



A Guide for Teachers and Students

Written by:
Allison Augustyn

Created by:



Dear Teacher,

Thank you for welcoming GPS Adventures into your classroom! These GPS (Global Positioning System) lessons and activities are meant to peak your students' curiosity, help them become more familiar with technology, and excite them to get out into the world to explore. Inside you will find lessons best suited for use before your visit to GPS Adventures, some for after your visit, and many that could be used either pre or post visit. Our intention is to give you a way to expand and extend the learning with your students in a variety of exciting ways, including writing, playing, and cooperative games and projects.

We encourage you to make adjustments to these lessons and activities and/or add your own creative flair. We would love to hear what worked for your kids! Send your questions or feedback to: info@minotaurmazes.com.

We also ask that you remind students' of their personal safety when encouraging them to explore. Internet and real world exploration can be exciting, but as with any activity, students should remember to exercise caution.

When you are exploring in advance preparation, www.Geocaching.com is a valuable resource to find additional information or to answer other questions you may have.

Again, we appreciate your joining us – you and your students are in for an exciting adventure!

Enjoy!

Minotaur Mazes Team



Grade Level Guide

Recommended grade levels for each lesson and activity

Grade	Lesson 1 <i>Up North, Down South</i>	Lesson 2 <i>Hidden Treasure</i>	Lesson 3 <i>Ordering the Universe</i>	Lesson 4 <i>Scaling the Globe</i>	Lesson 5 <i>X (and Y) Mark the Spot</i>	Lesson 6 <i>Latitude and Longitude</i>	Lesson 7 <i>Training the Eye</i>	Lesson 8 <i>Let's Go Geocaching!</i>	Lesson 9 <i>Satellites</i>	Lesson 10 <i>Let's Go Geocaching!</i>	Activity 1 <i>This is Where I Live (grades 2–3)</i>	Activity 2 <i>Create a Globe (grades 4–5)</i>
K	*											
1	*	*										
2		*	*	*							*	
3			*	*							*	
4					*	*	*	*				*
5					*	*	*	*				*
6									*	*		
7									*	*		
8									*	*		

Feel free to adjust this guide to suit your students' needs.



Table of Contents

Lesson 1	Up North, Down South
Lesson 2	Hidden Treasure
Lesson 3	Ordering the Universe
Lesson 4	Scaling the Globe
Lesson 5	X (and Y) Mark the Spot
Lesson 6	Latitude and Longitude
Lesson 7	Training the Eye
Lesson 8	Geocaching
Lesson 9	Satellites
Lesson 10	Geocaching
Activity 1	This is Where I Live
Activity 2	Create a Globe
Appendix A	Glossary
Appendix B	Book & Web Bibliography



Lesson 1: Up North, Down South

Grade level: K–1 **Time:** 30 minutes

Objective:

Students will become familiar with cardinal directions and begin thinking about the world and themselves in spatial terms, while also having fun and a bit of exercise.

Materials: none

Activity:

1. Read “Up North, Down South” by Doreen Gonzales, or another book on cardinal directions. This explains how and why we order the world.
2. Mark the NSEW directions clearly in the classroom. Include pictures for each direction. For example, polar bear for north, penguin for south, seal for west, camel for east.
3. Arrange chairs or mats in a non-perfect circle, so that some chairs are closer to one of the four directions.
4. Play musical chairs! When the music stops, ask the students if they can tell you where they are according to direction. See if they are a “polar bear,” or a “penguin,” and so on. Play until there is a winner.
5. **OPTIONAL:** have the students who sit out read books or draw pictures about the animals (or preferred symbols) with their directions.

Assessment: Are students becoming familiar with the directions in the classroom? What do their drawings tell you about how they understand NSEW?

Standards:

National Science Education Standards

- 6.1: Abilities necessary to do scientific inquiry
- 6.8: Systems, order, and organization

Key vocabulary:

Directions/North/South/East/West



Lesson 2: Hidden Treasure

Grade level: 1–2 **Time:** 30–45 minutes

Objectives:

Introduction to geocaching. Students will use cardinal directions (NSEW) to navigate the classroom and test puzzle and word (or numerical) skills. The treasure activity will give students a variety of creative tools and encourage imagination and the joy of discovery.

Materials:

- Crayons, markers, and papers
- other fun materials and little fun gifts: pipe cleaners, stickers, stars, glitter glue, chocolate gold coins, feathers, etc.
- Teacher-made: Paper clues (see Activity Step 2, below)
- Teacher-made: Cache of hidden treasure*

Activity:

1. Read “The Box that Watch Found” (Boxcar Children Series) by Gertrude Warner. Talk about geocaching and how clues can lead to hidden treasure. Explain that the class will be soon hunting for clues to find a treasure in the classroom!
2. Once the idea of geocaching is understood, you as Teacher can now make a series of clues, as well as a cache of hidden treasure, and hide these around the classroom.
 - a. Teacher writes a clue on paper letters that helps students locate the treasure. Let's say that the treasure is “under the east book shelf” (21 letters). To write this message, create the appropriate number of 2-inch paper circles for each letter in the phrase, and add one extra circle for each space between words—25 circles in all, in this case. (Don't forget to add a NSEW direction to the clue!) Cut out all the circles.
 - b. Lay the circles in a long row on a flat surface. Use a permanent marker to write one letter on each circle, leaving a plain blank circle between each new word. Leave your circles in this order, but turn each one over so that it's front is blank. Number each one from left to right. In this case, you'll go from 1–25. (You can add a sticker or star to the front of each paper circle to make the circles “special.”)



Lesson 2: Hidden Treasure

- c. Hide the paper circles and ask students to begin the hunt! Make sure to tell them what they are looking for, and that they will need to work together to solve the puzzle and find the cache. When all the paper clues are found, you can either have the students try to solve the puzzle by creating words, or by lining up the circles numerically. Turn over each of the paper circles in order, find the clue, and have the students find the treasure!
3. Students find and use the hidden treasure (stickers, glitter, etc.) to create their own ideas about what they'd like to find as a treasure. Post pictures on the wall.

Assessment: Are students recognizing the directions in the classroom? Are they working together to find the treasures? Are they inspired think about discovery in the world?

Standards:

National Science Education Standards

- 6.1: Understanding about scientific inquiry
- 6.5: Abilities to distinguish between natural objects and objects made by humans
- 6.5: Understanding about science and technology

Key vocabulary:

Cache/Geocaching

**It is important to know that this lesson is called "hidden" treasure because people often think of treasure as buried – but in geocaching, treasure can be right in front of you in the open! Although you will want to hide this treasure well because children will be familiar with the classroom, you may want to explain that in geocaching the box could be located someplace in the open, not necessarily buried underground.*



Lesson 3: Ordering the Universe

Grade level: 2–3 **Time:** 45 minutes

Objectives:

Students will learn about how humans order the world and the universe to help us find our way around.

Materials:

- Paper booklet (see Activity 1: “This is Where I Live”)
- Colored pencils, markers, etc.

Activity:

1. Have students fill in the paper booklet in Appendix 1 (“This is Where I Live”).
 - a. Talk about the solar system, and are we in the universe (Earth).
 - b. Show the students a globe, and have them think about where we are on the planet (Northern Hemisphere).
 - c. Have students locate where are we in the USA (state).
 - d. Have students write their address and draw their house.
2. Have a discussion about the booklet. Ask students why we order the world and universe. Bring up ideas of “finding your way home” and how important that is. Explain that sometimes people need to travel much farther distances to find important locations for food, resources, to visit far away family and friends, to simply find new information (when we learned about the sun, we discovered that it helps plants grow, etc.) Bring up the topic of technology – how did people figure out all this information? Satellites show us “pictures” of Earth from above. Computers help us keep track of the information. GPS units can help us navigate. Even how we travel (planes, cars, trains) is a kind of technology.

Assessment: Are students understanding the idea of scale? Are they able to understand that we use directions and addresses to locate places in the world, and why we might do this? Are they understanding that technology is in our lives every day?

Standards:

National Science Education Standards

- 6.1: Abilities necessary to do scientific inquiry/Understanding about scientific inquiry
- 6.5: Abilities of technological design
- 6.5: Understanding about science and technology



Lesson 4: Scaling the Globe

Grade level: 2–3 **Time:** 45 minutes–1 hour

Objectives:

Students will learn about scale, mapping, and measurement, and begin thinking about how technology aids humans by creating order, and then navigating that order.

Materials:

- Rulers, string, paper, pencils

Activity:

1. Read the book *“Are We There Yet?: Using Map Scales,”* by Doreen Gonzales, or another book on mapping and scale.
2. Show students a 2-D map of the world (make sure it has a clearly marked scale). Ask students to each pick any place in the world they would like to explore someday, and then find it on the map. Ask students to measure on the map and figure out how many miles it would take to get there. If you don’t have a ruler long enough to measure the length, have a student measure in the appropriate length of string and then use a ruler to determine the length of the string (and thereby the distance across the map).
3. Have students draw the place they would like to visit, and then write about why they chose that place. Ask students to think about how they would cover that kind of distance (plane, car, boat?). Ask students to think about how they would know where they were going (would they use a compass? GPS? would they look on a map? who would help them get there?).

Assessment: Are students understanding the idea of scale? Are they able to understand that we use directions and addresses to locate places in the world, and why we might do this?

Standards:

National Science Education Standards

- 6.1: Abilities necessary to do scientific inquiry/Understanding about scientific inquiry
- 6.4: Structure of the earth system
- 6.5: Abilities of technological design
- 6.5: Understanding about science and technology



Lesson 5: X (and Y) Mark the Spot

Grade level: 4–5 **Time:** 1 hour

Objectives:

Students will learn that orientation can differ, but directions help us find our way, especially if we pay attention to coordinates and grid systems. Scale is also in play, as students replicate the real world onto a 2-D map.

Materials:

- 4 sheets of large grid paper (around 3' x 3'), or enough 8.5 x 11 sheets grid paper for each student
- Rulers
- Masking tape, string
- Pens, colored pencils, markers

Activity:

1. Clearly mark NSEW with paper on the walls of the classroom. Now, create a grid on your classroom floor. Choose the X & Y axes, and mark them in a line of string or masking tape. Determine how your grid squares will be placed – if you have a checkered floor, this is easy! If you have an unchecked floor, simply measure one-foot increments and mark with masking tape. Assign each increment a number (1,2,3...) or letter (a,b,c...) to create your floor grid.
2. Place an “obvious object” in each of the four quadrants of the classroom. Make sure the obvious object has a distinct color and shape (basketball, football, large stuffed animal, fish tank, etc.).
3. Break the students into four groups, and have each group make a map of the classroom on their own grid paper, using the directions on the wall and the floor grid to guide them. Make sure that each group is facing inward from four corners of the room so that you will end up with four different perspectives of the same room (one facing north, south, east and west). Ask students to include the obvious objects when making their maps – each obvious object should have it’s own coordinate (football is at 3-C/giant stuffed lizard at 5-d, etc.). Monitor each group to make sure they understand what direction they’re facing, and help them to ensure correct placement of the obvious objects.





Lesson 5: X (and Y) Mark the Spot

4. On the board, draw grid coordinates along the X and Y axes (a-b-c..., 1-2-3...). When students are done, post each of the four maps against the access, each facing north (if you have each individual make a map, have each member of groups 1-4 take turns coming up to the board and posting their maps until everyone has had a chance to put up their maps). When maps are posted, you should have four different perspectives of the classroom, depending on the perspective.
5. Have students come to the board and find the obvious objects in each of the maps. Show that no matter which way the map is oriented we are able to find landmarks using a grid and coordinates.
6. Also discuss scale – did they draw the obvious objects at a realistic size? Did they replicate their desks at an appropriate size? What if you were lost in the woods – if the landmarks were the wrong size, would that be confusing? If you only have trees to guide you, is it important to know the size and placement of specific trees?

Assessment: Are students understanding orientation based on cardinal directions? Do they see that objects (or any location) can be located using a grid? Do they understand that landmarks should be replicated at a scale-appropriate size?

Standards:

National Science Education Standards

- 6.1: Abilities necessary to do scientific inquiry
- 6.4: Structure of the earth system
- 6.9: Systems, order, and organization
- 6.9: Change, constancy, and measurement

Key vocabulary:

Grid/X axes/Y axes





Lesson 6: Latitude and Longitude

Grade level: 4–5 **Time:** 60 minutes

Objective:

Students will learn about latitude and longitude and hemispheres. Students will also explore the concepts of spatial mapping – having experienced mapping in 2-D, now they will see how this applies to 3-D Earth.

Materials:

- map and globe of the world
- oranges or tennis balls*
- double-sided tape
- scissors
- paper print-outs

Activity:

1. Before class, take a large 2-D map of the world and mark major landmarks on it (White House, Pyramids, Sydney Opera House, etc., at least one in each hemisphere). If you can find pictures of the objects and place them on the map, this is best. Make sure to mark their latitude and longitude as well.
2. Have a discussion with students about latitude and longitude. Have them come up to the map and show how latitude lines go east-west and longitude are north-south. Talk about degrees of latitude and longitude based on their location from the Equator and Prime Meridian. You may want to write these new words on the board (see Vocabulary).
3. Now show students a globe. Try to wrap the flat, 2-D map around the globe. Show them how that doesn't work, because maps are just a representation of the world to help us navigate. Explain that students will be creating their own models of the Earth.
4. Provide the students with the instructions and map from Appendix 2 and ask them to complete the activity.
5. Ask students to draw the Equator in red and the Prime Meridian in blue on their globes. Ask them to mark in another color the location of the major landmarks you indicated earlier on the 2-D map (White House, etc).



Lesson 6: Latitude and Longitude

Assessment: Are students recognizing the concepts of latitude and longitude? Do they understand the concept of a flat map fitting onto a 3-D sphere? Can they transfer the idea of landmarks on 2-D onto a 3-D map?

Standards:

National Science Education Standards

6.1: Understanding about scientific inquiry

6.5: Abilities to distinguish between natural objects and objects made by humans

6.5: Understanding about science and technology

Key vocabulary:

Latitude/Longitude/Degrees/Hemisphere/Prime Meridian/Equator

*Oranges may be more readily available than many tennis balls – however, the inconsistency of the shape may be problematic. If you do choose oranges, try to find enough that are similar, and be sure to test one of the printouts in advance so that you know the paper will fit the shape. Added bonus – these globes sphere make a tasty snack when finished.



Lesson 7: Training the Eye

Grade level: 4–5 **Time:** 30-60 minutes

Objectives:

Students will begin to explore the ideas of looking for geocaching treasures by training their eyes to look for specific objects that are out of place in a familiar setting.

Materials:

- Pennies, nickels, dimes

Activity:

1. Before students come to class, tape pennies, nickels, and dimes around the room – on the wall, the floor, even on the ceiling. Keep track of how many you put up around the room (and keep track of where you position the coins!).
2. Before you begin, spend time exploring the idea of “unburied treasure” – you may find more in your environment when you start to look with a critical eye. Humans need to use their sense for discovery. Use an old favorite and provide students with age-appropriate “Where’s Waldo?” books, such as “Where’s Waldo? The Fantastic Journey” or “Where’s Waldo? The Wonder Book” by Martin Handford (ages 9-12). Allow them to share the books in groups and take turns simply looking through and trying to find him.
3. Tell the students to look around for the coins. Ask students to explore the classroom and keep track on paper of how many pennies, nickels, and dimes they can find. They don’t want to remove the coins, they just want to keep track. Then, ask students to add up the coins they found to see how close they were to finding all the coins (their total should match yours). Reveal to students where all of the coins are throughout the room so that they have a chance to see if they have missed any.
4. **Additional:** you can repeat this exercise as often as you’d like – training students to really look around at their environment can work for any number of days.

Assessment: Are students really looking and “seeing” their environment? Do they notice anything new about the classroom? Can they locate all of the coins?

Standards:

National Science Education Standards

6.7: Science as a human endeavor

6.9: Populations, resources, and environments





Lesson 8: Let's Go Geocaching!

Grade level: 4–5 **Lesson Part 1:** 1 hour **Lesson Part 2:** 1-1.5 hours

Objective:

Students will become familiar with the concepts of geocaching as a result of creating their own caches, hiding the caches, and logging the information. They will see technology as a link between science, geography, and people.

Materials:

- Small plastic containers (or plastic bags) for each student
- various materials they bring from home
- paper and pens

Lesson Part 1:

1. Explain to the students that you are going to spend some time a geocaching project. The first part will be creating the cache treasure, and the second part will be the hunt outside!*
2. Provide, or have each student bring, a waterproof plastic container or plastic bag to class**, along with an object or objects they would like to include in their cache. Objects should cost no more than \$1-2 total. Objects can be from nature (dried leaves or flowers, neat rocks), homemade (a poem, a picture, a burned CD with a favorite song, a beaded necklace), but not biodegradable (candy and gum fine, but not other types of food, like cookies)***. Give them ideas, but also freedom to include anything they think is interesting and might interest others. (You can extend this lesson by giving students creative time in class to write or draw a cache component.)
3. In class, ask students to create a log book to include in their cache. Explain that in geocaching, when people find a geocache, they hide it again in the same location for someone else to find. But before they do, they leave their name and notes in a log book included with the cache. The students' log "book" can be a simple piece of paper that includes:
 - the "title" of the cache (name could be the students' name, contents of the box, or anything they choose)
 - Places for people to write their names when they find the cache
 - Places for people to write notes when they find the cache
 - Don't forget to include a pen or pencil in each cache!





Lesson 8: Let's Go Geocaching!

4. Once the caches are made, break students into two groups. Have the first group go outside and hide their caches while the second group stays inside where they can't see. Ask the first group to think about a clue that will guide others to find their cache. It must be a short clue, using only 5-10 words.
5. When the first group is done, have them return to the classroom and take a little time to think about and write their clues on a piece of paper that no one else can see. They do not have to include their name on the clues. Have the second group hide their caches while the first group writes.
6. When the second group returns, instruct them to do the same with their clues. Gather the clues, and give each one a number. Type the clues on a sheet of paper and make enough copies of the "clue sheet" for each student.

Lesson Part 2:

7. Send the students out to find the caches! You can either have everyone go at once, or you can send the groups individually again. Explain to the students that each time they find a cache, they should log their name and some words about what they thought ("Cool!" or "Liked it!") in the notes. They should replace the cache and go find the next. The goal is to find as many caches as possible within the time allowed. Tell them not to worry if someone else sees them finding a cache – that's all part of the fun of the hunt, of helping others find caches too!
8. When everyone has had a chance to find the caches, bring everyone together and see who has found the most. Did everyone find all of the caches? Were the clues helpful? Confusing? Talk about what they liked best about the hunt. Talk about hunting for caches using GPS, and how by using technology, it can show you exactly where a location is.
9. Encourage students to go geocaching – they don't even need a GPS! They can use the Google Maps function to locate the cache in advance, then print out a copy and use their map skills to find the location (be aware that Google Maps can be off by as much as 100 feet – tell students that in advance). Please also remind students to go with an adult, carry a cell phone in case of emergency, and that they should always be cautious when accessing information from the internet.



Lesson 8: Let's Go Geocaching!

Assessment: Are students being creative in their creation? Are they excited about discovery and exploring outside their normal routine? Are they using critical thinking to figure out clues? Are they working together to find the treasures? Are they inspired think about discovery in the world?

Standards:

National Science Education Standards

6.1: Understanding about scientific inquiry

6.5: Abilities to distinguish between natural objects and objects made by humans

6.5: Abilities of technological design

6.5: Understanding about science and technology

6.6 Science and technology in society

Key vocabulary:

Cache/Geocaching

*If you have the ability to place the caches where they won't be disturbed, you can break this lesson into two days. Otherwise, you may spend the morning creating the caches and hiding, take a break, and then begin the hunt in the afternoon.

**Plastic bags may be a better option for two reasons: (1) cost, and (2) they are easier to hide if you have limited space to hide caches. But boxes can be a lot of fun because they feel more like a "treasure chest" and are also what people really use.

***In real world geocaching, food that can break down would not be included in a geocache. Imagine opening a lovely box of...mold!



Lesson 9: Satellites

Grade level: 6–8 **Time:** 60 minutes

Objective:

Students will understand how satellites work in orbit and relay information to GPS receivers (triangulation/trilateration). Students will also have a chance to work on their latitude and longitude skills, as well as explore geocaching.

Materials:

- 20 Frisbees (or similar object)
- paper and tape
- spool of string (at least 500-ft)
- measuring tape (up to 50-ft)

Activity:

1. In an outdoor space, lay out a series of 15 or more Frisbees in a group. Most Frisbees should be labeled underneath with latitude and longitude coordinate clues, but several should have nothing on them (decoys).
2. Around the group of Frisbees, choose three staggered, permanent designated starting positions on the ground ("1,2,3"). You can mark the positions in chalk. Measure the distance to each Frisbee from the three points. (For example, Frisbee #1 might be 20 feet from Point 1, 10 feet from Point 2, and 5 feet from Point 3.) If you are preparing this a day in advance, you might also mark the location of each Frisbee in chalk.
3. Bring the students outside and break into groups of six – in each group, three students will be satellites ("1,2,3") and three students will be their accompanying "beam" ("1,2,3"). Tell the students that when all six members work together, they will find the correct clue.
4. Give the first group its clue. For example, the Frisbee they are searching for is 20 feet from Satellite 1, 10 feet from Satellite 2, and 5 feet from Satellite 3. But they don't know in which direction to look. 20 feet in which direction?
5. Allow the students to measure and cut a 20-foot length of string, a 10-foot and 5-foot length. Satellite 1 stands on his/her designated spot, and the "beam" holds the other end of the string. If the beam walks in a circle, he/she can see that there is a wide arc and many Frisbees could be the correct Frisbee. One set of information from Satellite A is not enough to find the cache.





6. Ask Satellite Team 2 to begin walking. This adds more information, but there is still some doubt as to which Frisbee it could be. But when Satellite Team 3 begins walking, all three students will intersect at one point. Where all three intersect is the correct Frisbee. (Decoys are in place in case the students are off on their measurements, and to keep them guessing – if they think they know where they’re going and they find a Frisbee that is incorrect, it will encourage specificity).
7. Ask students to pick up the Frisbee and keep track of the coordinates underneath. Repeat the activity with each group taking turns until each team has two or three coordinates.
8. Return to the classroom and have students look up the latitude and longitude to find where the coordinates lead. They can be coordinates of major landmarks (Pyramids, Great Wall of China) or coordinates of the home state, major cities, etc.
9. One set of coordinates should be the location of a cache somewhere near or in the school. The cache can be prizes, treats, hall passes, extra credit activities...get creative!

Assessment: Are students understanding the idea of triangulation/trilateration? Do they understand that multiple satellites are needed to relay information for GPS? Are they using latitude and longitude accurately to find the appropriate landmarks?

Standards:

National Science Education Standards

6.4: Structure of the earth system

6.5: Abilities of technological design

6.5: Understanding about science and technology

Key vocabulary:

Triangulation/Trilateration





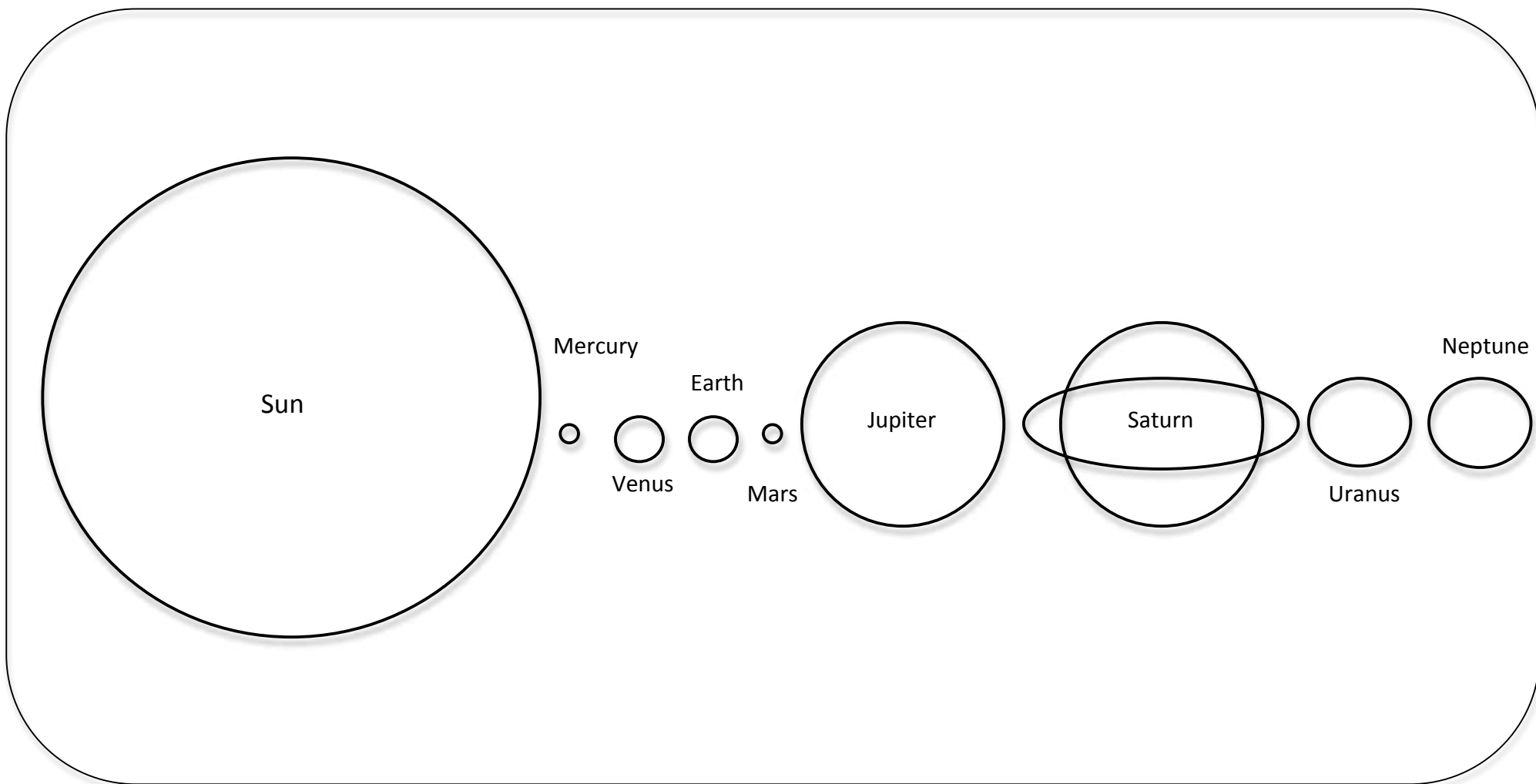
This is Where I Live

By _____

Created by:



Where do you live in the Universe?



Created by:



minotaur mazes



Where do you live in the World?



Created by:



minotaur mazes



Where do you live in the United States?



Created by:



minotaur mazes



Where do you live in your town?

A large, empty rounded rectangle with a thin black border, intended for a drawing or a written answer.

My address is: _____.

Created by:



minotaur mazes

Activity 1: Create a globe

Create a model of the Earth using the 2-D, flat map below. (Teacher, you can enlarge or shrink the print out on your copier, depending on the size of the globe object.)

1. Cut out the map below – be careful around the edges.
2. Wrap the map around your globe object so that the Equator is horizontal around the middle of the ball.
3. Tap the map together at the Equator.
4. Now, put a piece of two-sided tape at the North Pole and South Pole.
5. Bring all of the points of the map together at the top and bottom of the globe by pressing them into the tape.
6. You can use extra tape to fit the map to the globe object.

And there you have it – your very own globe of the world! If you used a tennis ball, bounce it! If you used an orange, eat it!





Glossary

These definitions are from the Oxford American Dictionary (2008). Some definitions have been simplified for the classroom.

Axis	a fixed reference line to measure map coordinates
Axes	plural of axis
Cache	a hidden storage place for valuables
Degrees	a unit of measurement to identify a location on a map
Directions	a course along which something moves
East	the eastern part of the world, or of a specified region
Equator	an imaginary horizontal line drawn around the world, equal distances from both the North and South Pole. The Earth's place of zero latitude.
Geocaching	an outdoor hunt, using GPS to find a cache
GPS	Global Positioning System, an accurate worldwide navigational facility based on signals from satellites
Grid	lines that cross each other to form a series of equal squares
Hemisphere	a half of the earth
Latitude	distance in degrees of a place north or south of the Equator



Longitude	distance in degrees of a place east or west of the Prime Meridian
North	the northern part of the world, or of a specified region
Prime Meridian	an imaginary vertical line drawn around the world passing through the North and South Pole. The Earth's place of zero longitude. Located in Greenwich, England.
Scale	ratio of distance on a map to distance on the ground
Scaling	resizing an image
South	the southern part of the world, or of a specified region
Triangulation	formation of a triangle, determined by three separate points
Trilateration	location of a single point within three overlapping spheres
West	the western part of the world, or of a specified region





Bibliography

Web

Geocaching – The Official Global GPS Cache Hunt Site

www.geocaching.com

The original GPS geocaching website, the most comprehensive information and users worldwide.

Books

The Editors & Staff of Geocaching.com. **The Complete Idiot's Guide to Geocaching.** Alpha. 2009.
Written by the staff of the <www.geocaching.com> website, this book is a complete and fun reference, filled with ideas for getting the whole family started.

Dillman, Erica. **Outdoors Online: The Internet Guide to Everything Wild & Green.** Mountaineers Books. 2007.

A quick, entertaining guide to a series of internet sites for the great outdoors. Covers not only geocaching, but a variety of activities, including hiking, safety, and gear sites.

Gonzales, Doreen. **Up North, Down South.** Capstone Press. 2008.

This book explains to children how to use directions, especially when lost. Using the perspective of friendly bird, children learn how maps are view of the world seen from above.

Gonzales, Doreen. **Are We There Yet?: Using Map Scales.** Capstone Press. 2008.

This book explains to children how maps “shrink” the world so that we can see more of the world at the same time, introducing the idea of scale.

Hinch, Stephen. **Outdoor Navigation with GPS.** Wilderness Press. 2011.

Not about geocaching specifically, but a great tool for learning about GPS and how to use it effectively in various terrain.



Layne, Cameron. **The Geocaching Handbook: The Guide For Family Friendly, High-Tech Treasure Hunting.** Falcon. 2011.

Everything you need to get started with the family, along with ideas for games and gear.

McNamara, Joel. **Geocaching for Dummies.** For Dummies. 2004.

A more technical reference guide for adults interested in learning more about geocaching.

Sherman, Erik. **Geocaching: Hike and Seek with your GPS.** Apress. 2004.

An older, yet still pertinent, look at geocaching in the early days. Good tips for combining technology and outdoor endeavors.

Warner, Gertrude. **The Box That Watch Found.** Albert Whitman & Company. 1989.

This book, from the classic Boxcar Children series, explains geocaching to children in a fun and accessible way through solving a mystery.