Introduction:

This lab activity provides students of all ages the opportunity to build and measure time with a sundial. From start to finish the students will build a unique sundial and ensure that it properly tells time. They will use observation to make any necessary changes. This will lead into a discussion on the importance of the evolution of timekeeping and how past civilizations kept time.
Grade level: 3rd grade - college level

Time: One hour for setup
      Minimum of 6 hours for observation
      One hour for analysis and discussion

Computer Technology: Microsoft Office: Word and Power Point

I. Learning Objectives and Expected Outcomes:
   1.) Students will demonstrate the scientific method and principles by conducting an experiment or activity, collecting and analyzing data, and interpreting the results.
   2.) Students will identify unifying principles and repeatable patterns in the physical world and apply them to problems or issues of a scientific nature.

II. Frameworks:
   1.) N.S. 9.1: Students will understand science is a way of knowing.
   2.) N.S. 11.5: Students will understand historical trends in physical science.
3.) **N.S. 12.2:** Students will gather and analyze data.

III. **Materials:**
   1.) Hammer
   2.) Nails
   3.) Handsaw
   4.) 6 Poster Boards
   5.) 3 Pieces of Lumber
   6.) Tape Measure
   7.) Markers

IV. **Procedures:**
   A. **Introduction:**

   Sundial History
   [http://www.youtube.com/watch?v=tI0GqYJha1Q](http://www.youtube.com/watch?v=tI0GqYJha1Q)

   B. **Making Your Sundial:**

   1.) Split the class into two groups of about ten (Depending on how big the class is) to begin construction on the sundial.
   2.) Each group should take an inventory of their materials and designate what each member of the group should do. For young children assistance will be required from the teacher.
   3.) Students will first brainstorm how, with these materials, they can build the best sundial. Groups may come up with variations.
4.) This should begin the students thinking like early man and will lead them into discussions about how they might have achieved such a task thousands of years ago.

5.) The students should measure and cut the lumber to their desired length for their sundial.

6.) Next, the students will make the numbers of the sundial and determine how to space them.

7.) All of the pieces of lumber should be nailed into place to make the centerpiece of the sundial.

8.) The students should then test out their sundial, making any revisions that are needed, and observe the time.

C. Cooperative Involvement:
1.) Each group will observe the results of their sundial and the other sundials and decide who had the more accurate sundial and why.

D. Closure: Each group should present a brief statement about why they built their sundial as they did.

V. Follow through: This activity will be used as a beginning to the history of the development of science.

VI. Evaluation: Write a paragraph about why early man developed the sundial and why they built their sundial the way they did.

Resources:

http://ccphysics.us/henriques/a105l/Sundial.htm
http://www.accuratesundials.com/site/591582/page/143772
http://www.beaglesoft.com/maintimehistory.htm