Hypothesis: By the end of this project students will have demonstrated their understanding of scientific thoughts by formulating their own hypotheses, collecting data, describing scientific methods, and analyzing data using a variety of graphical methods.

Methods: Students will conduct three experiments and write up three separate reports describing the how data was collected and analyzing their results. Some of the projects will include data collected as a class; some will use data that collected individually. The details of each required report are included below. Although each report will have a different subject, they will all have the same format, which will mirror the format scientist often use to report the results of their work.

All reports need to be double spaced and typed in a 12-point font. Pages should have margins of 1 inch around all sides of the paper. All reports should be presented in the order described below and include all sections described below:

1) The first 2 lines should be the Title, Author, and Date (see example above).
2) Next should be a Hypothesis that states the idea that is being tested in one or two sentences.
3) A Methods section should describes in one or two paragraphs how you collected the data. Be sure to include any problems you encountered with the data collection that could have affected the accuracy of your results.
4) A Results section should include your analyses and your interpretation of their meaning (this should reference your graphs).
5) A Conclusions section that describes how your analyses relate to your hypothesis (Note: your results may prove or disprove your hypothesis, or they may not provide useful information.)
6) Suggestions for future study: In a few sentences suggest what the best next step would be.
7) All reports should include a Data Table at the end that shows all data used in the report.

Part 1: Analyzing the Velocity of Soos Creek (Due by noon on Nov 25, 2009)

Step 1- Collect the data: Collect stream flow velocity data from Soos Creek on two different days when the stream level varies. You should use two different methods for collecting the velocity data on at least one day (congratulations- this part is already done).

Step 2- Analyze the data and report your findings (in 2 pages or less- not including data tables and figures). You need to write up a report on the findings of your study. Be sure to include a hypothesis about how the stream flow will differ on the two different measurement days; describe how and when the data was collected. You should produce 2 graphs for this report.

Part A: The report should include a description and analyses of the 2 different methods (Keith’s velocity
meter and the marshmallows) used to collect velocity data. Question to address = Do the two data sets have the variability (standard deviation) and the same average values. If the two data sets are different-which do you think is more accurate?

Part B: Compare the velocity measurements of the stream at the two different flow times. Question to address = Do the two data sets have the variability (standard deviation) and the same average values. If the two data sets are different, speculate why they are different.

Due Part 2: Make and test your own rain gauge (Due by noon on Dec 2, 2009)

Step 1- Collect the data- Congratulations, by now you should have made your own rain gauge. Now we need to test the effectiveness of the rain gauges made by the class. We will collect rain in two groups of rain gauges on the roof of the SC for 1 week and measure how much rain is collected by each group of gauges. Group 1 will be composed of all of the IDS-made rain gauges and group 2 will be composed of 6 purchased rain gauges.

Before we begin: formulate a hypothesis about how or if the rain measured by each group of rain gauges will differ.

Step 2- Analyze the data and report your findings (in 1 page or less- not including data tables and figures). Your data analysis should include a graph that shows the distribution of the rainfall measurement made by each group of rain gauges. If the two data sets are different-describe which group is more accurate-explain your reasoning. You should produce 1 graph for this report.

Part 3: Comparing rainfall & river discharge across the USA
(Presentation Dec 4th, Written report due by noon on Dec 7, 2009)

Step 1- Collect the data – The data set for this part of the project will be consist of measurement of 24-hour precipitation totals and daily river discharge data for the past several weeks. You will download the data from sites on the World Wide Web; detailed instructions on how to access and record the data will be given separately.

Before you collect the data, be sure to formulate a hypothesis about how or if the daily rainfall is related to daily river discharge.

Step 2- Analyze the data and report your findings. (1 to 2 pages - not including data tables and figures). The methods section for this report will be different as you did not collect the data directly. Instead of a description of data collection, you should include a map that shows the approximate location of where your data was collected and, Very Important, you need provide credit the people who collected the data by provide a detail reference. (Instruction for referencing the web site will be included with the instruction we will provide on how to find the websites). You should produce 1 graph for this report.

Your data analysis should include a graph that shows the relationship between rainfall and river discharge. You should also speculate about what factors may strengthen or weaken the relationship between rainfall and river discharge.