

Civil Engineering

Topographical Map and 3D Model Construction

Subject Area: Civil Engineering/Topography Grade Level: 6 Date: 12/2012

Lesson Overview:

Students will learn to read, understand, and create a 3d model and topographical map. They will understand how to read a legend and the language associated with cartography and civil engineering.

| Materials Included in this Lesson | Other Materials for this Lesson |
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| Play doh, pencils | Computer, |
| Paper, legend | Topographical maps, |
| Thread | Assessor maps, |
| Lesson plan worksheet | Google Earth |

| Skills the Student will Learn | Student Deliverables |
|--|-----------------------------|
| - How to read topographical map | - 3d model |
| - Language associated with topography and cartography | - topographical map |
| - Practical application of transferring from map to 3d model | |

Length of Lesson: 5 Days

Activity Day One:

Introduction to civil engineering

Introduction to cartography and map types

Language associated with cartography

Introduction to Google Earth

Activity Day Two:

Demonstration of taking a 3d model and transferring it to a topographical map

Activity Day Three:

Make a 3d model

Activity Day Four:

Draw a topographical map from the model

Activity Day Five:

Exchange maps with other groups and using only the maps, construct the original 3d model

Enrichment Suggestions

Students could eventually extend this out to a 3d topographical map and they could make it more practical by using an actual area (i.e. neighborhood) and compare it against the actual maps and models on record.

Student Resources

- Google Earth
- Maps
- <http://egsc.usgs.gov/isb/pubs/teachers-packets/mapshow/activity4.pdf>

State Standards Met

Earth Science

7.2 Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

7.4 Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.

CTE Pathway Standards

E. Environmental and Natural Science Engineering Pathway

The Environmental and Natural Science Engineering Pathway provides students with the opportunity to prepare for careers in the

environmental and natural sciences. They learn to design and develop processes, equipment, and systems that are used to create, monitor, prevent, or correct environmental events and conditions.

E2.0 Students study and understand the fundamentals of earth science as they relate to environmental engineering:

E2.4 Understand how to read, interpret, and evaluate topographical maps and images.

Lesson Plan Relevance to Externship

I did my externship at Baker-Williams Engineering Group. Baker Williams Engineering Group provides land development services throughout Northern California for both the private sector and for public agencies. They specialize in construction staking, project coordination, land planning, civil engineering consulting and design, mapping and boundary surveys.

| Rubric for the Topography Project | | | | |
|--|-------------------------------|-----------------------------|----------------------------------|-------------------------------------|
| Student Deliverables | 1 Exceeds Expectations | 2 Meets Expectations | 3 Approaches Expectations | 4 Fails to meet Expectations |
| 3d model | | | | |
| Topo map | | | | |
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