Bubble-ology Demonstration

Lesson Source(s)	Great Explorations in Math and Science(GEMS)- Lawrence Hall of Science *Bubble Festival* and *Bubble-ology*
Grade Level	Suggested grades K-6
Abstract	Bubbles and their behavior have fascinated people of all ages. Bubble behavior has attracted and compelled observations by chemists, physicists, mathematicians, and engineers. The search for deeper understandings about bubbles has yielded intriguing connections in many technical fields. During the Bubble-ology demonstration, students will use bubbles to make observations, collect and record data, analyze and form conclusions based on their investigations. The W.O.W! Wizard will provide everything needed to complete the investigation. Introduced to surface tension and molecule bonding the students will witness first-hand the fascinating world of bubbles.
Objectives	▪ Students will understand that is takes air to make bubbles. ▪ Students will understand that water has a special force or "stick-togetherness" called surface tension and that it can be broken by soap. ▪ Students will understand that light bends as it passes through bubble film to produce colors. ▪ Students will enhance their science process skills of observing, communicating, comparing, and measuring.
Pre-Visit	_____ Complete the *W.O.W! Photo Release* Form _____ Secure outdoor space _____ Provide four tables for materials _____ Students will need a pencil and hard-surface/slate board
Photo/Video	**Photo(s):**
Post-Visit	_____ Complete the brief post-visit survey http://www.surveymonkey.com/s/WOWDemoSurvey _____ Due to the nature of this demonstration, students are encouraged to wash hands of bubble juice residue
Best Teaching Practices	▪ Learning Cycle ▪ Hands-on/Minds-on Learning ▪ Inquiry Approaches ▪ Real-life Applications ▪ Theory-Based
Standard Alignment	As a of the demonstration, students should develop an understanding of

	▪ Science and Technology ▪ Physical Science ▪ Scientific Inquiry ▪ Scientific Ways of Knowing
Content Knowledge	Water, like all substances, is made of molecules (H2O) that are too small to see. These water molecules are attracted to each other. The effect of this attraction is called surface tension. Surface tension makes the water act as if it has an elastic skin. When soap is added to water, the molecules of the soap spread over the water and break the surface tension. A bubble is made of a sandwich-like covering made up of water and detergent that encloses some air. Light shining through a bubble makes beautiful colors. As walls of the bubble become thinner, the light is reflected back, either from inside the soapy film or from the outside. When this happens, the colors of the spectrum appear. The colors will change by disappearing and reappearing as the bubble stretches to become thinner and thicker.
Safety	Remind students before demonstration that the activity requires soap, avoid touching or rubbing eyes during the activity. Students are asked to use caution when blowing bubbles. Avoid blowing in classmate's face and eyes. Surfaces to contact with bubble juice will become slippery. At the conclusion of the activity, students should thoroughly rinse and dry their hands.
Applications	Tools – types of levels and sextants, used for surveying and navigation. Engineering, aerodynamic, and architectural career fields Light bulbs, bubble wrap, aquariums, and carbonated drinks…
Assessment	Completion of the *Data Collection Sheet* Observe student participation in the activity Observe student participation in discussion
Other Considerations	**Extend the lesson:** ▪ Challenge students to design the "ultimate" bubble blower. Explore questions – What makes a bubble blower work well? Have supplies available for use. During the design process, give the students the opportunity to go outside and test their blowers. Assess the designs – What was the easiest thing about designing your bubble blower? Or the hardest? Would you do anything different? What other plans do you have? Does the size or shape of the bubble blower change the bubble? How? ▪ Explore different bubble solutions. Challenge the students to design an experiment to compare the strength of solution vs. size of bubble. Which soap brand had the biggest average bubble diameter? Students will make predictions, measurements, and of course graph the results. *W.O.W! On Wheels* is happy to loan bubble wands, trays and solutions to classrooms – based on availability.
Skillsheet(s)	Bubble Wizard will provide *Data Collection Sheet*