Shoshoni High School Lesson Plan: 12/16/13

Earth and Space Science (High School)

**“Fire tornado”**

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**Objective:** Students will see evidence how pressure and pressure differential can create many natural disasters including thunderstorms, hurricanes, and tornadoes.

**Vocabulary:**

Pressure: the force per area on an object often used for the inside of an object holding gas.

Pressure Differential: The difference in pressure between two areas.

Coriolis Effect: Is the effect that acts on objects when viewed through a rotating reference frame, most notably in this case the earth, the reason why hurricanes spin.

**Standards Met:**

[Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-PS3-2),(HS-PS3-5)](http://www.nap.edu/openbook.php?record_id=13165&page=56)

[Use a model to provide mechanistic accounts of phenomena. (HS-ESS2-4)](http://www.nap.edu/openbook.php?record_id=13165&page=56)

Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HS-PS3-3)

**Materials Needed:**

Lazy Susan (or some other freely spinning object that lies flat)

Wire screen must be made of metal

Fire proof bowl or cup

Lighter fluid or alcohol

Sponge

Some type of bonding agent

**(Some preparation is required)**

**Introducing the Lesson:** The instructor should introduce hurricanes, tornados, and how they are formed, including descriptions of pressure and the Coriolis Effect.

**Engage:** Ask questions on what will happen when the Lazy Susan is turned with and without the screen. Either demonstrate the fire tornado you have made or have them build their own. Building may take a long time if building, have them make short wire screens to allow for easier attachment.

**Further Investigation:**

(At Home) Students could search other weather phenomena to see how they are formed.

(In school) Designing and testing different heights and diameter wire screens to create different sized tornados.

(Advanced) Students could measure the height of the Tornado and estimate the velocity of the Lazy Susan and plot them against one another to determine a relationship.

**Questions That Students Should Be Able To Answer:**

 1. What is a hurricane and how is it formed?

 2. How a tornado is formed?

 3. Why does the fire tornado work with the screen but not without the screen?

 4. What is the Coriolis Effect?

**Procedure:**

Place the Lazy Susan on a flat desk or lab bench.

Attach the fireproof bowl or cup to the Lazy Susan directly in the center fill with small pieces of sponge and flammable liquid.

Make the wire mesh into a cylinder with bonding agent (Sticky Tack is what I used)

Attach wire screen around the bowl also directly centered allowing for air to enter the bowl but only through the screen.

Light the liquid and spin the Lazy Susan this should create a fire tornado due the spinning air and pressure differential between the inside of the mesh and the outside.