PSI:
PHYSICAL SCIENCE INVESTIGATION

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GREAT LAKES Science Center

Teacher's Lesson Description

Title	**Blown Away**
Brief Description of Videos	Dante asks students to think about air. We often take air for granted because it is all around us. Air does have interesting properties and that's part of what this investigation is about.
Time Needed	2-3 class periods
Ohio Science Benchmarks Addressed	Grades 6-8 Science and Technology Benchmark A Grades 6-8 Scientific Inquiry Benchmark A Grades 6-8 Scientific Ways of Knowing Benchmark A
Ohio Grade Level Indicators Addressed	Grade 6 Science and Technology Indicator 5 Grade 7 Science and Technology Indicator 1 Grade 8 Science and Technology Indicator 4 Grade 7 Scientific Inquiry Indicators 1, 3 Grade 2 Scientific Ways of Knowing Indicator 3
Concepts Developed	Air is all around us. We call the air surrounding Earth the atmosphere. We can't see air but it takes up space, exerts pressure and pushes on everything around it. Students have misconceptions about air, generally assuming that it is light weight and calm.
Lesson Rationale	This demonstration is designed to build student content knowledge about properties of air. Several 6^{th}-8^{th} grade benchmarks and indicators involve air. The lesson is designed to focus on scientific process skills. The lesson allows students to learn through inquiry by designing and

	constructing their own device to move air.
Background Knowledge for Teachers	Review the teacher segment for *Blown Away* at the PSI web site. In the segment, Dante explains how the student segments can be used and models effective techniques that promote inquiry in the classroom.
Classroom Procedures	1. After viewing the student segments and conducting classroom discussions, tell the students that they will be building an air moving device. There are several ways to construct an air moving device but look at the following web sites for some ideas. Dragonfly TV Air Cannon http://pbskids.org/dragonflytv/superdoit/air_cannon.html Dragonfly TV Amazing Air http://pbskids.org/dragonflytv/superdoit/amazing_air.html 2. Have a variety of containers (plastic coffee cans, buckets, oatmeal containers, salt cartons, boxes). Anything that you can use to create an opening at 2 ends will be fine. Have several types of materials to stretch over the opening of the container (balloons, shower curtain pieces, trash bags, etc. Thin latex rubber sheets can also be purchased from science supply stores.) Duct tape is a real plus for making "air movers." 3. Divide students into pairs and explain that they will experiment to build an air moving device that can knock over a stack of Styrofoam cups from the furthest distance. Show students the Dragonfly TV web sites to provide ideas of how to construct an air moving device. 4. Tell the students that their device should be designed to knock over Styrofoam cups from the greatest distance. 5. Allow students to construct and test their air moving devices. Students should test different containers (if possible) and flexible materials to determine which device will knock over the cups from the furthest distance. Students should record experiences and data in their science notebooks.

	6. Prepare for the distance competition. Mark the room in meters and have each team compete for the greatest distance to knock over at least 1 Styrofoam cup. Allow 3 attempts from each distance. Before each team competes, have them share their experimental findings and final design. 7. Show a super air mover video at http://www.youtube.com/watch?v=ayaiArVkpA4. Tell the students that it is now their turn to move some air. Begin the competition. 8. At the conclusion of the competition, have students respond to the following questions in their science notebooks. *Did you test each air moving device more than once? Why or why not? *What material would you like to use that was not provided for you? Explain. *What are some real-world devices that use or create moving air? *What human qualities and abilities that you used in this lesson would be beneficial in everyday life? Explain. Extensions to the air moving contest can be made using criteria such as accuracy & precision (example: shooting only the top cup off of a stack), moving more air, moving less air, etc.
Materials Needed Per Pair	A variety of tubular or tapered containers, flexible materials, rubber bands, duct tape, 7 Styrofoam cups per pair, scissors, meter sticks
Science Connections	The concept that air is all around, has mass, and exerts pressure is connected to several Earth and Space indicators in grade 7. Several 6-8 grade science indicators are covered in the Edheads Weather activity found at http://www.edheads.org/activities/weather/.
Additional Web Resources	Air Now—Teacher Air Quality Resources http://www.airnow.gov/index.cfm?action=static.resource USA Today High and Low Air Pressure Graphic http://www.usatoday.com/weather/tg/whighlow/whighlow.htm

	Air Now—Air Quality Movie Links http://airnow.gov/index.cfm?action=movie.main

Ohio Science Standards Abbreviations:

ES – Earth/Space Science
LS – Life Sciences
PS – Physical Sciences
SI – Scientific Inquiry
ST – Science and Technology
SW – Scientific Ways of Knowing