**Sundials – Keeping Time Like Native Americans**

**Fellow/Teacher:** Christina O’Malley and Joan Johnson

**References:**

Classroom textbook

**Benchmarks:**

SLC number and description.
Scientific Inquiry
2. Analyze a series of events and/or simple daily or seasonal cycles, describe the patterns and describe the next likely occurrence.
3. Develop, design and conduct safe, simple investigations or experiments to answer questions.
6. Formulate instructions and communicate data in a manner that allows others to understand and repeat and investigation or experiment.

**Objectives:**

Students will be able to understand how the earth’s rotation can be observed as a change in the direction of a shadow cast from an immobile object. Students will create ideas about what this knowledge could have been used for by a primitive people.

**Materials**

Sidewalk chalk, immobile pole (tetherball post, basketball pole, etc), access to outdoors.

**Initial Observation/Demonstration:**

While working on a unit about Native American peoples in Ohio, students were curious about the term “sundial”, so the instructors decided to use times that the class was outside to show them to the students.

**Initial Observations:**

Students first made observations of the shadow cast by the sun in the morning when they arrived to school. They traced the shadow with the sidewalk chalk and recorded the time. They repeated this at recess time.

**Initial Model:**

It is unknown whether the students would have devised a model to do this. Most had not considered the rotation of the earth in a meaningful way.
**Procedure:**

1. Locate a post to use to cast shadow or create alternate “sundial” by using chopstick, straw, etc. Our model of a tetherball court was very handy – it was large and allowed easy work in groups, and could be traced on with chalk.
2. Record the location of the shadow and the time of day.
3. Return later (hours later works better). Discuss what has happened (observations) and why.
4. Discuss where the shadow will be at some later time. Discuss what will happen tomorrow. Will the shadows be at the same places you recorded today?
5. If several recordings are made, students may observe that the chalk lines actually resemble a clock. Discuss how these observations could lead you to a useful clock.

Once the shadow and time are recorded twice, groups can be taken outside to develop their final observations. This discussion includes why the shadow moves (as the earth turns, the sun appears to move and then the shadow is cast in a different way). Students reasoned that this happens the same way each day, and that the shadow would continue to move until the sun set (at which point this method of keeping time would be worthless). Finally, the students made a prediction about where the shadow would be when they left school for the day.

**Discussion/Summary:**

Later in the week the students watched a video for their social studies section describing the technologies the Fort Ancient people used in their daily lives. These included the solar calendar system used by the people who lived at the Sunwatch Indian Villiage (south of Dayton, Ohio). The students were able to discuss clearly and correctly after watching the video how the sun could be used as a daily clock or calendar.

The instructors were pleased at the simple way that science could be inserted even into social studies curriculum to improve the understanding of the technologies of native people.