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Where Is the Center of Mass of Florida?

Tom Greenslade
Kenyon College, greenslade@kenyon.edu

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Thomas B. Greenslade Jr.

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Where Is the Center of Mass of Florida?

Thomas B. Greenslade Jr., Kenyon College, Gambier, OH

An attention-grabbing center-of-mass demonstration uses the map of a state mounted on a sheet of heavy cardboard and cut out along the boundaries. The two-dimensional object is hung from a hole punched into a city near the edge, and a string with a pendulum bob attached to it passes through the center of mass. The process is repeated with a different city, and the center of mass is determined uniquely. I did this regularly with a map of the state of Ohio, and the geographic center of the state reliably came out to be the nearby village of Centerburg.

Which gets us to the problem of Florida: is the geographical center of Florida, an L-shaped state, located in the Gulf of Mexico? This seems easy enough to do in the lecture hall. You suspend the cutout map of the state from Jacksonville and then from Miami, draw the two plumb lines on the map, and see where they cross. The students agree that you do lecture demonstrations very well, and pass on. Perhaps if you spread the demonstration out over two class periods, and make the students do some work on their own, they might learn somewhat more. Here is a template that I propose.

Class 1. Demonstrate the method of finding the center of mass of an irregular body made of ceiling tile or heavy cardboard. Draw concentric circles around the center of mass with colored chalk and toss the figure to a student on the other side of the room; the circles rotate around the center of mass, which traces out a parabolic path. Bring out the cutout of your own state and use the method to locate its center of mass. Finally, show the cutout of Florida and shake your head when you contemplate where the center of mass might be. But, you might be able to make a rough calculation of its location as follows:

The students know how to calculate the center of mass of two point masses using

$$L_{CM} = \frac{(M_1 L_1 + M_2 L_2)}{(M_1 + M_2)},$$

where the $L$'s are distances measured from an arbitrary point along the line connecting the two masses. They also know that the center of mass of a rectangle is at its center. Therefore, trace the outline of Florida on the blackboard and note that it might be roughly represented by a rectangle for the upper tier and panhandle, and a second rectangle for the peninsula (Fig. 1). There is a small overlap of the two rectangles that will be ignored. Give the students a sketch of the rectangles (include a scale of miles) and ask them to calculate the center of mass of the state as a home-
work problem. With the rectangles shown in Fig. 1, my calculations put the center of mass right on the beach—and about 10 miles too far north.

**Class 2.** Collect the homework sheets and list the answers on the board. Locate the center of mass of Florida by hanging it up from Jacksonville, Miami, and Pensacola. You will find it 12 miles northwest of Brooksville in Hernando County, about 50 miles due north of Tampa. It is not in the Gulf of Mexico.

**References**


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**Thomas B. Greenslade Jr.** is professor emeritus in the physics department at Kenyon and a frequent author for *The Physics Teacher.*

**Physics Department, Kenyon College, Gambier, OH 43022; greenslade@kenyon.edu**

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