



TO WHAT DEGREE?

Objectives:

- Students will learn about map projection, latitude and longitude, and how to find coordinates.

Recommended Grades: 4-8**Materials (all included in the trunk):**

- Inflatable globe
- *To What Degree?* cards
- Colored cones

Preparation: 10 minutes

- Read over the activity, make adaptations for student grade level, and gather materials.
- Distribute colored cones and *To What Degree?* cards

Rules:

Shoes are not allowed on the map. Please have students remove shoes before walking on the map.



No writing utensils on the map.

PART 1: INTRODUCE/REVIEW PROJECTION, LATITUDE AND LONGITUDE

Projection:

Projection is the way a round earth is shown on a flat map. There are many types of projections. Show examples if time allows.

Demonstration: Using the inflatable globe, show the earth and point out the seven continents (Asia, Europe, Africa, North America, South America, Antarctica, Australia & Oceania). Hold the globe so that students are looking at Asia, first with the North Pole pointing straight to the ceiling. Then tilt the globe a little forward so that what students see on the globe reflects what they see on the giant map. Ask one student to help you—by squeezing the air out of the globe. Adjust the vinyl so that the view of the flattened globe approximates what students see on the giant map.

Latitude:

Latitude is a measurement of distance north or south from the Equator. Latitude on maps is represented by a series of parallel lines wrapping around the globe. Note that this map's latitude lines arc across the map, resembling the lines on a globe.

Demonstration: Ask students to line up along the yellow-braided rope at the bottom of the map. Ask one student to stand at the North Pole and another to stand at the Equator at 90° East (center-bottom of the map.) Add one student to each line of latitude directly north and south of these two points to form a straight line. Ask students to hold hands. The student at the North Pole must stay rooted to his spot, but may pivot. Direct students to begin walking west toward Europe, but to maintain the straight line.

What do students notice? Comments may include:

- The person on the equator has to walk more distance than someone further north.
- As marked on the map, these lines are the same distance apart from each other anywhere on the map. In fact they are referred to as parallels of latitude.

The North Pole is 90° north latitude. The South Pole is located at 90° south latitude (sometimes noted as -90° latitude.)

Longitude

Longitude is a measurement of distance east or west of the prime meridian.

Demonstration: Ask students to stand on the yellow-braided rope along the perimeter of the map. Ask each student to locate a line of longitude—they are the ones that converge at the North Pole. Start to walk toward the North Pole together.

What happens?

- Students get closer and closer together. Unlike parallels of latitude, which are kind of like a sliced onion, longitude lines are known as meridians. They run all the way around the earth. Each and any line of longitude runs through both poles and cuts the earth in half.

The earth is divided into 360° of longitude; 180° of longitude east of the Prime Meridian, and 180° west of it (sometimes noted with a minus sign.) The distance between degrees of longitude is not constant. At the equator one degree of longitude is about 69 miles, the same as latitude. A few feet from the poles, they are mere inches apart.

Coordinates

Any place on the surface of the earth can be located by its coordinates, a notation of a location's latitude and longitude.

Demonstration: Find a few famous locations in Asia using coordinates.

- Approximately 33° N, 44° E
- Approximately 22° N, 114° E
- Approximately 13° N, 100° E

PART 2: PLAY "TO WHAT DEGREE?"

Gameplay

Divide the class into 4 teams—red, yellow, green and blue—and instruct each team to line up on the yellow-braided border behind their "Base Camp" (the colored circles in the corners of the map). As the game is a relay race, each team should have the same number of players. If a team is short a player, one player on that team will play twice.

On the circle at each base camp stack colored cones of the corresponding team color, one cone per player.

Stack each team's *To What Degree?* Cards—one per player—face down next to the National Geographic icon at the base camps.

The object of the game is to be the first team to locate and mark each of the coordinates from the game cards. The teacher is the referee.

Instruct the first player in line at each base camp to stand on his or her Base Camp and take one cone from the stack. The player on the circle is the “Explorer.”

When the game begins, each Explorer must draw one card. On each card are coordinates to one location on the map. The Explorer must walk along printed lines of latitude and longitude on the map in search of these coordinates, being careful not to step off the line. If any Explorer steps off the line, he or she must return to base camp and begin again. If any two Explorers touch each other, they must both return to base camp and begin again.

When an Explorer locates his coordinates, he must place a cone there and return to base camp—he does not need to stay on the lines now. After tagging the next person in line on the yellow braided border he must rejoin his team members at the end of the line on the border.

The teammate who has just been tagged steps into the colored circle, becomes the Explorer, and draws a card.

Winning

The winning team is the first to locate and mark all of its coordinates and return to the yellow braided border. Continue playing until all teams have finished.

Note: The game may be a little more difficult for Red Team and Green Team as their Base Camps are at the north end of the map. In addition, as the game progresses many direct paths to coordinates may become blocked. Players may need to work harder to find a path to their coordinates through the maze of spots already marked.

Activity Option

Instead of marking the coordinates with a colored cone, each Explorer sits on the spot she has located. Later Explorers may not pass through that point, but must find another route to their coordinates. The winning team is the first to locate each location and sit on the spot. Continue playing until all teams have finished.

