Name: _____

The Best View of Earth?



A journey into the world of maps introduces you to globes, map symbols, legends, and directions. There are even different types of maps for different purposes. However, did you know that globes are the most accurate model of our planet? That's right; if you want the best view of Earth, globes are the way to go. Before you run out and fill your bedroom with globes, there is something you should know. In addition to being hard to carry in your pocket, globes do not show much of the surface detail. The tool that is best for that job is a flat map.

Cartographers produce flat maps of the Earth's curved surface by using **projections.** There are three main types of projections: **cylindrical, conical,** and **planar** or **azimuthal.** All of these projections distort the Earth's surface. Why? Imagine opening up a plastic globe from pole to pole along the prime meridian. Now imagine flattening the two halves on your desk at school. The continents would probably look odd. That's because the drawings of the land features were done to specific measurements based on a curved surface. To flatten them, the shapes would have to change. That is distortion.

Cylindrical projections, or **Mercator projections,** produce a map that looks like it was on a larger cylinder, wrapped around our planet. You will recognize this map because the latitude and longitude lines are straight. Together, these lines form a grid of rectangles. Maps with Mercator projections are used for sea and air navigation. Why? On these maps, the entire world is shown. The only areas not shown are the areas near the poles. Sailors and pilots can map their journey by drawing a straight line from point to point. One disadvantage about this map is that areas far away from the equator are distorted. These areas look larger than they are in real life. On a Mercator map, Greenland is greater in size than South America. In real life South America is almost eight times larger than Greenland.

Conical projection maps are produced as if a cone hat was placed on a globe at the North Pole. This would show that the paper hat only touches the globe on parallels halfway between the North Pole and the equator. A flattened map with this projection has curved latitude lines. Since the curving of the latitude lines mirrors our planet's curved surface, some of the land features are their true sizes and shapes. Cartographers may use this projection when mapping the United States. Since the United States is located in the middle latitudes and is a large area, there will be less distortion. However, the areas near the equator and the poles will have distortion.

The last projection, planar or azimuthal, looks like large sliced pizza pies but with land features. There is only one **contact point,** which is usually one of the poles. Imagine shining a light from the center of the globe towards one of the poles. That is the projection you get with planar maps. In fact, when a planar map shows a polar region, the longitude lines meet at the contact point in the center. There's your globe pizza pie. The land features that are farther away from the poles are distorted in size and shape. Navigators of airplanes and ships use planar maps to

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plot their trips. This is because they can draw a straight line between any two points and get a great circle route. Remember, the shortest distance between two points on a globe is the route along a great circle. Scientists also refer to these maps when studying the polar regions.

All map projections share the same goal - to show the Earth's curved surface on a flat map. However, each projection shows different parts of the world accurately (depending on the contact point) and other parts as distorted images.

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Questions

_____ 1. The three major map projections are _____.

A. conical, cylindrical, and elliptical
B. cylindrical, azimuthal, and polygonal
C. conical, cylindrical, and azimuthal
D. cylindrical, planar, and hexagonal

2. Why do cartographers use map projections?

_____

_____

3. True or false? Globes are not the most accurate model of our planet. Give a reason for your answer.

_____

_____

_____ 4. Azimuthal or planar maps are used mostly by _____.

A. airline and ship pilots
B. astronomers and meteorologists
C. scientists studying polar regions
D. both A and C

5. Compare cylindrical projection maps with conical projection maps.

_____

_____

6. What is the one disadvantage to using Mercator map projections?

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_____ 7. When a straight line is drawn between any two points on an azimuthal projection map, it produces a _____.

A. great circle route
B. parallel
C. contour line
D. fault line

8. Based on what you have read, why do you think globes are more useful for studying larger areas than maps?

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How many of these can you write about? Think! Write! Check all the ones you answered.

- ☐ You are a cylindrical or Mercator projection map. Write a speech that explains to the other map projections why you are valuable. Be creative!
- ☐ Create a panel discussion between a globe and the other three major map projections. The topic - "The Future of Mapmaking." Make sure you include a moderator (that could be you) and an audience (possibly the world's cartographers). Remember, every map deserves a voice! You can write your panel discussion as a script and have fellow classmates act out the discussion. Be creative!

Don't stop writing. Use a blank piece of paper to continue.