Florida's Changing Shape

Background:
For much of its history, Florida was underwater. At first, Florida consisted solely of the Florida Platform, a limestone base formed from the calcium carbonate remains of shelled marine animals. Though the Appalachian Mountains began to erode 65 million to 24 million years ago, and rivers carried this debris south, at first it could not be deposited because of swift currents in the Gulf Trough that separated the platform from the rest of North America. Later, currents changed and sediment filled the trough. By the late Oligocene Epoch, Florida emerged as a small peninsula atop the platform.

The Miocene Epoch lasted for 19 million years, from 24 million to 5 million years ago. It was notable for several reasons. Florida in the Miocene Epoch was home to both marine and land animals; in fact, a greater variety of animals lived on land in the Miocene than at any other time. This epoch was also notable for the formation of large amounts of phosphate in the oceans. There were many shifts in sea level, in response to polar freezes and thaws. When sea levels were high, organic material settled on the ocean floor and was moved toward the surface by upwelling currents. Marine animals in shallower water ate these wastes and added to them; the new waste material was deposited on top of underwater plateaus in the shallows. When seawater could no longer hold this compound in solution, it precipitated out. When sea levels were low, this material was reworked through weathering. Carbon was washed away; what remained was fluorapatite, or the phosphate rock that is mined today.

During the Pliocene Epoch, from 5 million to 1.8 million years ago, Florida was often submerged in shallow seas. At times Florida consisted of a few islands. At other times, Florida was a peninsula that extended as far south as today's Bradenton. Most, but not all, of the Pliocene fossils that are found in Florida are of marine animals.

The Pleistocene Epoch, which lasted from 1.8 million years ago to 10,000 years ago, is sometimes called the "Ice Age," though this epoch featured a variation in climates, also. When glaciers melted, sea levels rose and the Florida climate became more humid. During dry periods, sediments that had been carried by ocean currents and deposited to form islands became sand ridges, such as the Lake Wales Ridge. During cooling cycles, as glaciers advanced, sea levels fell and at times Florida expanded to roughly twice its current width. Expansion of Earth's land mass made it easier for many large land animals to migrate into Florida from the north (over the Bering Land Bridge from Asia) and from Central and South America.

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As the Pleistocene ended and the Holocene Epoch began, the climate grew warmer, sea levels rose, and Florida began to take its current shape.

Grades:
4-8

Standards:

LA.4.4.2.3	LA.5.2.2.3	LA.6.2.2.3	LA.7.2.2.3	LA.8.4.2.1
LA.4.5.2.1	LA.5.4.2.1	LA.6.4.2.1	LA.7.4.2.1	LA.8.4.2.3
SC.4.E.6.3	LA.5.4.2.3	LA.6.4.2.3	LA.7.4.2.3	LA.8.5.2.1
SC.4.E.6.6	LA.5.5.1.1	LA.6.5.1.1	LA.7.5.1.1	
SS.4.A.9.1	SS.5.G.1.4	LA.6.5.2.1	SC.7.E.6.4	
SS.4.G.1.1		SC.6.E.6.1	SC.7.L.15.1	
SS.4.G.1.3		SC.6.E.6.2		
		SC.6.N.3.4		
		SS.6.W.1.2		

Objectives:
The students will...

1. Recognize changes in Florida's land mass.

2. Understand that changes occurred over time.

3. Know natural forces that affected change.

Vocabulary:

epoch	era
sediment	peninsula
Florida platform	erosion
upwelling	phosphate
glaciers	Ice Age
habitat	fossils

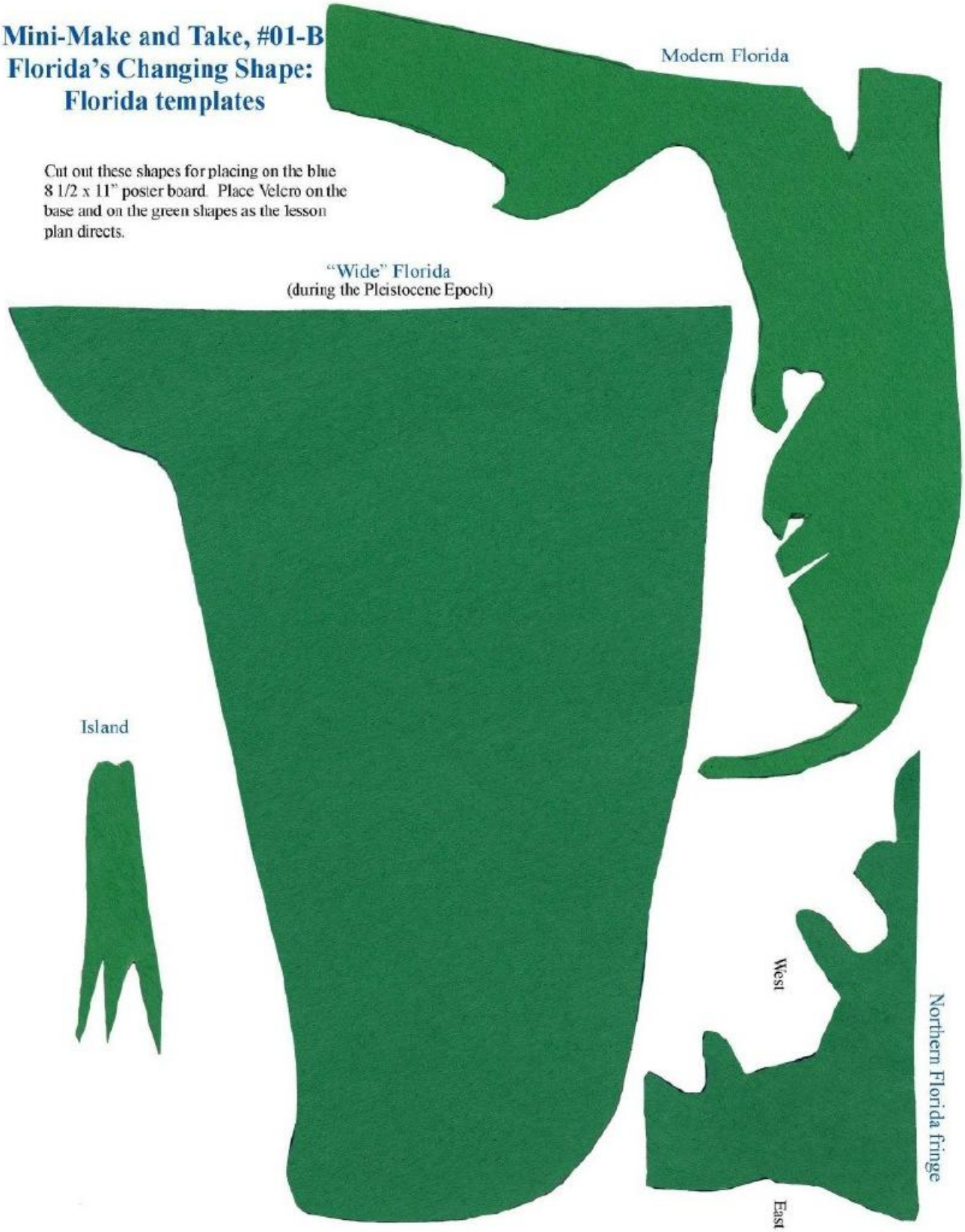
Materials:
Double-stick tape
Scissors
Blue construction paper
Mini Make & Take, #01-B template

Procedure:
Students will listen as the teacher reads a story describing changes in Florida over time (background). As the story is being read, whenever a change is indicated, students will place paper cut-outs of the different shapes of Florida on a piece of blue construction paper (the ocean base).

1. Before presenting the story, the teacher will distribute the Mini Make & Take template and allows students time to cut out all the shapes and place tape on the back side of each piece. (Regular one-sided tape may be rolled in half, to substitute for double-stick tape.)
2. The teacher will move the pieces onto or on the base as they narrate the story of how Florida changed over time.
3. The teacher will demonstrate the placement of the "Florida" shapes first and then have the students place the shapes as the teacher narrates the script the second time.
4. The teacher holds up the ocean base and explains, "For most of its history, Florida was covered by sea water."
5. The teacher will attach the north Florida fringe only. The teacher continues, "Gradually, sediments that eroded from the Appalachian Mountains settled in North Florida. In time, these sediments extended southward to form a small peninsula."
6. The teacher will attach the island cutout (the north Florida fringe is still on the base). The teacher continues, "Later, when polar ice melted and seas were high, Florida consisted of islands at the center of the state and a fringe of land in north Florida. At this time, an important mineral, phosphate, was formed underwater, in the shallows of oceans covering part of the peninsula."
7. The teacher will remove the north Florida fringe and island cutouts and attach the "wide Florida" cutout to the ocean base. The teacher notes, "When glaciers advanced and sea levels were low, during the Pleistocene Epoch, known as the Ice Age, much more land was exposed. At times, during dry years, Florida extended much farther into the Gulf of Mexico, and was twice as wide as it is today. It was a shorter trip for animals from South and Central America and western north America to reach this wider Florida peninsula."
8. The teacher removes the "wide Florida" (#1 cutout) and attaches it to the "modern-day Florida" cutout.
9. The teacher notes, "As the climate grew warmer and the glaciers melted, sea levels rose, and Florida took the shape it has today, in the Holocene (or Modern) Epoch.
10. Now as the teacher reads the script for the second time, the students are instructed to arrange pieces on the ocean base in the correct sequence, starting with Step 4. The teacher should make sure students demonstrate understanding by displaying the ocean base alone or correct shape or shapes on the base at each point in the story.

Mini-Make and Take, #01-B
Florida's Changing Shape:
Florida templates

Cut out these shapes for placing on the blue 8 1/2 x 11" poster board. Place Velcro on the base and on the green shapes as the lesson plan directs.



Assessment:

1. Students correctly choose the Florida shape to match text being read by the teacher.
2. Have students write a short essay describing how Florida changed over time. The essay should also include information about changes in sea levels and climate as Florida's coastal shape changed.

Extension:

In their own words and using their own materials (Florida shapes cutouts and ocean base), students tell the story to their parents.