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

Title:

Google Maps Orientation Basics

Short Description (Max 500 words):

- getting to know different Google Maps features (to set routes- also with different types of movements, satellite function, Google Street View)
- Using „Google Earthengine- Timelapse“ to interpret satellite imagery and recognize (ecological) changes, like urban growth, glacier retreat and deforestation

Keywords (Up to 5):

Maps Earthengine satellite

Information about the Implementation

Age and language of the students:

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

Number of Lessons – Duration (per lesson):

Number of Lessons: 2-3 Duration per Lesson:

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 ☐

Information about the Scenario

Curriculum and country:

Link of the current activity to the curriculum:

Country:	Austria	Class:	1	Grade:	5th

Topic: Orientation in the world

Objectives (Max 100 words):

Description of the learning objectives

Students learn how to use Google Maps, Google Street View and Google Earth Engine. They learn to interpret timelapse satellite imageries and discuss the importance of satellites and timelapse functions.

(Foreknowledge about what a satellite is and what it does is existing).

Materials (Max 100 words):

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

Google Maps and features as Google Street View and Google Earth Engine

worksheets

Spatial concepts, skills and abilities:

Which spatial concepts and skills are covered by the activity?

Spatial concepts:

Primitives: Identity/Name ☐ Location ■ Space/Time ☐

Simple: Distance ■ Direction ■ Connectivity ☐ Movement ■

Boundary ☐ Shape/Area ☐ Adjacency ☐

Difficult: Overlay ☐ Buffer ☐ Topology ☐ Coordinate ■

Map ■ Scale ☐ Shortest Path ■ Navigation ■

Surface ☐ Slope/Gradient ☐ Aspect ☐ Contour ☐

Complex: Interpolation ☐ Map Projection ☐ Spatial Dependency ☐

Other:

Spatial skills:

- [x] Map literacy
- [x] Navigation/orientation
- [ ] Estimating distances and directions
- [x] Recognizing and understanding patterns/Understand and identify models of spatial organization
- [ ] Select an ideal location based on the given spatial features
- [x] Visualization
- [ ] Understand and identify spatial correlations/ dependencies
- [ ] Categorize spatial entities/ geographic features and identify hierarchies
- [ ] Compare spatial entities and draw analogies among them
- [x] 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 & Online activities

Worksheet: DIGITAL MAPS

By using Google Maps or Google Earth you can see the world, because satellites in the All photograph and film our Earth all the time. Type the desired location in the search field and click on the loupe for „Search". By using the „plus" sign you can zoom in and you can discover cities and landscapes in bird's- eye perspective. You can choose between the map mode and the satellite mode. Besides there is the possibility (but not everywhere in the world) to use Google Street View and thereby to „walk through" cities, as if you were really there. Google Maps does not show current satellite imagery, so you cannot control if somebody is at home right now☺. The feature „Directions" allows you to calculate the needed time between two locations and kilometres of your route. (walking, by car, bike or public transportation).

1) Type „GoogleMaps.at" and enter it. Next to the loupe type in „Bg Schwechat" and enter it. Which buildings do you find next to our school?
   _____

2) After it click at satellite mode (left below) and zoom in (use the plus sign). How many cars are parked at the school parking area? _____

3) On the left side you can see an orange male. Pull it to the blue line that appears between the new and the old school building. How many metres are written on the shield? _____

4) Walk in the direction of „Multiversum" by clicking on the arrows. Stop before the stop sign. Turn right. What do see next to the traffic light? _____

5) Click at the „back arrow" (top left). You left Google Street View. Click an „route planner" and fill in your home adress as the starting point Use the sign for pedestrians. How long would you walk to school? _____ How many kilometres would you have to walk?_____

6) Click on the bike sign. How long would it take to arrive in school by bike?_____

7) As a starter adress put in your adress and choose a target location you would like to travel to (all over the world). Which location did you choose? _____. How long would you have to travel (by walking, by car oder airplane)?_____

8) Search for several locations in the world (f.e. eiffel tower, Grand Canyon, statue of liberty,.) and use the different features of google maps.

Click here: https://earthengine.google.com/timelapse/

The Google Earth Engine Timelapse function shows several areas in the world by timelapse. It means that you see satellite imageries from the same area in different years. You can see how the areas changed.

Click through and choose at least two areas and try to answer the following questions with your partner.

- What is the earliest and the last year of satellite imagery in your chosen area?
- What changes can you recognize? (colors, something getting bigger/smaller, …)
- If you are not sure what it means, google the topic word for your area (like mining, drying, urban growth,…) and read a definition you understand.
- Try to interpret (= explain the meaning of this imagery and the changes there) with your partner. What happens? Why do you think does it happen or what is it needed for? What kind of damage might it cause and for whom? How do you feel about what you see? (You can always ask your teacher if something is unclear).

Questions to ask in plenum:

- Who wants to present a satellite timelapse?
- What topic did interest you most, so that we can work with it in further lessons?
- Why aren't there any satellite imageries before the 80's? What could be a reason for that?
- Do you think satellite imageries are important? Why would you say so?

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References (if any):

Assessment (if any):