GRACE Mission - "Scaling Your Watershed" (Hydrology)

Background: Project GRACE is capable of measuring small changes in the Earth's mass. The gravitational pull of earth varies slightly from place to place because of subsurface water and rocks have different densities. GRACE is very sensitive to small changes in aquifers. With this powerful satellite scientists will investigate yearly changes in aquifers, such as those under many of the deserts. Working with scale will help students put maps into perspective. Students will use the concept of ratio to compare a topographic or LandSat image map, to their three-dimensional map project of their watershed. A watershed is an area of land in which all rain and snow runoff and small tributaries drain into a common body of water such as a creek or lake.

Objective: Students will be able work with scale using the watershed models from the "Modeling Your Watershed" activity.

Standards: Science: unifying concepts & processes; science as inquiry; earth and space science
Math: measurement; computation & estimation

Vocabulary: watershed topographic Landsat

Materials: Watershed model from the previous activity
Calculator

Procedure:

1. Students will use a string on their topographic or LandSat maps to trace the length of their river. Give examples of natural or human made landforms. (example: dams, mountain, lake, canyon, etc.) Tie knots in the string to designate cities and

natural or human made landforms. Ask the students to find at least ten places to tie knots. Use the string's length and your map's scale to determine the ten distances in our watershed from the source and mouth of our river. Record these data in a table. A sample table may look like:

Location Name	Distance from mouth – inches	Map scale conversion

2. After this is completed, ask the students to convert their distances to metric values. Make another table showing these values.

Location Name	Map scale conversion	Conversion to metric

Extensions:

- Write a paper about how watershed projects affect the role of soil and water resources throughout the world.
- Give a classroom talk about how humans affect the watershed.
- Organize a watershed clean up in your area.

References / Resources:

http://www.capri.cgiar.org/wp/capriwp17.asp

http://bcn.boulder.co.us/basin/learning/mappingteacher.html