**Problem-Based Learning Lab Overview**

I.  Formation of Groups: Human Graph-Knowledge of Water’s Properties

II. Role Assignments: Beginning with the Materials Manager, all roles are assigned to the right (clockwise).  
 Materials Manager/Traveler (Spy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Checker/Timekeeper: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

        Data Recorder:      \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

        Encourager/Observer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

III. Task 1: Your Team will be charged with conducting careful testing of several fluids in order to select a determine how many drops of each fluid a penny will hold. You will accomplish the task by working collaboratively to predict and the conduct up to three trials. You will then work together to create a graph that depicts your results.

Task 2: following a brief presentation by the facilitator about the structure of water and the definition of the scientific principles embodied in the exercise, teams will reconvene to create a poster describing the importance of water (H2o) and how to introduce the study of water to children in grade levels kindergarten to fifth grade.

IV. Time Limit: 60+ minutes

V. Social Skills and or Habits of Mind to Engage/Assess: Attentive Listening; Disagree with the Idea --Not the Person; Flexibility in Thinking; Perseverance; Team Work

 VI  Level of Voice:  Classroom Level 3 – Normal Voice Table Talk  
 

VII. Processing--Questions for team and individual reflection:

        Content  Standards: CA; CCSS; NGSS  Discussion of the PBL in securing student engagement, (voice) exploration, explanation, elaboration and evaluation

VIII. Assessment of Cooperation/Collaboration:    
Self-Assessment of Collaborative Activity Performance and Learning

Rate Your Mates

Imagination, How Science and the Engineering Process can be integrated with Literacy, the Arts and Social Studies

VIII. Encouraging Energizer: Varied: Team selected

***Adapted from* *Blueprints for Learning in the Cooperative Classroom*. Bellanca and Fogarty**

**Role Assignments**

**Materials Manager/ Spy Tasks:**   Make sure your team receives and uses the materials without spilling; If the team has a question following Three Before ME  go to another team to answer your question [or see what they have learned]

**Checker's Tasks -** Make sure the time limits are observed.  Help others complete their tasks. Let instructor know when your team has completed the lab.

**Recorder's Tasks**:  Carefully observes and counts the number of drops that a penny will hold so that each team member has access to the data.  Carefully completes the Team analysis page to represent the results of the trials.

**Encourager/Observer' s Task** -  Coach the team to persevere and stay together while sharing and turn-taking. Notice, identify and record occurrence of team members' social skills and habits of mind

**The “Human Graph” Strategy**

**This is a highly effective tool to organize participants so that you have a “mixed knowledge or ability” character to each of the teams or groups formed.**

**Here are the steps to this Strategy:**

A. Ask participants to reflect on their level of knowledge or expertise in the topic to be focused upon in the activity. For example, comfort in you knowledge about the laws of physics).

B. Identify a space in the room or corridor that is long enough for the participants to line themselves up from *1–Strong comfort in knowledge to 5—Very tentative comfort in knowledge.*

C. Confirm that participants have placed themselves correctly. Then FOLD the line from end to end by bringing the person at the furthest “1” around to the person at the furthest “5”. Then have them face one another. To select groups of four divide by quads and ask them to return to their seats to gather belongings so that they may move to a designated workspace.

*Reflections on Transfer/Application: How might you utilize this strategy in the K-12 classroom when introducing or culminating a unit of study?*