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

Title:

Google maps and geographical concepts

Short Description (Max 500 words):

How to use digital tools to train concepts linked to earth's map network: latitude, longitude, projection, turning circuit, equator, arctic circle, coordinates.

a) Learn how to use.
- Google maps
- GPS in mobile phone (Settings for geotags on photos)
- Compass in mobile phone

b) Designing a tourist-map.
Level 1: make a map of the hometown with pictures, coordinates, and text.

Keywords (Up to 5):

GIS, photo interpretations, maps, directions,

Information about the Implementation

Age and language of the students:

Language:	Age:	9-12	12-15	15-18	18+
		☐	☐	☒	☐

Number of Lessons – Duration (per lesson):

Number of Lessons: 3 Duration per Lesson: 30-90 min

Subjects:

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

Science ☐

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

Technology ☐

Engineering ☐

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Arts ☐

Mathematics ☐

Information about the Scenario

Curriculum and country:

Link of the current activity to the curriculum: https://www.skolverket.se/undervisning/gymnasieskolan/laroplan-program-och-amnen-i-gymnasieskolan/gymnasieprogrammen/amne?url=1530314731%2Fsyllabuscw%2Fjsp%2Fsubject.htm%3FsubjectCode%3DGEO%26courseCode%3DGEOGEO0%26lang%3Dsv%26tos%3Dgy%26p%3Dp&sv.url=12.5dfee44715d35a5cdfa92a3#anchor_GEOGEO0

Country:	Sweden	Class:	Geography	Grade: 10-12

Topic:	Geographical concepts, cartography, GIS,

Objectives (Max 100 words):

Description of the learning objectives

The basics of cartography, such as earth models, map projections, positioning and the map as a model of reality. Scale and generalization. Map production. The basics of geographical information systems (GIS) and visualization of geographical information in maps.

Materials (Max 100 words):

Google maps

iPhone or similar smart phone

Computer

Classroom with a digital Projector

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 [ ]

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

Boundary [ ] Shape/Area [ ] Adjacency [ ]

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

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

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

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

Other:

Spatial skills:

- [ ] Map literacy
- [X] Navigation/orientation
- [X] 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: (60 min)

Teachers starts the lesson by introducing geographical concepts such as: latitude, longitude, projection, turning circuit, equator, arctic circle, coordinates.

Then the teacher introduces Google maps on: https://www.google.com/maps and shows the tools and how to navigate and search.

The students will then work individually or together to solve the following questions with the help of Google maps.

1. What color is the carpet in The Blue Mosque in Istanbul?
2. Which of the following cities lays on or close to the equator? Hint: If you tap on any given place on the map, you will be given the coordinates for this place.
    - Istanbul
    - Singapore
    - Rio the Janeiro
    - Wellington
    - Memphis, Tennessee
    - Shanghai
    - Iquitos
    - Ulan Bator
    - Canberra
    - Hiroshima
    - Timbuktu, Mali
    - Kampala

3. Find out which of the cities that are closest to the polar circles, the tropic of Cancer or Capricorn, or the Prime meridian. Complete the table by applying X in the appropriate box. Hint: Click on the city on Google maps to find out the coordinates.

City	Northern Polar circle	Southern Polar circle	The tropic of Cancer	The tropic of Capricorn	The Prime meridian
Accra, Ghana					
Murmansk, Russia					
Alice Springs, Australia					
Adélie Land, France					
Havanna, Cuba					

Solutions to lesson 1:

1.The color of the carpet is red.

2. Singapore, Iquitos and Kampala are the cities nearest the equator.

3.

City	Northern Polar circle	Southern Polar circle	The tropic of Cancer	The tropic of Capricorn	The Prime meridian
Accra, Ghana					X
Murmansk, Russia	X				
Alice Springs, Australia				X	
Adélie Land, France		X			
Havanna, Cuba			X		

Lesson 2: (30 min)

Part 1: (15 min) Take photos with geographical positioning.

(These instructions could be provided to students as a preparation for lesson 3.) Modern mobile phones have GPS receivers that can receive signals from satellites and determine the position of the mobile. By allowing location information for photographs, latitude and longitude positions are obtained in the images. The following instruction is useful if you have an iPhone.

1. Go to settings>privacy>location services> camera>switch to the “on” position.
2. Take a photo where you are sitting.
3. Go to photos>album>select people and locations> select locations and look at your latest photo. Select "map" and tap the small blue arrow in the lower corner of the left. Zoom out the image and see if you are in the correct map position.

Part 2: (15 min) How to use a digital compass.

Instructions for students:

- Find the compass on your iPhone at “Extras”. At the bottom of the screen the direction and coordinates are displayed.
- Keep the iPhone flat, with the fitting of the cross wires on to the middle of the compass, for a careful reading of the compass card.
- Tap the compass to lock the current direction. You can then see the deviation from the chosen direction marked in red. Unlock again.
- To open your location in Maps, tap the coordinates at the bottom of the screen. If the compass doesn’t see your location, you have to open the settings and allow location services when the compass app is in use.

Let the student work in pairs.

- Think of three landmarks in your city.
- Try to guess in what directions they are in.
- Then examine, using compasses and map services, in which direction and how many degrees the landmarks are in. Compare your answers with your classmate’s.

Lesson 3 (90 min):

The teacher introduces the assignment.

The students will then work in groups.

- Plan a trip for tourists in your hometown. With the help of Google maps, pictures, smartphone or other digital tools, your task is to plan and make a trip for visitors who are visiting your hometown for the first time. When you have done your map, you must show the trip for your classmates, and you will get feedback from them.
- Try to think what advantages your town is offering. Is there for example, beautiful nature, cultural activities, exciting food, architecture…?

The presentation in the classroom must be with digital technique, for ex with computer and projector.

Online activities

Description of activities for distance learning in home-schooling

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References (if any):

Assessment (if any):