Lesson Plan 3

Solar Cooker

**Instructional Goal:**
Students will understand important components of the engineering process.

Students will understand that the heat energy from the sun can be harnessed and employed for use in a measurable manner. Students will understand the relationship between their experimental design and the success of the experiment, and will appreciate the importance of designing and redesigning during the engineering process.

Standards:
1. Students will plan and conduct a scientific investigation to test a hypothesis
2. Students will distinguish between variable and controlled parameters in a test

**Performance Objective:**
In groups students will create and implement a design for their own solar oven. They will test their design by measuring and recording their oven's efficiency, efficacy, portability and cost while baking a standard dish.

**Rationale:**

**Lesson Content:**

**Day One:**
- Introduction to idea of heat energy
- Sun as source of energy
- Ways to harness that energy
- Flashlight/mirror demo
- Introduce project: Principles of engineering, materials, time, assessment, etc.
- Organize into groups, choose and draft design

**Day Two:**
- Draft project (drawing)
- Purchase materials
- Finish construction

**Day Three:**
- Test design
- Short activity during cooking
- If time permits, correct issues with original design and retest

**Instructional Procedures:**

**Evaluation Procedures:**
Portability (weight)
Efficacy (time to cook/heat), maximum heat
Cost
Efficiency (amount it cooks at one time)

**Teaching Materials:**

Something to cook: time dependent
  - Cookies
  - Grilled Cheese
Thermometer

Lots of cardboard
Tinfoil
Tape
Glue
Black markers or construction paper
Plastic wrap

Insulation materials

Optional:
Magnifying lens ([link](http://www.amazon.com/Wholesale-Credit-Wallet-Magnifiers-OpticLens/dp/B004Z76DEG/ref=sr_1_20?ie=UTF8&qid=1363652867&sr=8-20&keywords=plastic+magnifying+glass))
Foil disposable dishes (?)
Reflective blanket/car shield/ Mylar Blanket (amazon $8/10)
Fake money
Cooling racks
Clothespins
Chicken skewers
Freezer bags

YOKA materials
Oven mitt
Buckets
Max heat \times (1 + \text{dollars leftover})
(\text{Weight (lbs)} + \text{time to heat to 120 degrees (min)})