

ROCKS AND MINERALS OF CENTRAL FLORIDA GRADES 5-8

OBJECTIVES:

- Students will research the rocks and minerals of Florida.
- Students will identify the location of Florida's rocks and minerals by county.
- Students will create a quilt to identify the uses of Florida's minerals.

FCAT STRANDS ADDRESSED:

Reading Exam: Main idea / Research and Reference

Writing Exam: Expository writing

Science Exam: Processes that Shape the Earth / The Nature of Science

SUNSHINE STATE STANDARDS / BENCHMARKS:

SOCIAL STUDIES – Grade 5

Strand A: *Time, Continuity, and Change*

Standard 6: *The student understands the history of Florida and its people.*

Benchmark SS.A.6.2.2 The student understands the influence of geography on the history of Florida.

Strand B: *People, Places, and Environments (Geography)*

Standard 1: *The student understands the world in spatial terms.*

Benchmark SS.B.1.2.1: The student uses maps, globes, charts, graphs, and other geographic tools including map keys and symbols to gather and interpret data and to draw conclusions about physical patterns.

LANGUAGE ARTS – Grade 5

Strand A: *Reading*

Standard 2: *The student constructs meaning from a wide variety of texts.*

Benchmark LA.A.2.2.1 The student determines the main idea or essential message in a text and identifies relevant supporting details and facts, and arranges events in chronological order.

Benchmark LA.A.2.2.5 The student reads and organizes information for a variety of purposes, including making a report, conducting interviews, taking a test, and performing an authentic task.

Strand B: *Writing*

Standard 2: *The student writes to communicate ideas and information effectively.*

Benchmark LA.B.2.2.3 The student writes for a variety of occasions, audiences, and purposes.

SCIENCE – Grade 5

Strand D: *Processes that Shape the Earth*

Standard 1: *The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.*

Benchmark SC.D. 1.2.1 The student knows that larger rocks can be broken down into smaller rocks, which in turn can be broken down to combine with organic material to form soil.

Benchmark SC.D.1.2.4 The student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.

Strand D: *Processes that Shape the Earth*

Standard 2: *The student understands the need for protection of the natural systems on Earth.*

Benchmark SC.D 2.2.1: The student knows that using, recycling, and reducing the use of natural resources improve and protect the quality of life.

Strand H: *The Nature of Science*

Standard 1: *The student uses the scientific processes and habits of mind to solve problems.*

Benchmark SC.H.1.2.2 The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results.

VISUAL ARTS – Grade 5

Strand B: *Creation and Communication*

Standard 1: *The student creates and communicates a range of subject matter, symbols, and ideas using knowledge of structures and functions of visual arts.*

Benchmark VA.B.1.2.1 The student understands that subject matter used to create unique works of art can come from personal experience, observation, imagination, and themes.

Strand C: *Cultural and Historical Connections*

Standard 1: *The student understands the visual arts in relation to history and culture.*

Benchmark VA.C.1.2.2 The student understands how artists have used visual languages and symbol systems through time and across cultures.

SOCIAL STUDIES – Grades 6-8

Strand A: *Time, Continuity, and Change*

Standard 6: *The student understands the history of Florida and its people.*

Benchmark SS.A.6.3.2 The student knows the unique geographic and demographic characteristics that define Florida as a region.

Benchmark SS.A.6.3.5 The student understands how Florida has allocated and used resources and the consequences of those economic decisions.

Strand B: *People, Places, and Environments (Geography)*

Standard 1: *The student understands the world in spatial terms.*

Benchmark SS.B.1.3.1 The student uses various map forms (including thematic maps) and other geographic representations, tools, and technologies to acquire, process, and report geographic information including patterns of land use, connections between places, and patterns and processes of migration and diffusion.

LANGUAGE ARTS – Grades 6-8

Strand A: *Reading*

Standard 2: *The student constructs meaning from a wide variety of texts.*

Benchmark LA.A.2.3.1 The student determines the main idea or essential message in a text and identifies relevant details and facts and patterns of organization.

Benchmark LA.A.2.3.5 The student locates, organizes, and interprets written information for a variety of purposes, including classroom research, collaborative decision making, and performing a school or real-world task.

Strand B: *Writing*

Standard 2: *The student writes to communicate ideas and information effectively.*

Benchmark LA.B.2.3.3 The student selects and uses appropriate formats for writing, including narrative, persuasive, and expository formats, according to the intended audience, purpose, and occasion.

SCIENCE – Grades 6-8

Strand D: *Process that Shape the Earth*

Standard 1: *The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.*

Benchmark SC.D. 1.3.1 The student knows that mechanical and chemical activities shape and reshape the Earth's land surface by eroding rock and soil in some areas and depositing them in other areas, sometimes in seasonal layers.

VISUAL ARTS – Grades 6-8

Strand B: *Creation and Communication*

Standard 1: *The student creates and communicates a range of subject matter, symbols, and ideas using knowledge of structures and functions of visual arts.*

Benchmark VA.B.1.3.1 The student knows how different subjects, themes, and symbols (through context, value, and aesthetics) convey intended meanings or ideas in works of art.

Benchmark VA.B.1.3.2 The student knows how the qualities and characteristics of art media, techniques, and processes can be used to enhance communication of experiences and ideas.

Benchmark VA.B.1.3.3 The student understands and distinguishes multiple purposes for creating works of art.

Strand C: *Cultural and Historical Connections*

Standard 1: *The student understands the visual arts in relation to history and culture.*

Benchmark VA.C.1.3.1 The student understands and uses information from historical and cultural themes, trends, styles, periods of art, and artists.

Benchmark VA.C.1.3.2 The student understands the role of the artist and the function of art in different periods of time and in different cultures.

ROCKS AND MINERALS OF CENTRAL FLORIDA

MATERIALS:

- White board w/ white board markers or chart paper w/ markers
- Teacher resource list of *Florida's Rocks and Minerals*
- Blank Florida map with the outlines of each county
- Handout – “History Center Viewing Guide – Limestone / Seminole Patchwork”
- Rocks and minerals guides for student research or Internet resources
- Handout – My Florida Rock or Mineral
- Article – “Seminole Patchwork”
- Construction paper or copier paper in various colors
- Drawing pencils or markers
- Paper model – Seminole Indian woman wearing patchwork dress
- Glue stick

Limestone Demonstration Materials

- Sample of limestone
- Pan or container
- Vinegar

PRE-VISIT ACTIVITIES:

1. Ask students what rocks and minerals they think they might find in Florida. If possible, ask them to identify which rocks and minerals are igneous, metamorphic or sedimentary. You can also ask students to identify the uses for the various rocks and minerals listed. Record the students' responses on the board or chart paper. After discussing the students' responses, give them a copy of the “Florida's Rocks and Minerals” handout. Have them read the handout and identify any rocks and minerals that they listed in their brainstorming session.
2. After the brainstorming session, give each student a copy of the map with the Florida counties. Their task is to create a map that shows the locations of Florida's various rocks and minerals. Ask students to create a legend for the each of the rocks and minerals listed in the handout that identify counties and draw / color this legend on the side or bottom of the map. Next, the students should draw symbols

or color the map to indicate where each of the rocks and minerals are located in Florida.

3. Go over the “History Center Viewing Guide – Limestone / Seminole Patchwork” so that students know what to look for while on the field trip.

AT THE HISTORICAL CENTER:

Give students a copy of the “History Center Viewing Guide – Limestone / Seminole Patchwork.” Ask them to complete this worksheet as they walk through the exhibits. In particular, they will focus on the Natural Environment and Seminole Indian sections.

POST-VISIT ACTIVITIES:

1. Go over the students’ responses to the “History Center Viewing Guide – Limestone / Seminole Patchwork.”
2. Ask each student to become an expert on one of the rocks and minerals listed in the handout given to students prior to the field trip. Using the information provided in the guide and other resources (encyclopedias, field guides, Internet), explain to the students that they will be responsible for describing their rock or mineral’s physical properties, where it can be found, its uses, and at least 2 other details not provided in the original handout. The students should also locate a picture of their rock or mineral. Each student will write a mini-report about his or her rock or mineral using the handout (My Florida Rock or Mineral) as a template.
3. After students have completed their reports on their rocks or minerals, explain to them that they are each going to create a patch to put on a paper doll model of a Seminole Indian woman in order to create a “class patchwork dress.” Share with them the information from the article – “Seminole Patchwork.” If possible, have students read and summarize the article on their own. Afterwards, draw an outline of a female Seminole Indian on a large piece of bulletin board paper and put it up on the wall. Let students decorate their Indian woman based on information they got from going through the Seminole Indian exhibit at the History Center. Have each student design a 3” x 3” patchwork section on a piece of colored construction or copier paper. Their patch should represent the rock or mineral that they studied. After each student has completed his or her patch, glue the patches to the class paper model to form a “dress.”
4. Conduct the dissolving limestone demonstration experiment. Place the limestone sample in a pan and cover the limestone with vinegar. Ask the students to make predictions about what will happen over the next few weeks. Have them record

their daily observations in their notebooks. After a few weeks, have the students draw conclusions about their observations.

FLORIDA'S ROCKS AND MINERALS

LIMESTONE

Various types of limestone underlie all of Florida, but in many parts of the state, the limestone is covered by the sand and clay that forms the land surface.

Limestone is a sedimentary rock composed principally of the mineral calcite (CaCO_3). It may be easily identified by the application of a drop of cold dilute hydrochloric acid, which causes the calcite particles to effervesce freely.

TYPES OF LIMESTONE

KEY LARGO LIMESTONE: The Key Largo Limestone is a hard, white to light gray rock, which contains numerous fossil corals. It is found at the land surface in the Florida Keys from Sand Key to Loggerhead Key.

MIAMI LIMESTONE: The Miami Limestone is a soft, white limestone composed mainly of ooliths with some quartz sand and other fossils. Ooliths are small rounded grains so named because they look like fish eggs. Ooliths are formed by the deposition of layers of calcite around tiny particles, such as sand grains or shell fragments. The Miami Limestone is found at the surface in parts of Broward, Collier, Dade and Monroe counties.

OCALA LIMESTONE: Generally the Ocala Limestone is soft and porous, but in places it is hard and dense because of cementation of the particles by crystalline calcite. The deposit is remarkable in that it is composed of almost pure calcium carbonate: shells of sea creatures and very tiny chalky particles. Ocala Limestone underlies almost all of Florida, but it is found at the surface of the land only in a small portion of the state.

ANASTASIA COQUINA: Coquina limestone is composed of whole or broken shells and quartz sand grains that have been more or less firmly cemented together. In Florida, the principal cementing agent is calcite. Coquina has been used as a building stone in Florida for over 400 years. It is found at land surface along the east coast from St. Johns to Palm Beach counties, but is rarely found more than 5 miles inland.

SUWANNEE LIMESTONE: Not as pure as the Ocala, Suwannee Limestone nevertheless contains a very high percentage of calcium carbonate. The impurities in the Suwannee (principally quartz sand and clay) may amount to 10 percent of the rock. The Suwannee is usually harder and more compact than the Ocala.

TAMPA LIMESTONE: The Tampa Limestone is much more variable in composition than either the Ocala or the Suwannee. The impurities, which may be quartz sand, clay or phosphate, range from 20 to as much as 70 percent of the rock. The Tampa is usually a

hard, massive crystalline rock and in some areas it contains small cavities called molds where shells have been dissolved out of the rock.

MINERALS

CALCITE: The minerals calcite, which make up limestone, is composed of calcium carbonate (CaCO_3). It varies in color from white to colorless to shades of yellow, orange or gray. It breaks up readily into crystalline forms called rhombohedrons and can be identified further by its effervescence in cold dilute hydrochloric acid.

DOLOMITE: Dolomite is a sedimentary rock composed principally of the mineral dolomite $\text{CaMg}(\text{CO}_3)_2$. The minerals have a white, light brown or pink color, with a white streak. The test for dolomite is the same as that for calcite, except that dolomite effervesces very slowly in cold dilute hydrochloric acid, and more vigorously in warm acid. It is unusually found closely associated with limestone deposits. Dolomite can be used for most of the same purposes as limestone except for making Portland cement.

COMMON CLAY: Another sedimentary rock, common clay is sticky and is composed primarily of varying amounts of clay minerals, quartz sand, calcite, iron oxides, organic impurities and other materials. Most of Florida's clay was originally deposited as a mud in seas, lakes, and rivers or on deltas. It occurs in almost every county north of the latitude of Lake Okeechobee. Principal use of common clay in Florida is as an addition to sand in the construction of roads. The clays are also used in the manufacture of Portland cement and lightweight aggregate.

KAOLIN: Kaolin is a soft, lightweight, often chalk-like sedimentary rock that has an earthy odor, and in Florida is generally light in color and associated with large amounts of quartz sand. The state reserve of kaolin occurs in large deposits in the east central part of the state from southern Clay County to northern Highlands County. A small deposit occurs in west Florida in a narrow belt extending from Jackson County into Santa Rosa County.

FULLER'S EARTH: This name is applied to certain clays that have the ability to absorb coloring matter from vegetable, mineral and animal oils. Generally, fuller's earth found in Florida is light green or gray in color, has a greasy feel when wet, and has a low specific gravity. Sizable deposits are known to occur near the surface of the ground in Gadsden, Marion, Pinellas and Manatee counties.

QUARTZ SAND: Quartz sand is a loose, unconsolidated material of small grain size composed primarily of the mineral quartz. Though common quartz sand is the most abundant surface material in the state of Florida, the deposits are not extensively developed. Quartz sand is used for making glass and for grinding and polishing metals. Other uses are as molding sand, blast sand, filler sand and fill sand.

SANDSTONE: This is another sedimentary rock commonly composed of quartz sand grains cemented together by silica, calcite, iron oxide, or other mineral substance. Depending upon the amount and character of the cementing agent, sandstones may be

almost any color. The occurrence of sandstone is limited in Florida largely to the red sandy clay formations of the central peninsula and northwestern part of the state.

CHERT: Chert is also known in the state as flint or flint rock and is an extremely fine grained variety of the mineral quartz. Florida's cherts are generally gray in color, through some are bright shades of blue, red, yellow and orange. It is characterized by its extreme hardness and is found in association with some of the limestone formations, especially the Ocala. Florida's Indians utilized chert in the manufacturing of axe and spearheads and arrow points.

LIMONITE: Limonite, a compound of iron, oxygen and hydrogen, is a yellowish brown to dark brown or black mineral. Impure limonite occurs in many counties in the state, often appearing as a rust-like material staining sand and binding it together. A deposit of fairly high-grade limonite is known to exist near Chiefland in Levy County. Commercially, limonite is used as an ore for iron and as a pigment in paints.

ILMENITE: The black to brownish iron ilmenite (titanium oxide) often has a black to brownish red streak. Ilmenite is naturally slightly magnetic, but the magnetism can be greatly increased by heating. In Florida, ilmenite occurs as rounded sand-size particles. The chief use for the mineral ilmenite is in the manufacturing of titanium oxide pigment for white paints. Ilmenite, along with rutile is used for coating electric welding rods and also as a source of titanium metal.

RUTILE: Another titanium oxide, rutile is red, red-brown or black in color, with a yellow or pale brown streak. It is or has been produced along with ilmenite in Clay, Duval and Indian River counties.

ZIRCON: This is a commonly colorless zirconium silicate. In Florida, however, zircon may be red, blue, brown or lavender with a colorless streak. It occurs as sand-size particles in Florida and may be distinguished from quartz by its brilliant luster and smooth crystal faces, as seen with the aid of a microscope. Zircon withstands very high temperatures.

STAUROLITE: Staurolite is a complex iron, aluminum silicate. It's usually some shade of brown, has a colorless streak and occurs as rounded sand-sized particles. Staurolite is one of the most abundant minerals in Florida's heavy sand deposits. Principal use is in the production of Portland cement, where it substitutes for clay in supplying the necessary alumina and part of the iron as required by the cement formula.

ANHYDRITE: The mineral anhydrite is an anhydrous calcium sulfate (CaSO_4). It is closely related to the mineral gypsum but has a marble-like texture and usually shows no crystal form. Anhydrite has a white, gray, or brown color and a white streak and is distinguished from calcite by its superior hardness and the fact that it does not effervesce in hydrochloric acid.

GYPSUM: The mineral gypsum is a hydrous calcium sulfate. It may be transparent to translucent when pure, but is often colored gray, yellow, red, brown or black by impurities. It is soft enough to be scratched by a fingernail and occurs in several forms, two of which are known in Florida. Selenite is a coarsely crystalline, transparent variety composed of flat, angular crystals that can be easily split apart. Massive gypsum is a granular variety, showing no crystal form. Gypsum and anhydrite (closely related sulfate minerals) are common minerals deep in the subsurface of the state. No commercial deposits are known to exist near the surface in Florida, though deposits of commercial extent are believed to be present at approximately 2,000 feet below the ground surface in Monroe County.

PHOSPHATE ROCK: “Phosphate rock” is a general term applied to natural deposits of minerals valued chiefly for their phosphorus content. It is an earthy material, which varies from a hard rock to a granular, loosely consolidated mass. Florida’s phosphate deposits are primarily on the “land pebble” type, which represent marine reworking of phosphate limestones, and deposition of hard people of phosphate in a gravel bed. The state is the world’s leading producer of phosphate rock. Hard-rock phosphate deposits are mined in Citrus and Marion counties and are known to occur in a general area extending from Suwannee to Hernando counties, north-south. Phosphate has a great many uses, the largest of which is in the manufacture of phosphoric acid, superphosphate, triple supersphosphate, ground rock and other phosphatic salts for fertilizer.

History Center Viewing Guide – Limestone / Seminole Patchwork

Name: _____

Directions: Complete the following sections as you walk through the History Center.

Section 1 – The Natural Environment

As you walk through this exhibit, write down notes about limestone in Florida in the space below. You should record at least 3 key facts.

Section 2 – The Seminole Indians

As you walk through this exhibit, write down notes about the Seminole patchwork dresses in the space below. You should record at least 3 key facts.

Draw a picture of the Seminole patchwork dress on display.

Section 3 – Rocks and Minerals in Florida

On the back of this page, write down any information you learn about other Florida rocks and minerals as you go through the various exhibits.

My Florida Rock / Mineral

Name: _____

Rock / mineral: _____

Circle:

Rock

Mineral

Picture:

Seminole Patchwork

by *Victoria Westermark-Many Bad Horses*

During the early 19th century Seminoles wore clothing made from hides or skins similar to that of other Southeast tribes. Furs and hides provided warmth against the cool climate of the area around Georgia where many Seminoles still lived. President Andrew Jackson's Indian removal policies of the 1830's and the ensuing Seminole Wars sent the remaining Seminoles fleeing ever southward into Florida. In the 1840's approximately 300-500 of the surviving Florida Seminoles sought refuge by disappearing into the Everglades. For several decades the Seminoles lived quietly, free from the influences of other tribes or much interference from the outside world.

With the Wars stopped, families finally emerged from the Everglades, and turned to trade as their main economy. There were no roads, no motorized vehicles. The swamp provided alligator hides, egret plumes, and a rich supply of trade items from its mysterious world. The Seminoles loaded up their families into dugout canoes and poled into the Miami River, eventually reaching town (Miami) some sixty miles away. Here, at outposts, families would often camp for days to trade their bounty for ammunition, sugar, flour, and other supplies. The Seminoles also traded for cotton cloth, which came in large rolls and which they used to make clothing. The long trip of several days each way was usually made only once a year.

The first versions of Seminole patchwork, from the late 1800's to the early 20th century evolved out of necessity. When cloth ran short, and a journey to town was not likely, women would take the small strips remaining from the ends of the cotton rolls and make strips out of the remnants. These were hand sewn into larger pieces for clothes, referred to as strip clothing. Necessity turned into wearable art.

The introduction of the sewing machine during the early 20th century caught the creative imagination of Seminole women. An Everglades explorer commented there were sewing machines in all the Seminole camps he visited in Southeast Florida. The sewing machine revolution transformed Seminole clothing. In the 1920's, patchwork, now done with a machine, flourished. Women sewed with calicos, stripes, solids and plaids. They sewed not only to clothe their own families, but creatively, and to contribute to the growing tourist trade.

Soon the larger strips evolved into more elaborate patterns. Seminole women began competing to create ever more complex designs as they became more adroit. Different reservations had different traditions. Patchwork, also called intricate patchword, is different from applique work in that the pieces making the designs are part of the garment's structure.

The Seminole Tribune notes, "Women's garments during this era consisted of a very full, floor-length skirt, gathered at the waist. A long sleeve blouse had an attached cape,

trimmed with a ruffle, which came only to the shoulders and was very short. To complete the outfit, she wore as many strings of glass necklace beads as she could afford."

Men of this period wore a simple full cut shirt. Every Seminole man owned a "big shirt," a patchwork shirt with a waistband that came to just above the wearer's knees, inspired perhaps by an Irish long coat or even a kilt. Later shorter jackets became fashionable.

Sometimes women sewed patterns that were symbolic of Seminole clans. Each Seminole Indian born from a Seminole mother is a member of her clan, a traditional extended family unit: bear, snake, panther, toad/bigtoad, bird, deer, wind, and otter. Some designs reflected daily life: lightning striking across the sky, crosses that reflected Christian teachings, fires that raced through the swamp, the spools that held the colored threads used to sew the very patchwork. A design might be named after its creator. Copying a designer was a high compliment. Color might play a part, and sometimes reflected the medicine colors of the four directions.

So distinguishing was this patchwork garment art that pattern changes in patchwork trace the history of the Seminole over the past one hundred years. Lee Tiger, a Seminole public relations executive, mounted a popular exhibit illustrating Seminole history through clothing for the International Travel Exchange Trade Show in Berlin, Germany in 1995-96. A student of patchwork will be intrigued to discover the noticeable pattern and garment differences that reflect each decade since the 20's. Patchwork bands narrowed over time. This was carried to an extreme in the 1960's when the small-scale bands became known as "postage stamp work."

From the 1970's to the present, many seamstresses enlarged their designs and began utilizing fabrics other than cotton for special occasions. Although a few traditional people still wear patchwork for every day, most now wear their patchwork for ceremonial or special occasions. Patchwork vests are worn frequently today. Patchwork has also been used to decorate all other types of clothing.

Seminole and Miccosukee women have been creating patchwork for nearly a century. Passed on through generations, this unique art is a source of cultural pride, a testament to the adaptability, and creativity of a people whose artistic achievement continues to flourish.

Resources:

Ah Tha Thi Ki Museum - *Patchwork and Palmettos, Seminole-Miccosukee Folk Art since 1820*, by David Blackard, from an exhibition sponsored by the Ft. Lauderdale Historical Society, 1990

<http://www.abfla.com/1toctf/seminole/semart.html>

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