



Air & Dust

Goals

Students will gain a greater awareness of the characteristics of air, airborne dust and air quality.

Description

Through the reading of two books, *I Face the Wind* by Vicki Cobb and *Stars Beneath Your Bed, The Surprising Story of Dust* by April Pulley Sayre, and a demonstration of planting seeds in soil, students gain a better understanding about the characteristics of air, airborne dust, and the importance of keeping airborne dust (particulates) down. *I Face the Wind* is an interactive book where students listen to the story and help with demonstrations to learn that air has force through wind and the speed of air molecules, and that air has weight and takes up space. With *Stars Beneath Your Bed*, students listen to the book and learn what dust is, that dust scatters light and 'paints' the sky at sunrise and sunset, what makes dust, and that dust is around for a very long time. During the seed /soil demonstration, children see the difference between a dry, dusty soil and moist soil. Discussion highlights human causes of airborne dust, and methods, such as, establishing plants and using water can be effective ways to keep airborne dust down.

Objectives

Students will:

- be interactive learners.
- better understand what air quality means.
- be able to identify ways to improve air quality.
- have fun.

Materials

- *I Face the Wind* by Vicki Cobb
- *Stars Beneath Your Bed, The Surprising Story of Dust* by April Pulley Sayre
- Family homework page (1 per student)
- *The Clean Air Crew Activity Guide* (1 per student)
- Props: Plastic grocery bag or zip-close bag
- Hanger
- Pencil
- Tape
- Two identical balloons
- Small ball
- Book
- Dry soil
- Potting soil
- Small plant pot and saucer
- Small shovel
- Seeds
- Spray bottle

Use pre-assessment to measure prior knowledge for a base line to compare to post-assessment.

Activity Plan Introduction

Read the book *I Face the Wind*

Mesh reading with discussion and brainstorm on how wind affects things.

❖ Grade Level

K through 3rd

❖ Subject Areas

Environmental Science
(Air Quality)

❖ Duration

25 minutes prep
45 – 60 minutes Activity

❖ Setting

Classroom

❖ Skills

Listening, reading,
discussing, brainstorming,
assuming, drawing,

❖ Vocabulary

Air, air quality, airborne, dust,
index, inversion layer,
molecules, particles,
pollution, soil, weigh, wind



Meet Cory. He's got a thing for healthy air. In other words, he's happiest when he's floating around in a clean, blue sky. From up there, he can see a lot. And what he likes to see most is people making more clean air. Riding their bikes, using brooms and rakes instead of blowers, getting on buses and trains, and controlling dust on construction sites. So the next time you're outside enjoying the fresh air, look up. You just might see Cory looking down at you. And if he's smiling, it's because you're keeping the air clean.

Facilitate Group Activity

With the help of students, perform these exercises from the book:

1. Wind strengths
 - a. Trap air in a bag and feel it push back as the bag of air is squeezed.
 - b. "Weigh" identical empty balloons on a hanger, fill one balloon with air and "weigh" them again.
 - c. Use a small ball to roll it slowly and quickly against a student to feel the difference in strength of the bump.
 - d. Wave a book slowly and quickly in the air to make different strengths of wind.

Read *Stars Beneath Your Bed*

Read the story and discuss where students see dust and where they think it comes from.

1. Picture clean air
 - a. Have the students draw a picture of how air pollution could be reduced in the future to improve our air quality. Ideas could be: people riding solar powered trains, beautiful bike paths, and healthy children playing outside.
 - b. Have children display art work and explain how they envision a world without air pollution.
2. AQI – What is it?
 - a. Have the children color and complete the Air Quality Index (AQI) sheet.
 - b. Explain how the AQI is used to assess air quality and how an inversion layer, which is created in areas surrounded by mountains such as Maricopa County, can make air quality worse.

Seed Planting Demonstration – a way for us to help nature keep the air cleaner!

- Discuss different types of dirt (particle sizes) and again where you might find dirt. Shovel a small amount of dry, dusty soil into plant pot. Have the students notice dust floating above the pot.
- Mix in potting soil noting that this soil does not create dust like the dry soil, and it helps to keep dust down.
- Plant a few flower or vegetable seeds in the topsoil, mentioning that sometimes people will plant vegetation to help stabilize the soil and watering the plants can help keep dust down.
- Use a spray bottle to water the seeds. State that water and heat are needed for the seeds to grow into plants. Water can also be used by people, like construction workers, to keep dust down on their construction sites.
- Discuss where airborne dust comes from in our community and possible health effects of breathing airborne dust (asthma, Valley Fever, etc.).

Facilitate group discussion

During presentation, get students to ask questions about air quality issues.

Give post-assessment and compare with pre-assessment to measure knowledge gain.

Author

Pima County Department of Environmental Quality (May 2006)

Revised by

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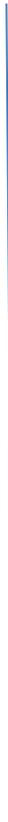


Air & Dust

Pre-assessment

1. What makes our sunsets so beautiful in Maricopa County?
 - a. Car exhaust
 - b. Gases
 - c. Dust
 - d. Water

2. Draw a picture of bad air quality and another picture of good air quality. Label the causes of bad air quality.



3. What can you do to help make our air quality better?



Air & Dust

Post-assessment

1. What makes our sunsets so beautiful in Maricopa County?
 - a. Car exhaust
 - b. Gases
 - c. Dust
 - d. Water

2. Draw a picture of bad air quality and another picture of good air quality. Label the causes of bad air quality.



3. What can you do to help make our air quality better?



❖ **Grade Level**

K through 3rd

❖ **Subject Areas**

Environmental Science
(Air Quality)

❖ **Duration**

45 – 60 minutes

❖ **Setting**

Classroom

❖ **Skills**

Listening, reading,
discussing, brainstorming,
assuming, drawing,

❖ **Vocabulary**

Air, dust, airborne, inversion
layer, molecules, particles,
pollution, quality, soil, weigh,
wind



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Correlations to the Arizona Academic Standards

Kindergarten

Writing, Grade 0, Strand 1, Concept 1

P.O. 1 -- Generate ideas through class discussion.

P.O. 2 -- Draw a picture about ideas generated through class discussion.

Writing, Grade 0, Strand 1, Concept 2

P.O. 1 -- Communicate by drawing, telling, or writing for a purpose.

Writing, Grade 0, Strand 2, Concept 1

P.O. 1 -- Use pictures that convey meaning

P.O. 2 -- Use pictures with imitative text, letters, or recognizable words to convey meaning.

P.O. 3 -- Use labels, captions, or picture descriptors to expand meaning.

Writing, Grade 0, Strand 2, Concept 4

P.O. 1 -- Select labels, captions, or descriptors to enhance pictures.

P.O. 2 -- Use words, labels, or short phrases that clearly go with picture text.

Reading, Grade 0, Strand 2, Concept 1

P.O. 1 -- Participate (e.g., react, speculate, join in, read along) when predictably patterned selections of fiction and poetry are read aloud

P.O. 2 -- Identify elements of a story, including characters, setting, and key events

P.O. 3 -- Retell or re-enact a story, placing the events in the correct sequence

P.O. 4 -- Determine whether a literary selection, that is heard, is realistic or fantasy

Reading, Grade 0, Strand 3, Concept 1

P.O. 1 -- Identify the purpose for reading expository text

P.O. 2 -- Restate facts from listening to expository text

P.O. 3 -- Respond appropriately to questions based on facts in expository text, heard or read

Science, Grade 0, Strand 1, Concept 1

P.O. 1 -- Observe common objects using multiple senses.

P.O. 2 -- Ask questions based on experiences with objects, organisms, and events in the environment.

P.O. 3 -- Predict results of an investigation based on life, physical, and earth and space sciences (e.g., the five senses, changes in weather).

Science, Grade 0, Strand 2, Concept 1

P.O. 1 -- Give examples of how diverse people (e.g., children, parents, weather reporters, cooks, healthcare workers, gardeners) use science in daily life.

Science, Grade 0, Strand 4, Concept 1

P.O. 1 -- Distinguish between living things and nonliving things.

P.O. 2 -- Name the following human body parts: head, legs, shoulders, hips, arms, knees, elbows, ankles, wrists, feet, hands, heels, fingers, toes (see 1CH-R3-01)

P.O. 3 -- Identify the five senses and their related body parts: sight-eyes, hearing-ears, smell-nose, taste-tongue, touch-skin.

Science, Grade 0, Strand 4, Concept 3

P.O. 1 -- Identify some plants and animals that exist in the local environment.

P.O. 2 -- Identify that plants and animals need the following to grow and survive: food, water, air, space.

P.O. 3 -- Describe changes observed in a small system (e.g., ant farm, plant terrarium, aquarium).

Science, Grade 0, Strand 5, Concept 1

P.O. 1 -- Identify the following observable properties of objects using the senses, shape, texture, size, color.

P.O. 2 -- Compare objects by the following observable properties: size, color, type of material.

Science, Grade 0, Strand 5, Concept 2

P.O. 1 -- Describe spatial relationships (i.e., above, below, next to, left, right, middle, center) of objects.

1st Grade

Writing, Grade 1, Strand 1, Concept 1

P.O. 1 -- Generate ideas through prewriting activities (e.g., brainstorming, webbing, drawing, writer's notebook, group discussion).

P.O. 2 -- Draw a picture or storyboard about ideas generated.

Writing, Grade 1, Strand 2, Concept 1

P.O. 1 -- Write stand-alone text that expresses a clear message.

P.O. 2 -- Incorporate details in pictures and text.

Writing, Grade 1, Strand 2, Concept 4

P.O. 1 -- Select words that convey a clear, general meaning.

P.O. 2 -- Use a variety of words, even if not spelled correctly, to convey the intended message.

P.O. 3 -- Use expressive or descriptive phrases and short sentences, beyond one- or two-word labels.

Writing, Grade 1, Strand 2, Concept 5

P.O. 1 -- Write simple sentences.

Writing, Grade 1, Strand 3, Concept 2

P.O. 1 -- Create expository texts (e.g., labels, lists, observations, journals) through drawing and/or writing.

Reading, Grade 1, Strand 1, Concept 1

P.O. 4 -- Identify the title, author, and table of contents of a book.

Reading, Grade 1, Strand 2, Concept 1

P.O. 1 -- Identify the plot of a literary selection, heard or read

P.O. 2 -- Describe characters (e.g., traits, roles, similarities) within a literary selection, heard or read

P.O. 3 -- Sequence a series of events in a literary selection, heard or read

P.O. 4 -- Determine whether a literary selection, heard or read, is realistic or fantasy.

Reading, Grade 1, Strand 3, Concept 1

P.O. 1 -- Identify the topic of expository text, heard or read

P.O. 2 -- Answer questions (e.g., who, what, where, when, why, how) about expository text, heard or read

P.O. 3 -- Identify organizational features (e.g., title, table of contents, heading, bold print) of expository text

Science, Grade 1, Strand 1, Concept 1

P.O. 1 -- Compare common objects using multiple senses.

P.O. 2 -- Ask questions based on experiences with objects, organisms, and events in the environment.

P.O. 3 -- Predict results of an investigation based on life, physical, and earth and space sciences (e.g., animal life cycles, physical properties, earth materials).

Science, Grade 1, Strand 1, Concept 2

P.O. 1 -- Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

P.O. 2 -- Participate in guided investigations in life, physical, and earth and space sciences

P.O. 3 -- Use simple tools such as rulers, thermometers, magnifiers, and balances to collect data (U.S. customary units). (See M01-S4C4-07)

P.O. 4 -- Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper).

Science, Grade 1, Strand 1, Concept 3

P.O. 1 -- Organize (e.g., compare, classify, and sequence) objects, organisms, and events according to various characteristics. (See M01-S4C4-01)

P.O. 2 -- Compare the results of the investigation to predictions made prior to the investigation.

Science, Grade 1, Strand 1, Concept 4

P.O. 1 -- Communicate the results of an investigation using pictures, graphs, models, and/or words.(See M01-S2C1-02)

P.O. 2 -- Communicate with other groups to describe the results of an investigation.

Science, Grade 1, Strand 2, Concept 1

P.O. 1 -- Give examples of how diverse people (e.g., children, parents, weather reporters, cooks, healthcare workers, gardeners) use science in daily life.

Science, Grade 1, Strand 4, Concept 2

P.O. 1 -- Identify stages of human life (e.g., infancy, adolescence, adulthood).

2nd Grade

Writing, Grade 2, Strand 2, Concept 1

P.O. 1 -- Write stand-alone text that expresses a clear message

P.O. 2 -- Incorporate relevant details that give the text interest.

Writing, Grade 2, Strand 2, Concept 4

P.O. 1 -- Select words that convey the intended meaning and create a picture in the reader's mind

P.O. 2 -- Use a variety of words, even if not spelled correctly, to convey the intended message

P.O. 3 -- Use expressive or descriptive phrases and short sentences, beyond one- or two-word labels.

Writing, Grade 2, Strand 3, Concept 2

P.O. 1 -- Write expository texts (e.g., labels, lists, observations, journals)

P.O. 2 -- Participate in creating simple summaries from informational texts, graphs, tables, or maps.

Reading, Grade 2, Strand 2, Concept 1

P.O. 1 -- Describe literary elements of text including characters, plot (specific events, problem and solution), and setting

P.O. 2 -- Describe characters (e.g., traits, roles, similarities) within a literary selection

P.O. 3 -- Sequence a series of events in a literary selection

P.O. 4 -- Identify cause and effect of specific events in a literary selection

P.O. 5 -- Identify words that the author selects in a literary selection to create a graphic visual experience

P.O. 6 -- Identify words that the author selects to create a rich auditory experience (e.g. alliteration, onomatopoeia, assonance, consonance) in a literary selection

P.O. 7 -- Identify differences between fiction and nonfiction.

Reading, Grade 2, Strand 3, Concept 1

P.O. 1 -- Identify the main idea in expository text

P.O. 2 -- Locate facts in response to questions about expository text

P.O. 3 -- Locate specific information by using organizational features (e.g., title, table of contents, headings, captions, bold print, glossary, indices) in expository text. (Connected to Research Strand in Writing)

P.O. 4 -- Identify a variety of sources (e.g., trade books, encyclopedias, magazines, electronic sources, textbooks) that may be used to answer specific questions and/or gather information

P.O. 5 -- Locate specific information from graphic features (e.g., charts, maps, diagrams, illustrations, tables, timelines) of expository text.

Science, Grade 2, Strand 1, Concept 1

P.O. 1 -- Formulate relevant questions about the properties of objects, organisms, and events in the environment. (See M02-S2C1-01)

P.O. 2 -- Predict the results of an investigation (e.g., in animal life cycles, phases of matter, the water cycle).

Science, Grade 2, Strand 2, Concept 2

P.O. 1 -- Identify components of familiar systems (e.g., organs of the digestive system, bicycle).

P.O. 2 -- Identify the following characteristics of a system: consists of multiple parts or subsystems, parts work interdependently.

P.O. 3 -- Identify parts of a system too small to be seen (e.g., plant and animal cells).

Science, Grade 2, Strand 4, Concept 1

P.O. 1 -- Identify animal structures that serve different functions (e.g., sensory, defense, locomotion).

P.O. 2 -- Identify the following major parts of: the digestive system - mouth, esophagus, stomach, small and large intestines, respiratory system - nose, trachea, lungs, diaphragm, circulatory system - heart, arteries, veins, blood.

P.O. 3 -- Describe the basic functions of the following systems: digestive - breakdown and absorption of food, disposal of waste, respiratory -exchange of oxygen and carbon dioxide, circulatory - transportation of nutrients and oxygen throughout the body.

Science, Grade 2, Strand 5, Concept 1

P.O. 1 -- Describe objects in terms of measurable properties (e.g., length, volume, weight, temperature) using scientific tools.(See M02-S4C4-01 and M02-S4C4-02)

P.O. 2 -- Classify materials as solids, liquids, or gases.

P.O. 4 -- Demonstrate that solids have a definite shape and that liquids and gases take the shape of their containers.

3rd Grade

Writing, Grade 3, Strand 1, Concept 2

P.O. 2 -- Organize writing into a logical sequence that is clear to the audience.

Writing, Grade 3, Strand 1, Concept 5

P.O. 1 -- Prepare writing in a format (e.g., oral presentation, manuscript, multimedia) appropriate to audience and purpose

P.O. 2 -- Share the writing with the intended audience

P.O. 4 -- Write legibly

Writing, Grade 3, Strand 2, Concept 1

P.O. 1 -- Express ideas that are clear and directly related to the topic

P.O. 2 -- Provide content and selected details that are well-suited to audience and purpose

P.O. 3 -- Use relevant details to provide adequate support for the ideas.

Writing, Grade 3, Strand 2, Concept 4

P.O. 1 -- Use a variety of specific and accurate words that effectively convey the intended message

P.O. 2 -- Use descriptive words and phrases that energize the writing

Writing, Grade 3, Strand 3, Concept 2

P.O. 1 -- Record information (e.g., observations, notes, lists, charts, map labels and legends) related to the topic

P.O. 2 -- Write an expository paragraph that contains: a. a topic sentence b. supporting details c. relevant information.

Reading, Grade 3, Strand 2, Concept 1

P.O. 3 -- Sequence a series of events in a literary selection

P.O. 4 -- Make relevant connections (e.g., relationships, cause/effect, comparisons) between earlier events and later events in text

P.O. 7 -- Distinguish between/among fiction, nonfiction, poetry, plays, and narratives, using knowledge of their structural elements.

Reading, Grade 3, Strand 3, Concept 1

P.O. 1 -- Identify the main idea and supporting details in expository text

P.O. 2 -- Locate facts in response to questions about expository text

P.O. 3 -- Locate specific information by using organizational features (e.g., title, table of contents, headings, captions, bold print, key words, glossary, indices, italics, key words) in expository text

P.O. 4 -- Use a variety of sources (e.g., trade books, encyclopedias, magazines, atlases, almanacs, electronic source, textbooks) to answer specific questions, and/or gather information

P.O. 5 -- Interpret information from graphic features (e.g., charts, maps, diagrams, illustrations, tables, timelines) of expository text.

Reading, Grade 3, Strand 3, Concept 2

P.O. 1 -- Follow a set of written multi-step directions

P.O. 2 -- Provide multi-step directions

P.O. 3 -- Evaluate written directions for sequence and completeness

P.O. 4 -- Interpret information in functional documents (e.g., maps, schedules, pamphlets) for a specific purpose

Science, Grade 3, Strand 1, Concept 1

P.O. 1 -- Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.(See M03-S2C1-01)

P.O. 2 -- Predict the results of an investigation based on observed patterns, not random guessing.

Science, Grade 3, Strand 1, Concept 2

P.O. 1 -- Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry

P.O. 2 -- Plan a simple investigation (e.g., one plant receives adequate water, one receives too much water, and one receives too little water) based on the formulated questions.

P.O. 3 -- Conduct simple investigations (e.g., related to plant life cycles, changing the pitch of a sound, properties of rocks) in life, physical, and earth and space sciences.

P.O. 5 -- Record data in an organized and appropriate format (e.g., t-chart, table, list, written log).(See W-F4-01)

Science, Grade 3, Strand 1, Concept 3

P.O. 1 -- Organize data using the following methods with appropriate labels: bar graphs, pictographs, tally charts (See M03-S2C1-02).

P.O. 2 -- Construct reasonable interpretations of the collected data based on formulated questions.(See M03-S2C1-03)

P.O. 3 -- Compare the results of the investigation to predictions made prior to the investigation. (See M03-S2C2-05)

P.O. 4 -- Generate questions for possible future investigations based on the conclusions of the investigation.

P.O. 5 -- Record questions for further inquiry based on the conclusions of the investigation.

Science, Grade 3, Strand 1, Concept 4

P.O. 1 -- Communicate investigations and explanations using evidence and appropriate terminology.(See W-F5-01)

P.O. 2 -- Describe an investigation in ways that enable others to repeat it.(See LS-F1)

P.O. 3 -- Communicate with other groups to describe the results of an investigation.

Science, Grade 3, Strand 2, Concept 2

P.O. 1 -- Describe how, in a system (e.g., terrarium, house) with many components, the components usually influence one another.

P.O. 2 -- Explain why a system may not work if a component is defective or missing.

Science, Grade 3, Strand 3, Concept 1

P.O. 1 -- Describe the major factors that could impact a human population (e.g., famine, drought, disease, improved transportation, medical breakthroughs).

P.O. 2 -- Describe the beneficial and harmful impacts of natural events and human activities on the environment (e.g., forest fires, flooding, pesticides).

Science, Grade 3, Strand 4, Concept 1

P.O. 1 -- Describe the function of the following plant structures: roots - absorb nutrients, stems - provide support, leaves - synthesize food, flower- attract pollinators and produce seeds for reproduction.

Science, Grade 3, Strand 4, Concept 3

P.O. 1 -- Identify the living and nonliving components of an ecosystem.

P.O. 2 -- Examine an ecosystem to identify microscopic and macroscopic organisms.

P.O. 4 -- Describe how plants and animals cause change in their environment.

P.O. 5 -- Describe how environmental factors (e.g., soil composition, range of temperature, quantity and quality of light or water) in the ecosystem may affect a member organism's ability to grow, reproduce, and thrive.

Science, Grade 3, Strand 6, Concept 1

P.O. 4 -- Describe fossils as a record of past life forms.

P.O. 5 -- Describe how fossils are formed

P.O. 6 -- Describe ways humans use earth materials (e.g., fuel, building materials, growing food).