The Problem with Maps
Fruit-Peel Map

The Mercator Miracle

While it was widely known that the earth is spherical, creating a flat map of a round globe was challenging. In 1569, Gerardus Mercator created a new representation, or projection, of the earth based on a cylinder. If a tube or cylinder of paper wrapped around the earth and the land forms are projected onto the paper, and then it is unfolded, that is the Mercator map. It is most correct at the equator, where the tube “touches” the earth. Lands farther from the equator are “stretched” out of shape. Mercator also used a grid system where compass directions are straight lines, which made it excellent for navigating. As long as sailors held true north, they could use the map easily.

For this activity, you’ll need:

- A grapefruit or orange
- Permanent marker
- Plastic knife
- Paper towels for mess

Cartographers had a difficult time trying to make a flat map depict a round globe. To simulate the difficulty of flattening a sphere’s surface perfectly, you’re going to try peel your piece of fruit.

1. Using the marker, identify and mark on the fruit the locations of the North Pole and South Pole.
2. Now locate the spot that is halfway between the two poles, and use a marker to draw a line around the earth at that point, which geographers refer to as the equator.
3. Draw a few lines of longitude on the map.
4. Next, draw shapes to represent the continents on the earth.
5. Either you, or with the help of an adult, to cut “your globe”, starting at the stem end and making a cut halfway around the grapefruit to the opposite spot.
6. Carefully work your fingers around and under the edges of the skin and peel, keeping it in one piece if possible. Try to keep as much of the “globe” intact as possible.
7. Your challenge now is to create a map that is flat and readable from the outside peel of your fruit.

A few things to think about:

- What kinds of problems are you having?
- Is your map difficult to read?
- What does your “world” look like now, compared to the way it did when it was still round? It’s difficult to flatten a curved surface without some pulling and pushing, or even cutting.