

GIS Enabling Next Generation Science Standards in STEM Education

UC

GRACE Project

- **Overview of Project**
 - Mayor's Youth Corp
 - ITEST
- **Goals**
 - STEM Education
 - Career Pathways
- **Funding**
 - NSF until 2018
- **Sequence of Activity**

Next Generation Science Standards

- **Three Dimensions of Science Learning**
 - **Science and Engineering Practices**
 - **Disciplinary Core Ideas**
 - **Crosscutting Concepts**
- **Evolution from “Learning about” to “Figuring out”**
- **Specific Performance Expectations**



Merging NGSS and GIS

- **GIS provides an opportunity for students to analyze data to “figure out”**
- **Need exemplar investigations that are already aligned with students using the 3 dimensions of science learning**



An example: NGSS and GIS

- **NGSS standard**
- **Map Journal**
 - **Living Together**



Embedding GIS in Middle School Science

- How does water quality affect the ecology of a community?
 - How do flowing water and land interact?
 - How Do You Determine the Quality of Water in a Community?
 - How Can Changes in Water Quality Affect the Living Things in an Ecosystem?

How do flowing water and land interact?



How Do You Determine the Quality of Water in a Community?



How Can Changes in Water Quality Affect the Living Things in an Ecosystem?



How GIS supports “Figuring Out?”

- Engage students in data analysis that encourages both answering AND asking questions
- Embed in materials that support multiple ways uses of science and engineering practices, are student centered, and move beyond “point and click”
- Scaffold student learning of the tools without taking away the “A-Ha”!

