

Geo-Spatial Thinking: Exploring Google Earth

OVERVIEW & OBJECTIVES

This is an introductory lesson to the Google Earth GIS software. We began this activity on the fifth day of the new school year to spark student interest in geography by using this compelling technology to virtually tour their home, our school, and significant places in the Eastern Hemisphere that will be relevant in our regional geography curriculum.

Students will be able to...

- Execute specific Google Earth tools and functions such as: search/fly to, street view, historical imagery, and ruler/measurement.
- Obtain and analyze geographic information to investigate places and answer specific geographic questions.
- Apply Google Earth to explore specific places in the eastern hemisphere in order to describe physical and cultural characteristics of place.

GRADES

8th

TIME

3 days

REQUIRED MATERIALS

- ✓ Computer Internet access with projector
- ✓ Computer Internet access for students
- ✓ Access to Google Maps
- ✓ Google Earth Tutorial Videos:
 - Navigation:
<http://www.google.com/earth/learn/beginner.html#tab=navigation>
 - Street View:
<http://www.google.com/earth/learn/beginner.html#tab=street-view>
 - Historical Imagery:
<http://www.google.com/earth/learn/beginner.html#tab=historical-imagery>
 - Drawing and Measuring (Ruler):
<http://www.google.com/earth/learn/beginner.html#tab=drawing-and-measuring>

MINNESOTA SOCIAL STUDIES STANDARDS & BENCHMARKS

Minnesota Social Studies Standards

Standard 1. People use geographic representations and geospatial technologies to acquire, process and report information within a spatial context.

8.3.1.1.1 Obtain and analyze geographic information from a variety of print and electronic sources to investigate places or answer specific geographic questions; provide rationale for its use.

Standard 3. Places have physical characteristics (such as climate, topography and vegetation) and human characteristics (such as culture, population, political and economic systems).

8.3.2.3.1 Use appropriate geographic tools to analyze and explain the distribution of physical and human characteristics of places.

SUGGESTED PROCEDURE

Opening

Google Earth Part 1: Explore Basic Functions and Tools

To prime students for learning about and using Google Earth, the teacher introduces the idea of seeing the world in spatial terms and some basic questions geographers would seek to answer such as:

- Where is it?
- What's it like there?
- How has this place been affected by the movement of people, goods and ideas?
- How do people change the environment to fit their needs?
- How does this place fit in with other places around it?
- How is this place similar to or different from other places?

The class watches the Google Earth Navigation tutorial video at <http://www.google.com/earth/learn/beginner.html#tab=navigation>. Next, the teacher demonstrates some of the basic tools and functions of Google Earth on the classroom Smartboard.

Development

Students are given specific instructions using the handout, “Exploring Google Earth”. (Google Earth Part 1 refers to our school setting; however, the document may be modified to apply to any school setting.) The teacher directs students to use basic tools such as Search, Street View, Historical Imagery, and the Ruler. This introductory phase of the activity keeps the focus local, so students begin with their home, broaden to the school and larger community, and finally to the Twin Cities.

To facilitate their learning, students are directed to watch the following Google Earth tutorials prior to using each new Google Earth function.

- Street View: <http://www.google.com/earth/learn/beginner.html#tab=street-view>
- Historical Imagery: <http://www.google.com/earth/learn/beginner.html#tab=historical-imagery>
- Drawing and Measuring (Ruler): <http://www.google.com/earth/learn/beginner.html#tab=drawing-and-measuring>

At various points during the Development phase, a formative assessment is used to have students self-evaluate their learning using the handout, “Exploring Google Earth Formative Assessment”. This formative assessment tool helps students track their growth in learning and offer additional support when necessary. Circle the statement that best describes your understanding of each of the four features below.

In Google Earth I know how to:

Use “Fly to” to find specific locations.	<i>Starting...</i>	<i>Getting there...</i>	<i>Got it!</i>
Use “Street View” to navigate 360 degrees from a location.	<i>Starting...</i>	<i>Getting there...</i>	<i>Got it!</i>
Use “Historical Imagery” to learn about how places have changed over time.	<i>Starting...</i>	<i>Getting there...</i>	<i>Got it!</i>
Use the “Ruler” tool to measure distances between places.	<i>Starting...</i>	<i>Getting there...</i>	<i>Got it!</i>

Google Earth Part 2: Exploring the Eastern Hemisphere – What’s it like there? Physical and Cultural Characteristics of Place

Part 2 allows students to apply their learning from Part One to specific places in the eastern hemisphere. Students select a physical and a cultural site in each region from a teacher-generated list. Sites align with places and regions of study in the eighth grade curriculum. Then students describe each site in terms of its physical and cultural characteristics of place.

Closing

Google Earth Part 3: Reflection on Learning

Finally, students are asked to reflect upon their learning in terms of the basic functions and tools of Google Earth as well as their experience investigating specific places. The places of interest that students note will be used to inform future lessons and curricular focus.

Assessment

- Exploring Google Earth Formative Assessment
- Exploring Google Earth Activity Packet, Parts 1, 2, and 3

Resources

“Navigation” from Google Earth Tutorial Videos describes how to navigate to specific locations using the Google Earth Search/Fly to tool.

<http://www.google.com/earth/learn/beginner.html#tab=navigation>

“Street View” from Google Earth Tutorial Videos describes how to place the “pegman” on blue highlighted roads to get a “street view” of that location.

<http://www.google.com/earth/learn/beginner.html#tab=street-view>

“Historical Imagery” from Google Earth Tutorial Videos describes how to turn on the historical imagery and see what this place was like at different periods of time.

<http://www.google.com/earth/learn/beginner.html#tab=historical-imagery>

“Drawing and Measuring (Ruler)” from Google Earth Tutorial Videos describes how to use the ruler tool to measure straight-line distances or create a path and measure the distance.

<http://www.google.com/earth/learn/beginner.html#tab=drawing-and-measuring>

Name _____

Hour _____

Exploring Google Earth Formative Assessment

Circle the statement that best describes your understanding of each of the four features below.

In Google Earth I know how to:

Use "Fly to" to find specific locations.	<i>Just Starting...</i>	<i>Getting there...</i>	<i>I've got it!</i>
Use "Street View" to navigate 360 degrees from a location.	<i>Just Starting...</i>	<i>Getting there...</i>	<i>I've got it!</i>
Use "Historical Imagery" to learn about how places have changed over time.	<i>Just Starting...</i>	<i>Getting there...</i>	<i>I've got it!</i>
Use the "Ruler" tool to measure distances between places.	<i>Just Starting...</i>	<i>Getting there...</i>	<i>I've got it!</i>

Questions?

Name _____

Hour _____

Exploring Google Earth Formative Assessment

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Questions?

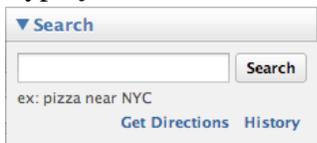
Being able to think like a geographer and see the world in spatial terms will be an essential skill in eighth grade World Geography. Some of the basic questions geographers ask are:

- Where is it?
- What's it like there?
- How has this place been affected by the movement of people, goods and ideas?
- How do people change the environment to fit their needs?
- How does this place fit in with other places around it?
- How is this place similar to or different from other places?

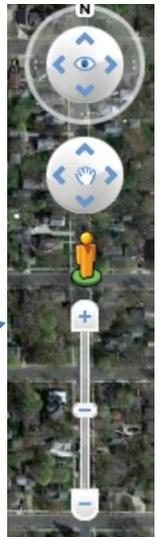
In this activity you will be using Google Earth to obtain and analyze geographic information to investigate places and answer some of these geographic questions.

Part 1: *Explore Basic Functions & Tools*

1. To open Google Earth go to the Start menu at the bottom, all programs arrow, then open Google Earth.
2. Explore the toolbar at the top, especially the “View” and “Tools” tabs.
3. Type **your home address** in the Search box and double click on the Search button.



- When you arrive at your home, spend a few minutes exploring the “Navigation Tools” in the upper right hand corner of the Google Earth window. They will appear when you hover your mouse over this area. (You may also go back to the Google Earth Navigation tutorial we watched at <http://goo.gl/pvZu6>.)
- Now go to the Google Earth Street View tutorial at <http://goo.gl/FAKnm>. After watching the short video grab the pegman icon, look for the blue borders to appear and place the pegman as close to your home as possible.
- Describe this place as a geographer from Google Earth might. (*What does the land look like? What types of vegetation are there? What evidence of human population can you see?*) _____



4. Exit street view and search for search for Central Middle School (CMS) by typing in the school address: 8025 School Rd., Eden Prairie, MN 55344

- Looking at the aerial view of our school, orient yourself by finding the bus loop, the track, the softball field, the volleyball courts, etc. Click on the “Roads” layer on the left, what is the name of the highway that runs NW of CMS? _____



- Using cardinal directions (NSEW), in which area of the school are most eighth grade classrooms located? _____

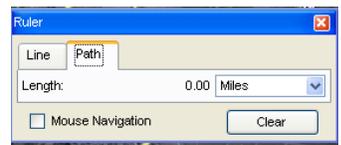
- Watch the Google Earth Historical Imagery tutorial at <http://goo.gl/SxpDH>.

Make sure you are zoomed in enough that the historical imagery clock is showing. Look at the pond located south of our school, CMS, and north of Scenic Heights Road. Adjust the historical imagery clock to see changes over time.

- In what year(s) was the pond totally dry? _____
- In what year was the new track constructed? _____ Based on the historical imagery evidence, make an educated guess as to why the track location was changed. _____

5. Watch the Google Earth Drawing and Measuring tutorial at <http://goo.gl/Vzx8z>

- Using the ruler tool draw a line between your home and CMS. What is the distance in miles? _____



Challenge: Switch to path and follow roads to link your home to CMS.

What is the distance in miles? _____

Ultra-Challenge: Can you create your bus route between home and school? Do so and calculate the distance in miles of your bus route? _____

6. Now fly to Minneapolis, MN 55401.

- What direction is Minneapolis from Eden Prairie? (*What direction did you fly from Eden Prairie to get to Minneapolis?*) _____
- Click off the Roads layer on the left and click on the 3D buildings layer. Zoom in and tilt to look at the Minneapolis skyline. Use the pegman to look at the street view of downtown.

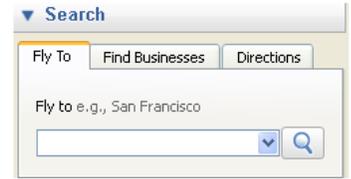
Exploring Google Earth ~ Part 2: *Physical and Cultural Characteristics of Place – What’s it like there?*

In the chart below are the five World Regions that we will be exploring this year. Within each region is a list of physical and cultural characteristics of place. You will choose at least one physical and one cultural characteristic for each region to zoom in using Google Earth. Explore what’s there. Look at the pictures, check out the Street View, dig into the historical data, and start to build your own mental map of where these places are, what these places are like, and what makes them similar to and different from Eden Prairie.

Region	Europe	Africa	Middle East	Asia	Australia
Physical Characteristics <i>Pick at least one physical characteristic in each region—please circle your choices at right.</i>	<ul style="list-style-type: none"> • Danube R. • Rhine R. • Caucasus Mts. • The Alps • English Channel • Mt. Blanc • Thames R. • Black Sea • Caspian Sea • Mediterranean Sea • Bosphorus Strait 	<ul style="list-style-type: none"> • Nile R. • Victoria Falls • Great Rift Valley • Atlas Mts. • Niger R. • Sahara • Kalahari Desert • Namib Desert • Sahel • Mt. Kilimanjaro 	<ul style="list-style-type: none"> • Rub al Khali Desert • Tigris R. • Euphrates R. • Negev Desert • Zagros Mts. • Elburz Mts. • Persian Gulf • Dead Sea • Suez Canal • Mt. Ararat 	<ul style="list-style-type: none"> • Himalayas • Mt. Everest • Ganges R. • Yangtze R. • Yellow R. • Mekong R. • Indus R. • Thar Desert • Gobi Desert • Plateau of Tibet 	<ul style="list-style-type: none"> • Murray R. • Darling R. • Uluru • Great Barrier Reef • Great Dividing Range • Great Victoria Desert • Lake Carnegie • Great Australia Bight • Devils Marbles
Cultural Characteristics <i>Pick at least one cultural characteristic in each region—please circle your choices at right. (If you would like to explore something not on the list, see your teacher.)</i>	<ul style="list-style-type: none"> • London Olympic Stadium • Eiffel Tower, Paris • Colosseum, Rome • Parthenon, Athens • Kremlin, Moscow • Hagia Sophia, Istanbul • St. Peter’s, Vatican City • Museo del Prado, Spain 	<ul style="list-style-type: none"> • Great Sphinx of Giza • Aswan High Dam • Rock of Gibraltar • Kwame Nkrumah Memorial Park, Accra Ghana • Robben Island Prison, South Africa • Suez Canal 	<ul style="list-style-type: none"> • Western Wall, Jerusalem • Prophet’s Mosque, Medina • Al Ka’ba, Mecca • Dome of the Rock, Jerusalem • Petra, Jordan • Masada, Israel • Pamukkale, Turkey 	<ul style="list-style-type: none"> • Great Wall of China • Taj Mahal • Singapore Merlion Park • Angkor Wat Temple • Bird’s Nest Stadium, Beijing • Shinjuku, Tokyo, Japan • Forbidden City, Beijing • Tiananmen Square, Beijing 	<ul style="list-style-type: none"> • Sydney Opera House • Sydney Harbor Bridge • Melbourne Cricket Stadium • Perth Zoo • Bondi Beach • Canberra Capital Hill

- Zoom in to each place using the Fly To feature in the Search box.
- Once you're at the location, record the absolute location measured in latitude and longitude. This is located at the bottom of the screen.

37°54'55.52" N 29°06'28.76" E elev 701 ft



Please record degrees and the first 2 digits, which are called seconds. So the above example would be recorded as (37°54" N, 29°06" E).

- Then, look around to see what this place is like.



- Click on the picture icon to open pictures which people have posted to Google Earth.
- You may choose to explore the street view or historical images at this location.
- Finally, you may want to turn on various layers (by checking and unchecking layers).



- Explore long enough to give you a mental picture of what this place is like. Then describe what you've discovered in a couple of sentences in the chart below. *Please write in thorough, thoughtful, and detailed complete sentences to clearly describe what this place is like! A good rule of thumb is to fill the space provided—no more, no less.*

	Place Name & Absolute Location (Latitude ° N/S, Longitude ° E/W)	Detailed description of what this place is like
Europe	Physical: Absolute Location: _____	
	Cultural: Absolute Location: _____	

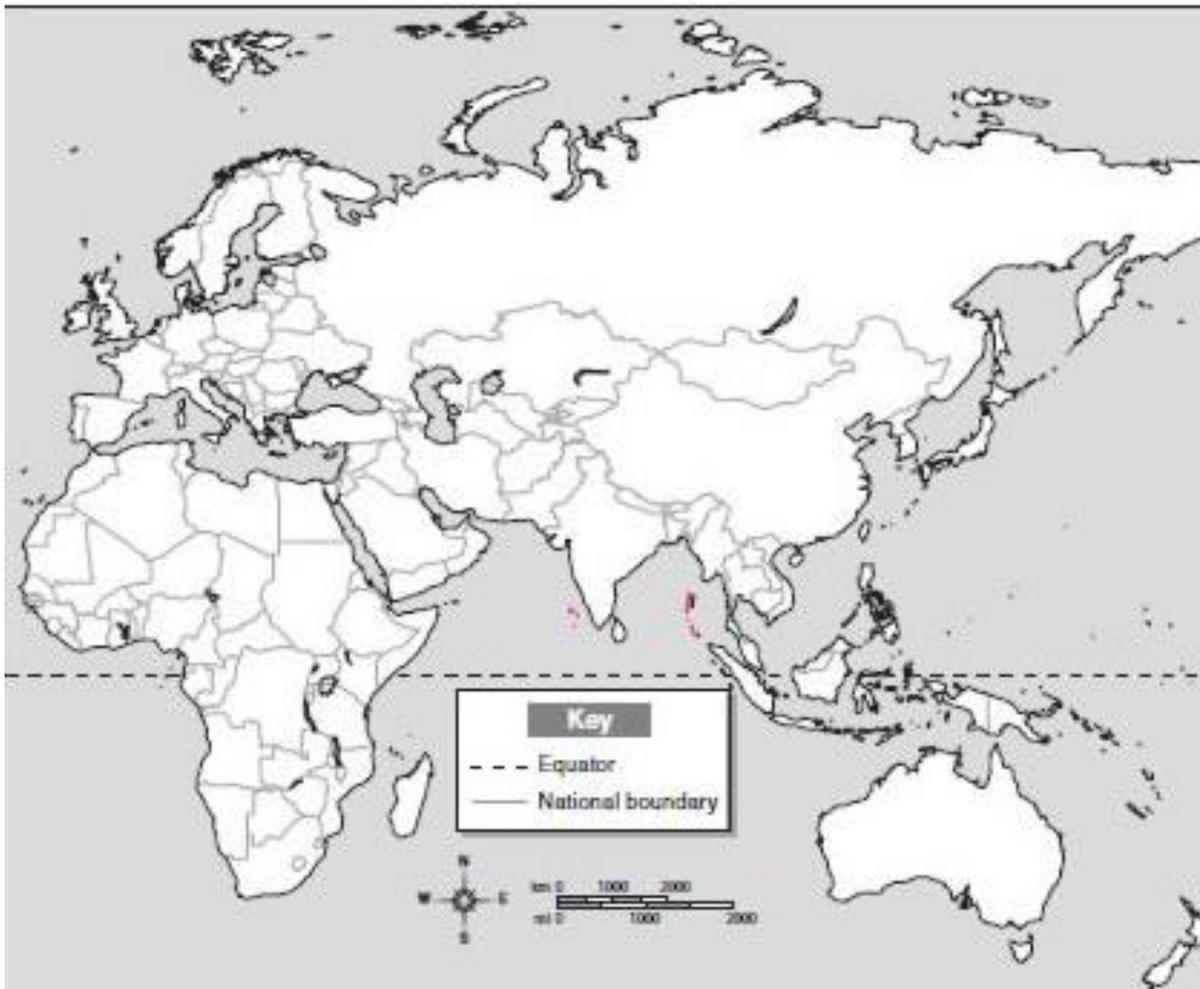
	Place Name & Absolute Location (Latitude ° N/S, Longitude ° E/W)	Detailed description of what this place is like
Africa	Physical: Absolute Location: _____	
	Cultural: Absolute Location: _____	
Middle East	Physical: Absolute Location: _____	
	Cultural: Absolute Location: _____	
Asia	Physical: Absolute Location: _____	
	Cultural: Absolute Location: _____	

	Place Name & Absolute Location (Latitude ° N/S, Longitude ° E/W)	Detailed description of what this place is like
Australia	Physical: Absolute Location: _____	
	Cultural: Absolute Location: _____	

- If you have time, please explore more of these places and the different features available on Google Earth. It's so cool! Have fun!

Exploring Google Earth ~ Part 3: *Reflection on Learning*

1. What Google Earth feature did you find to be the coolest/most useful/interesting/etc.? Please explain your answer.
2. Which of the above places would you be most interested to travel to now?
3. Which places would you most like to learn more about? (“None” and “All” are not acceptable answers.) Please explain what interests or intrigues you about them.
4. Now, put the ten places that you explored via Google Earth on the map below.
Fill in the legend at right to help explain the symbols on your map.



<u>LEGEND</u>	
	Europe
1.	
2.	
Africa	
3.	
4.	
Middle East	
5.	
6.	
Asia	
7.	
8.	
Australia	
9.	
10.	