Co-funded by the
Erasmus+ Programme
of the European Union

GOSTEAM Hands-on Activity Template *(Classroom-Formal)*

Title:

How to use Google Earth

Short Description (Max 500 words):

How to use Google Earth:

a) Trying out different symbols (3D, Streetview, compass, ruler, voyager, zoom).
b) Searching with coordinates.
c) Finding areas of deforestation.
d) Part 1: Topography exercise; movement across Hungary across the Alps to see the height differences. Compare the Netherlands with Slovakia.
Part 2: Measuring distances between cities.

Keywords (Up to 5):

Cartography, coordinates, distance, geography, scale

Information about the Implementation

Age and language of the students: 9-12 12-15 15-18 18+

Language: English Age: ☐ ☐ ☒ ☐

Number of Lessons – Duration (per lesson):

Number of Lessons: 3 Duration per Lesson: 45

Subjects

For which subject(s) the activity is usable, is it an interdisciplinary activity?

Science ☐

Physics ☐ Chemistry ☐ Biology ☐ Geosciences ☒ Environmental ☒ Other ☐

Technology ☐

Engineering ☐

Arts ☐

Mathematics ☐

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Information about the Scenario

Curriculum and country:

Link of the current activity to the curriculum:

Country: Sweden | Class: geography | Grade: 10-12

Topic: Cartography

Objectives (Max 100 words):

Description of the learning objectives

Knowledge of geographical concepts and models. Training and developing digital abilities with the help of Google Earth. Strengthen the spatial capability.

Materials (Max 100 words):

Which resources and materials (software, hardware) are needed?

Google Earth

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Spatial concepts, skills and abilities:

Which spatial concepts and skills are covered by the activity?

Spatial concepts:

Primitives: Identity/Name [X] Location [X] Space/Time [X]

Simple: Distance [X] Direction [X] Connectivity [X] Movement [ ]

Boundary [X] Shape/Area [X] Adjacency [X]

Difficult: Overlay [ ] Buffer [ ] Topology [ ] Coordinate [X]

Map [X] Scale [X] Shortest Path [X] Navigation [ ]

Surface [ ] Slope/Gradient [X] Aspect [ ] Contour [ ]

Complex: Interpolation [ ] Map Projection [ ] Spatial Dependency [ ]

Other:

Spatial skills:

- ☐ Map literacy
- ☒ Navigation/orientation
- ☒ Estimating distances and directions
- ☐ Recognizing and understanding patterns/Understand and identify models of spatial organization
- ☐ Select an ideal location based on the given spatial features
- ☒ Visualization
- ☐ Understand and identify spatial correlations/ dependencies
- ☐ Categorize spatial entities/ geographic features and identify hierarchies
- ☐ Compare spatial entities and draw analogies among them
- ☐ Identify/determine connections/relations
- ☒ Understanding scale in space and time
- ☐ Delineation of spatial regions/ zones based on given features/ properties

Short Description

Navigation/orientation: Finding one's way in unfamiliar environments, interpreting and giving walking and driving directions.
Estimating distances and directions: Measure paths, weighted distances, angles.
Map literacy: Using, interpreting/understanding, learning from, and communicating acquired spatial knowledge from maps, comprehension of geographic features represented as points, lines, or polygons.
Recognizing and understanding patterns/Understand and identify models of spatial organization. Delineation of spatial regions/zones based on given features/properties: Regionalization processes, pattern recognition and clustering identification in the 2d and/or the 3d world.
Select an ideal location based on the given spatial features: Single or multi-criteria siting and optimal areas identification.
Visualization: Visualizing spatial entities from written/oral verbal descriptions, from their 2d or graphical representations or through mental transformations; such as axis rotation or perspective taking.
Understand and identify spatial correlations/ dependencies: The ability to realize, identify and explain patterns, clusters and relevant spatial dependencies.
Categorize spatial entities/geographic features and identify hierarchies: Identify the hierarchical form of data and gradients between spatial entities.
Compare spatial entities and draw analogies among them: Calculate and compare different geometric objects' shapes, area and, boundaries.
Identify/determine connections/relations: The ability to identify links and common characteristics among spatial entities and between humans and spatial entities.
Understanding scale in space and time: The understanding of changes/transitions through space and time for different spatio-temporal scales.

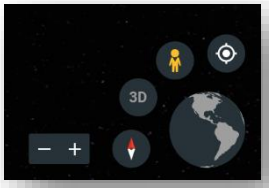
Geospatial concepts and spatial abilities documentation (see Section 3.2):
http://www.gosteam.eu/wp-content/uploads/2021/05/GOSTEAM_IO1_A1_final.pdf

Description of the activity in detail

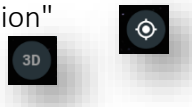
Classroom activities

Lesson 1: (45 min)

The exercise is carried out individually.



- Enter Google Earth: https://earth.google.com/web/
- In the lower right corner there are some symbols around the sphere:
- Click "Fly to your location"
- Click "Tilt view"



- Click "Street view", drag and drop in a place that you want to investigate.

- End "Street view. Click on the globe and spin the big blue globe to see if you can identify the different continents. If you lose orientation, you can click on the compass.

- Find your municipality and find an area you want to visit. You can zoom in and out of the image using the + and – symbols.
- Take a screenshot (tap PrtSc in the lower right part of the keyboard).
- Save the picture to a Word document.
- Measure the distance from school to your area using the ruler.

- Make a brief description of the area in your document.

Lesson 2: (45 min)

The lesson starts with the teacher giving a brief introduction to latitude, longitude, and coordinates.

The exercise is then carried in groups.

The tasks for the students are:

- Search 5 cities on Google Earth, with famous landmarks, and enter their coordinates with degrees, minutes, and seconds.

  For example, the Eiffel-tower in Paris: 48° 51' 29'' N, 2° 17' 41'' E.

- Use coordinates to find out which five cities are located on the following coordinates.
  - The values are given in two different ways. Find out in what way the search works best.
  - Try to take replace °, ', and '' with space to see if the search will carry out anyway.

Coordinates	City
33° 55′ 31″ S, 18° 25′ 26″ E -33.925278°, 18.423889°	
12° 2′ 36″ S, 77° 1′ 42″ W -12.043333°, -77.028333°	
35° 18′ 29″ S, 149° 7′ 28″ E -35.308056°, 149.124444°	
55° 45′ 6″ N, 37° 37′ 4″ E 55.751667°, 37.617778°	
64° 10′ 0″ N, 51° 44′ 0″ W 64.166667°, -51.733333°	

- Each group shows how they solved the first task for the rest of the class, with the help of a projector.

Solution to the second task:

Coordinates	City
33° 55′ 31″ S, 18° 25′ 26″ E -33.925278°, 18.423889°	Cape town, South Africa
12° 2′ 36″ S, 77° 1′ 42″ W -12.043333°, -77.028333°	Lima, Peru
35° 18′ 29″ S, 149° 7′ 28″ E -35.308056°, 149.124444°	Canberra, Australia
55° 45′ 6″ N, 37° 37′ 4″ E 55.751667°, 37.617778°	Moskva, Russia
64° 10′ 0″ N, 51° 44′ 0″ W 64.166667°, -51.733333°	Nuuk, Greenland

Lesson 3: (45 min)

Finding out areas of deforestation in Indonesia (or Amazonas).

The teacher divides the class into groups.

The class is given the following information:

- Go to Google Earth and find Indonesia (or the Amazonas).
- Identify some of the untouched (not deforested) areas.
- Identify some areas that are strongly affected by deforestation.
- How do you identify which areas are deforested and which are not?
- Describe your observations. Write down a few points.

- Discuss two different future scenarios. One where deforestation increases and one where it decreases. Which of these scenes do you think is the most likely? Motivate your conclusion based on current debate, your own thoughts and knowledge, and based on what you can interpret from the map images. The teacher finishes the lesson by having groups account for some of their results and thoughts.

Lesson 4: (45 min)

Part 1; Focus on topographic structures.
How can you identify differences in heights?

The lesson starts with teacher zooming in and out on a hill on Google Earth to show how you can see shades and colors that indicates slopes and altitude. The teacher also shows the tilt function of the 3D-button in Google Earth.

The students are given a task to examine the variation of topographical structures in Europe. Travel from Donau's delta in Rumania across Europe to the delta of Rehn in the Netherlands. How does the landscape change regard to topography? Are there any mountains, any plains, how does the rivers float?

Part 2: Measuring distances between cities.

The teacher shows how to measure distances in Google Earth with the help of the ruler.

The students will then compare the distances between following cities, measured in Google earth and by searching in Google.

Distance	Distance measured in Google Earth (km)	Searched distance (km)
Copenhagen-Berlin		
Aten-Rom		
Helsinki-Moskva		
Bukarest-Lissabon		

Online activities

Description of activities for distance learning in home-schooling

Sustainable contact:

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References (if any):

Tutorials:

https://www.youtube.com/watch?v=b1gnPw0cqRI&t=19s

https://www.youtube.com/watch?v=45XAtn2qdn0

Assessment (if any):

Not necessary