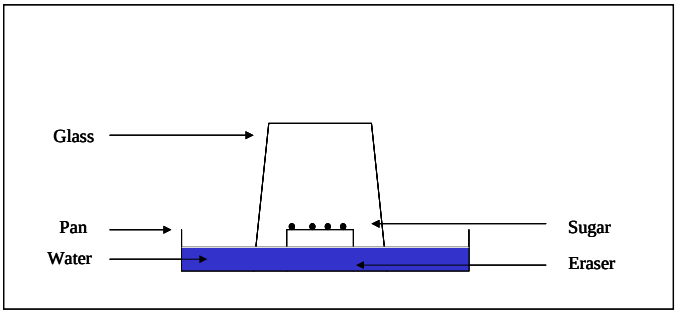
NHU/NASA Summer Institute

Lesson Plan

Student Name __Phaik Teoh_____ Date _13 November 2004 _____

Lesson Plan Title	Particular Particles
Grade Level	Five
Concept/Topic to Teach	Earth Sciences – Earth's Water
Content Standards	3c. Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow. 6g. Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data. 6h. Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.
General Goals	Demonstrate water condensation
Specific Objectives	To learn that water condenses around particles in the sky to form clouds.
Required Materials	Rectangular pans Small drinking glasses with a large mouth Large rectangular pencil erasers Sugar Water

Anticipatory Set	Start slide-show of NASA photos of clouds. Ask students what's common in all the photos – Clouds! Have students volunteer what they know about clouds. Explain that they will do an experiment that demonstrates how clouds are formed.
Step-by-Step Procedures	1. Start off by demonstrating the procedure below to the class. a. Place the pan where it is warm (ex. in the sun). b. Fill the pan with 0.5 in. of water c. Put the eraser in the middle of the pan. d. Place about 10 grains of sugar onto the eraser e. Place the glass over the eraser so that the mouth of the glass is resting on the pan.  2. Have the students make a hypothesis about what they will see at the end of 20 minutes.
Plan for Guided Practice	1. Break the class up into heterogeneous groups of four. 2. Each group works follows the procedure that was demonstrated (step 1 in above section). 3. They record observations every 5 minutes for 20 minutes. 4. Have each group discuss and record their responses in their journal to the questions below. - What happened to the sugar? - How did the water droplets get from the pan to the sugar? - Based on the results, what predictions could be made about the atmosphere that makes cloud formation possible? - Have a class discussion about the experiment, with groups volunteering their responses to the questions above.

Plan for Independent Practice	1. Have students hypothesize what would happen if some of the conditions were changed (ex. temperature, color of water, type of particle). Have them design another experiment to test their hypothesis. 2. Have students investigate the NASA sites below to find out more about clouds: a. http://spaceplace.jpl.nasa.gov/en/kids/cloudsat_puz3.shtml: explains cloud's role in the water cycle, and how NASA's satellites help us learn more about clouds b. http://antwrp.gsfc.nasa.gov/apod/ap030311.html: explains why clouds can be of different colors c. http://asd-www.larc.nasa.gov/SCOOL/: homepage of 'SCOOL project where students observe and record clouds to help NASA compare surface- and space-based observations on clouds.
Assessment (based on objectives)	Students will be assessed on their group participation and their responses in their journal.
Adaptations (ELL students or special populations)	- The slide-show gives visual clues to ELLs about the subject matter. - Vocabulary that may be unfamiliar to ELLs in the class should be introduced prior to the start of the lesson (e.g. hypothesis, observation) - The teacher's demonstration of the procedures provides a graphic guide for what each group is to do. - The heterogeneous groups provide opportunity for ELLs to clarify meanings of terms, and procedures. Where possible, a buddy with the same native language will be placed in the group.
Extensions (for gifted students)	Have students research the different types of clouds, and the weather conditions that cause them to form. Have students work on the Independent practice assignments.

Adapted from:

Particular Particles. The case of the phenomenal weather.
http://whyfiles.larc.nasa.gov EG-2002-04-LaRC