Lesson Title	Cloud Lab
Length of Lesson	One (50 minute) class period
Created By	Will McBryde, Rob Thornton
Subject	Earth Science
Grade Level	8th grade
State Standards	8th: 1a, 1b, 1c, 1d (Inquiry); 4c, (Earth Science)
DOK Level	DOK 3
DOK Application	Identify, Distinguish, Investigate, Hypothesize, Differentiate
National Standards	5-8: A (Inquiry); D (Earth/Space)
Graduate Research Element	Identifying and distinguishing the types of clouds is a basic component of the meteorology discipline. Cloud differentiate can help one predict weather.

Student Learning Goal:
MS 8th Grade:
1(a) Design, conduct, and analyze from an investigation that includes using experimental controls 1(b) Make inferences based on observations 1(c) Make quantitative and qualitative observations based off of tools 4(c) Examine weather forecasting and describe how meteorologists use atmospheric features and technology to predict weather
National Science Education Standards of Content 5-8:
A: Inquiry: Understandings about scientific inquiry; Students will observe the PowerPoint as well as conduct an experiment.
D: Earth and Space Science: Structure of the Earth's System; Students will distinguish between different types of clouds and create their own clouds.

Materials Needed (supplies, hand-outs, resources):
Cloud PowerPoint (INSPIRE_McBryde_10.15.10_PP); Cotton balls (2 per student), eye dropper (1 per student); cup of water (1 per student)

Capture Activity Materials: empty water bottle, fizz saver (keeps soft drinks from going flat), small cup of water

Lesson Performance Task/Assessment:
The students will observe a PowerPoint slideshow and write down the type of clouds they observe. The answers to the types of clouds will be reviewed at the end of the slideshow. A type of clouds lesson would have been taught in a preceding class. This lesson is strictly for review, reinforcement, and hands on activities. After the PowerPoint lesson is complete a hands-on activity will ensue where students will create a data table (on the same sheet of paper as where they listed the types of clouds), conduct an experiment, and fill out the data table. The notebook paper students write on will be submitted to the instructor at the end of the class period for a grade.

Lesson Relevance to Performance Task and Students:
The lesson is relevant because the students will perform tasks that will help them identify and remember types of clouds. Students will see pictures of clouds and create their own clouds. This lesson will serve as a tool used by the students to make weather predictions on their own through the knowledge of knowing how much moisture can be carried by certain clouds.

Anticipatory Set/Capture Interest:
The capture activity is the fizz saver and water bottle activity. The instructor will have an empty water bottle and pour in a little water (~1 ounce) then screw the fizz saver cap on. The instructor will then pump the fizz saver and release the valve to release the pressure. As the pressure is released a cloud should form in the top of the bottle. Show the students how a cloud is formed when the pressure in the bottle is released through the fizz saver.

Guided Practice:
The instructor will show the students a PowerPoint (INSPIRE_McBryde_11.01.10_PP) slideshow that will have pictures of 10 different types of clouds. The students will observe the pictures and write down the type of clouds they see. The answers to the types of clouds will be reviewed at the end of the slideshow. After the PowerPoint activity is complete a hands-on cloud making experiment will follow. The students will be instructed to make a data table (2 rows: cumulonimbus, nimbostratus) (2 columns: number of water drops estimated, number of water drops actual). The students (individually or in groups) will be given 2 cotton balls, 1 eyedropper, and 1 cup of water. If materials are running low the teacher can put the students into groups to conserve on resources.

Independent Practice:
Once the materials are passed out to the students the students will then be instructed to create two types of clouds out of the cotton balls. One cotton ball, I mean cloud, is barely pulled apart and remains thick and puffy (cumulonimbus) and one cloud is pulled apart and is thinned (nimbostratus). The students will then use the eyedropper to put water onto the cotton balls while holding them. Students will count how many drops it takes for the cotton ball to be completely saturated. Be sure to tell the students to move the dropper around on the cotton ball to saturate the ball evenly. Students will record observations. The students will observe and answer individually on their own paper the type of clouds they observe in the PowerPoint presentation. The students will create a data table (with the instructors help if needed) on the same sheet of paper the PowerPoint answers are written. The students will perform the lab tasks with the cotton balls. The students will fill in the data table with their results.

Remediation and/or Enrichment:
Remediation – Individual IEP

Enrichment- Students could graph data and make inferences in regards to why certain clouds can hold more water.

Check(s) for Understanding:
Observe students during lab and ask questions.

Closure:
Ask students questions.
Question 1: What type of clouds hold the most moisture?

Question 2: How many drops did it take to saturate the cumulonimbus cotton ball? Nimbostratus?

Possible Alternate Subject Integrations:
Math, Physics

Teacher Notes
This lab serves as a capture, review session, and hands-on activity that follows a lecture based class sessions in which the students learned the vocabulary for the types of clouds.

Put the students into groups after the cloud PowerPoint to conserve resources (i.e. cottons balls, cups, water) if necessary.