Video
MEDIA SPOTLIGHT

Selecting a Map Projection

Get behind the cartographers' table at *National Geographic* magazine

For the complete videos with media resources, visit:
http://education.nationalgeographic.com/media/selecting-map-projection/

The video above is from the September 2012 iPad edition of National Geographic *magazine.*

Choosing a map projection is a major challenge for cartographers. Features such as size, shape, distance, or scale can be measured accurately on Earth. Once projected on a flat surface, however, only some of these qualities can be accurately represented. Every map has some sort of distortion. The larger the area covered by a map, the greater the distortion.

Depending on the map's purpose, cartographers must decide what elements of accuracy are most important to preserve. This determines which projection to use. For example, conformal maps show true shapes of small areas but distort size. Equal area maps distort shape and direction but display the true relative sizes of all areas. There are three basic kinds of projections: planar, conical, and cylindrical. Each is useful in different situations.

Cartographers at National Geographic chose to use a version of the Mollweide projection for their map highlighting ocean floors, published as the map supplement in the September 2012 issue of *National Geographic* magazine. This Mollweide projection is referred to as a pseudocylindrical projection. The specific version of the Mollweide projection used is called an interrupted Mollweide, because lines of longitude, or meridians, are interrupted. The map is pulled apart at specific meridians to minimize distortion in areas where the cartographer would like the map reader to focus their attention.

Find more interactive content, photos, and videos in the iPad version of National Geographic *magazine*.

QUESTIONS

- When did Flemish cartographer Gerardus Mercator first design the famous projection named after him?
  The projection was first designed and used by Gerardus Mercator in **1569**, during the 16th century.

- According to the video, how many times larger than Greenland is Africa?

According to the video, Africa is fourteen times larger than Greenland. Even though Greenland appears to be larger in maps projected in the Mercator projection, this is just a distortion introduced by the projection.

- What map projection was chosen for the *National Geographic Magazine* September 2012 map supplement and which ocean was chosen as the center point of the map?

An **interrupted Mollweide projection** was chosen, and cartographers chose to have the map centered on the **Pacific Ocean**.

- Why did cartographers at *National Geographic* choose the map projection they did?

They chose the interrupted Mollweide projection because **it shows all three oceans with the least distortion**

possible. The emphasis in this map is meant to be on ocean floors rather than land areas.

- What are two characteristics of the Mollweide map projection that a cartographer would consider when creating a map?

The **Mollweide projection is not appropriate for use in navigation, but you can use it to compare the size and shape of land areas**. An interrupted version of the map projection can also be used to minimize distortion in important areas.

FAST FACTS

- In 1922, the National Geographic Society adopted the Van der Grinten projection, which depicts the globe by projecting it in a circle rather than a rectangle (as in the well-known Mercator projection) or an ellipse, common in other projections. The Van der Grinten projection was used by National Geographic until 1988.
- In 1995, the Winkel Tripel projection replaced the Robinson projection on the Society's signature world maps. Long used in various European atlases, the Winkel Tripel, first published as a map supplement in *National Geographic Magazine* in April 1995, is one of the most accurate representations of the round globe on flat paper.
- The "Map of the Moon," published in the February 1969 issue of *National Geographic Magazine*, was the first map to show the entire lunar surfaceincluding the far side of the moonon a single sheet of paper.
- Many popular online map services like Google Maps and ArcGIS Online use a variation of the Mercator projection. This projection is very good for preserving angles in maps, but is not good for viewing areas of the world close to the North and South Poles.

VOCABULARY

Term	Part of Speech	Definition
accuracy	*noun*	condition of being exact or correct.
bathymetric map	*noun*	representation of spatial information displaying depth underwater.
cartographer	*noun*	person who makes maps.
cartography	*noun*	art and science of making maps.
conformal map	*noun*	representation of spatial information where angles, scale, and shape are preserved.
cylindrical projection	*noun*	map projection where the Earth's surface is projected onto a tube, or cylinder, shape.
distortion	*noun*	representation that is twisted, mistaken, or false.
ellipsoid	*noun*	shape of an elongated oval with some dimension of depth.
equal area map	*noun*	maps that show true relative sizes but distort shape and direction.
Goode projection	*noun*	representation of a sphere that does not distort land masses and divides spatial information into six unequal lobes. Also called an orange-peel map.
longitude	*noun*	distance east or west of the prime meridian, measured in degrees.
map	*noun*	symbolic representation of selected characteristics of a place, usually drawn on a flat surface.

map projection	*noun*	method by which shapes on a globe are transferred to a flat surface.
Mercator projection	*noun*	representation of a sphere where lines of latitude and longitude are straight and at right angles to one another.
meridian	*noun*	line of longitude, dividing the Earth by north-south.
Mollweide projection	*noun*	representation of a sphere where area is shown accurately but directions and shapes are distorted.
navigation	*noun*	art and science of determining an object's position, course, and distance traveled.