products. The goal is to gain the students' attention, motivate them to make observations or collect data, and provide the tools necessary for them to conduct an investigation of their own design based on the application of science process skills or other critical thinking strategies. The remaining performance task questions build on the knowledge gained from the power thinking exercise and reinforce concepts related to the designated content theme for that study area. Many of these tasks also require the application of concepts and skills covered in previous student activities. Enrichment Activities provide an additional avenue to apply these newly learned concepts within a broader perspective.

Authentic Assessment Strategies

Authentic Assessment, also known as performance-based assessment, encompasses one of the most profound paradigm shifts ever to affect the teaching profession. Of course the primary goal of any assessment instrument is to "test what has been taught," to determine if students have learned the content at a satisfactory level, but performance-based assessment goes one step further by requiring students to demonstrate proficiency in the process of learning, not just the end result. No longer will recall-oriented multiple choice exams at the end of a unit provide sufficient data to evaluate students' mastery of course objectives and curriculum standards. Students now must not only document that they know the answer, but also that they are capable of analyzing the problem and carrying out the observation and application skills that lead to that answer.

The SE MAPS performance tasks in themselves can be treated as a type of formative assessment instrument. Students can self-assess their own level of understanding based on how well they are able to answer the questions contained in each Activity. Test questions modeled after these performance tasks should be able to adequately evaluate students' mastery of skills and concepts that have been covered in the unit lessons. Questions that require the student to perform a task using a map or other product are best.

Science

The best assessment strategies for science involve students actually performing tasks using the cartographic products. For example, in the Blue Ridge Front Study Area, one performance task asks students to locate and mark a county boundary line on an aerial photograph. That boundary line is not shown on the photograph. To answer this question, the student must refer to a topographic map and realize that the county boundary in this part of the Blue Ridge Front was placed along a major drainage divide. They must then analyze the photograph, using their knowledge of how to interpret infrared aerial photography, to determine the location of the ridgeline which acts as the drainage divide. The student can then trace this line on the photograph thereby demonstrating the ability to interpret map and photographic information to solve a problem. Test questions should use map and lithograph data whenever possible.

Open ended questions are another excellent method for assessing student comprehension. Although taking longer to grade, such questions allow students to demonstrate their ability to think through a problem, hypothesize, and design a strategy to solve the problem. By asking students to document their progress throughout their answer, it is possible to ascertain what misconceptions, if any, the student has developed about the topic and to evaluate the logical structure of their reasoning.

Mathematics

There are a variety of ways to assess the mathematics skills taught through the SE MAPS curriculum. Some general examples include: extended projects, with periodic checkpoints; direct problem solving, where students would show their work and explain each step they took; student designed mathematical problems developed from the cartographic products, in which students model their own questions after performance tasks in SE MAPS; teacher prepared pretest/posttest questions which directly tie mathematical skills to the maps and images; portfolio assessment, in which students would prepare samples of mathematical work done with the cartographic products, and examinations with clearly defined scoring rubrics, in which several steps of student mathematical reasoning are compared with predetermined criteria.

Some examples of criteria for use with scoring rubrics for a question involving the concept of perimeter of a field might include:

- Shows understanding of concept of perimeter
- Use of appropriate strategies to solve the problem
- Correctness of computations
- Clarity of written explanations
- All requirements of problem are satisfied or addressed

This list of criteria may be graded on the basis of superior, satisfactory, marginal, or unsatisfactory answers.

Social Studies

Specific assessment techniques are best left to the teacher and the school system. It should also be noted that many of the books listed in the References and Resources section are excellent sources for historical vignettes. SE MAPS assessment could involve any number of assessment techniques including:

- Teacher prepared pretest to determine what students know about Southeastern history and geography before the use of SE MAPS materials followed later by a teacher made posttest
- Checklist where teacher assesses student accomplishment of unit objectives
- Portfolio assessment in which a variety of student work is included
- Use of projects developed and presented by students which reflect objectives of SE MAPS activities *e.g.*, maps showing transportation systems
- Written reports on themes of topics introduced in SE MAPS activities

Language Arts

Assessment strategies for measuring student growth and change are as varied as the storytelling and other activities themselves. The following vignette incorporates an assessment strategy into an SE MAPS activity and can be used as an example to assist teachers in generating their own strategies.

After investigating, reading about, and telling local stories, a class of middle school students wants to investigate the particular stories that relate to a cave that is located outside of their town. Then, they want to retell their favorite tales about the cave and compose original ones. In small groups, the students design a long list of requirements for evaluating their oral and written story products. They rank order the requirements, listing the most important first. After researching old newspaper articles, interviewing folks living near the cave, and obtaining a local park ranger or interpreter as a guest speaker, the students decide to create group stories of different types.

For example, one group wants to create a story to explain the origin of a cave; another a story that describes bats incubating their babies in a cave; a third wants to explain groundwater flow by telling about the trip of a golf ball through a cave; and so forth. The class decides to revise their evaluation list, shortening it and making it specific for each story type. Two weeks later, the students are ready to tell their stories. After the first couple of tales, the class decides to eliminate any ratings on their evaluation requirements having to do with actual storytelling performance and to instead give points for amount and accuracy of research and for the creative ways that each group has incorporated the factual information. Each group scores and discusses the other groups' work. Then, each student writes a personal reflection discussing their individual progress within their group and identifies things that they might like to try differently next time as well as ideas for future explorations.

This scenario allows the teacher to assess what students initially know about story composition and to assess what they are learning as the groups progress. It also incorporates an assessment of the final product and the process, and provides for group and individual evaluations. Most importantly, it involves students in an authentic, purposeful, and useful self-assessment throughout the investigation.

Culminating Assessment Activity

At the end of the SE MAPS portion of the yearly course of study, pilot teachers have found it useful to achieve closure on the topic of Southeastern map studies by arranging a culminating group activity involving all of the cartographic products. Each group is assigned two study areas to investigate. The sites are selected to be as different as possible although all sites have certain basic categories of features which can be compared. Instructions to groups include describing the following three items for each area and preparing a report to the class highlighting similarities and differences between their two sites.

A. The natural landforms and diversity of the landscape
B. Human interference with the landscape including alterations and use of land
C. Ways that culture was affected by the landscape in this region

The following study area pairs are suggested as examples:

- Cumberland Plateau vs. Carolina Bays
- Blue Ridge Front vs. Mississippi River Alluvial Plain
- Birmingham vs. Columbia
- Outer Banks vs. New Orleans to the Gulf of Mexico
- Pine Mountain Belt vs. Cumberland Gap
- Mississippi Gulf Coast vs. Grand Strand
- Cumberland Plateau vs. South Florida

GLOSSARY

abolitionist - a person in favor of putting an end to slavery

alluvium - unconsolidated material that is transported and deposited by a river

antebellum - refers to the time period before the American Civil War

aquifer - a body of permeable rock capable of holding and transporting significant amounts of groundwater, usually underlain by impermeable material

Back Country - a region that is unsettled; distant from largely populated areas

barrier islands - elongated ridges of sand offshore of a coastline and above sea level

batholiths - a large body of formerly molten rock that had pushed its way into the earth's crust from below and then solidified

Blue Ridge - the sparsely populated, relatively mountainous region of South Carolina which is underlain by igneous and metamorphic crystalline rock and is characterized by recreational land use

beach renourishment - the addition of new sand to beach areas which have experienced severe coastal erosion and subsequent loss of sand

Carolina Bay - a shallow, elliptical surface depression found in the Coastal Plain

Coastal Plain - the relatively flat region of South Carolina which is underlain by Cretaceous and Tertiary sedimentary rocks and is characterized by forests and agriculture as primary land uses

Coastal Zone - the relatively flat region of South Carolina which lies along the Atlantic Ocean, is underlain by unconsolidated Quaternary sedimentary rocks, is characterized by active coastal processes and has tourism as the major land use

cuspate delta - a triangular shaped delta

colluvium - unconsolidated weathered material transported by gravity down a hill slope

delta - a low-lying depositional landform formed when sediment laden river currents enter an open body of water, slow down, and drop their sediment load

dendritic drainage pattern - a geometric pattern formed by rivers and streams which resembles the design on the veins of a leaf

detritus - material derived from preexisting rocks, formed by erosion or weathering; also loose fragments of dead organic material which accumulate in marshes or swampland

dike - thin, flat, formerly molten rock that has pushed into the crust of the earth from below cutting across previously existing layers, also earthen or other dam which holds back water to form a reservoir

disappearing streams - streams that disappear into the ground due to dissolution of limestone or other soluble rock in areas of Karst Topography, and which may possibly reappear or re-emerge from underground caverns

dissolution - the dissolving of rock or other material through the action of groundwater, surface water, or chemical agents

downfaulted basins - low areas between parallel fault zones formed by rocks breaking and subsiding or sliding downward relative to the surrounding landscape

escarpment - a linear cliff-like ridge of land or exposed rock commonly formed by faulting or fracturing of the earth's crust or by differential erosion of rock

estuary - that part of the mouth or lower course of a river in which its current meets the sea's tides; there is a mixing of fresh and salt water in this area

Fall Line Zone - geologic boundary between Piedmont and Coastal Plain, characterized by waterfalls or rapids in the rivers and change in stream gradient

fault - a fracture in a rock along which there is or has been an observable displacement

floodplain - the low-lying, level area that is periodically flooded on both sides of a river; it is made up of unconsolidated sediment deposited by the river

flotilla - a large number of small naval vessels

folds - bends or curves visible in layered rock

fossiliferous - bearing or containing intact or fragmented fossil plants and animals, or other evidence of past life; usually refers to rock

Grand Strand - the wide, crescent-shaped beach stretching from the North Carolina border to Winyah Bay; noted for tourist activity

groin - a breakwater made from rock, concrete, wood, or metal erected on a beach to inhibit the movement of sand to protect against longshore drift

habitat - the particular local environment in which a species of plant or animal lives

hydrolysis - a chemical process which occurs during weathering of minerals in rock whereby a compound reacts with water and is changed into a different material giving a byproduct of dissolved ions which are carried away by groundwater

igneous intrusion - any mass of formerly molten rock that has pushed into the crust of the earth from below and solidified

igneous - rocks that have formed by the cooling and solidification of molten material

indigo - plant in the legume family used for obtaining blue dye

jetty - a pier or structure of stones or wood projecting into the sea to protect a harbor from wave damage by deflecting the current

kaolin clay - a fine white clay produced by the alteration of alkali feldspar minerals in crystalline rocks, used in ceramics, paper, pharmaceuticals, and other products

Karst - a landscape characterized by underground caverns, disappearing streams, and surface sinkholes formed in regions of limestone or other soluble bedrock

landform - term referring to a landscape feature on the earth's surface which has been produced by geological processes, *i.e.* hills, valleys, streams, terraces, etc.

limestone - a sedimentary rock composed primarily of the mineral calcite (calcium carbonate) which often contains fossils and produces Karst Topography

lithographs - a picture produced by inking a specially prepared surface and then pressing the surface onto paper, or, in SC MAPS, the infrared color images and photographs printed from aerial photographic film or satellite imagery

loam - a soil containing sand, silt, clay and organic matter

Low Country - another name for the Coastal Plain and Coastal Zone of South Carolina

maritime forests - refers to a forest whose growth and microclimate are influenced by its proximity to the ocean

marsh- a grassy, saturated, poorly drained area intermittently or permanently water-covered

meander - a stream channel bend that increases its curvature through time and slowly migrates back and forth across its floodplain

metamorphic - referring to rocks that have changed in texture or composition due to the effects of heat and/or pressure

metamorphism - the process whereby rocks undergo physical or chemical changes as a result of heat and/or pressure

Midlands - a name given to the central portion of South Carolina, particularly the area around Columbia, because of its central location in the state; sometimes used as another name for the Sandhills Region

monadnock- isolated hill or mountain formed by erosion, an eroional remnant

niche - the function or position of an organism within its ecological community

oxbow lake - a horseshoe-shaped lake formed in an abandoned meander loop

oxidation - chemical process that occurs when a substance is combined with oxygen

perennial streams - streams that flow year-round without ever drying up

permeability - the ability of rock, sediment, or soil to permit fluids to flow through it

pettiagua - a long, hollowed-out flat boat similar to a canoe

Piedmont - the gently rolling, moderate elevation, foothills region of South Carolina underlain by igneous and metamorphic crystalline rocks and characterized by industrial, agricultural, and forestry related land uses

point bar - low lying mound of sand and/or gravel deposited on the inner margins of meander bends where stream velocity is lowest

porosity - the volume of the void spaces within a rock or soil, expressed as a percentage of the total volume

postbellum - the period after the American Civil War

pumped-storage - the type of hydroelectric power generation in which water is pumped from a lower elevation lake to a higher elevation lake during the night when power demand is low, then allowed to flow back into the lower lake through turbines to generate electricity during periods of high power demand

rapids - shallow, rocky areas in a stream channel which contain small waterfalls or rough water which is not navigable for boats, but is an easy place to cross

rectangular drainage pattern - a geometric arrangement of stream courses in which tributaries flow into larger streams at right angles; this type of pattern is usually controlled by faults or fractures in the underlying rock

regolith - any loose material overlying bedrock

relief - a measure of the difference in elevation between the highest and the lowest points in a specific localized area

remnant island - a coastal island which is thought to have originally been part of the mainland until it was separated from the shore by erosional processes

reservoir - a lake-like body of water formed by the blocking of streams by artificially constructed dams or embankments

rift zone - a system of parallel fractures in the earth's crust characterized by normal faults and extension of the land surface; often associated with basaltic lava extrusion and usually precedes the opening of a new ocean basin

salt marsh - a tract of low elevation wetlands, usually along the ocean, with a high salt concentration in the water

Sandhills - the central hilly region of South Carolina underlain by Cretaceous and Tertiary sedimentary rocks and characterized by poor soils and mining operations as the major land use

saprolite - partially decomposed rock which remains in its original location

seawall - a strong wall or embankment along the beach to prevent the encroachment of the sea, acts as a breakwater, etc.

sinkhole - steep-sided depression or basin found in areas of Karst Topography; caused by solution of limestone bedrock near the surface or by collapse of a cavern roof

sinkhole lakes - lakes formed in the portion of the hole formed by the collapse of a cave which is below the groundwater table

slough - low, swampy depression in a floodplain; usually filled with mud

swamp - an area having shrubs and trees, intermittently or permanently water-covered

tectonic - pertaining to the broader large scale structural features of the earth, how they originated, and how they relate to mountain building episodes

terrace - nearly level surface, relatively narrow, bordering a stream or body of water and terminating in a steep bank

tidal channel levee - a raised embankment next to a tidal channel, showing a gentle slope away from the channel; results from periodic overbank flooding due to the tidal influence on the channel.

tidal inlet - waterway connecting open water to a lagoon, bay, or tidal flat

topography - the general shape and physical features of the landscape

Tories - supporters of England during the American Revolutionary War

transgressive barrier island - narrow sand ridge built up seaward of the coastline; very unstable; contains sparse vegetation

Up Country - in South Carolina, refers to the Upstate; or in general a mountainous area

watershed - the land area drained by a system of rivers

weathering - the chemical and physical breakdown of rocks by rain, wind, snow, etc.

wetlands - a general term, used by specialists in wildlife management, for a group of wet habitats

xerophytic - adapted to very dry conditions