

# Understanding the Indoor Environment

## Identifying Indoor Environment Pollution Sources (List, Group, Label Activity)

*The purpose of this activity is to develop understanding for the causes of indoor air pollution.*

<b>TOPIC(S)</b>		COMPOSITION OF AIR	DEFINING THE INDOOR ENVIRONMENT
	EFFECTS OF INDOOR AIR POLLUTION ON OCCUPANTS	SOURCES OF INDOOR AIR POLLUTION	MOVEMENT OF AIR Natural and mechanical airflow (HVAC)
✓	IDENTIFYING INDOOR ENVIRONMENT POLLUTANTS	SOLVING INDOOR ENVIRONMENT PROBLEMS (Preventing and Fixing)	VOCABULARY

### OBJECTIVE(S)

The students will be able to categorize the causes of indoor air pollution.

### SCIENCE/HEALTH STANDARD CORRELATIONS

#### National Science Education Standards, Science Content Standards

##### 6.1 Science as Inquiry

- Levels K-12: Abilities necessary to do scientific inquiry, Understanding about scientific inquiry

##### 6.6 Science in Personal and Social Perspectives

- Levels K-4: Personal Health; Changes in environments
- Levels 5-8: Personal Health; Populations, resources, and environments, Natural hazards
- Levels 9-12: Personal and community health; Environmental quality; Natural and human-induced hazards

#### Mid-continent Research for Education and Learning (McREL), Science Standards

Earth and Space Sciences 1.1, 1.4, 1.5 and Physical Sciences 8.1, 8.3, 8.5

*\*See "Curriculum Connections" section for standards that apply to other content areas.*

### SUGGESTED GRADE BAND

4-5, 6-12 science

### ESTIMATED TIME LENGTH

1 class period

### LESSON PROCEDURES

In this lesson students will explore sources of indoor air pollution using the List/Group/Label strategy.

#### **PHASE 1 - ACTIVATE PRIOR KNOWLEDGE**

Ask students what they know about pollution (most responses may be geared towards outdoor pollution). Ask students how many of them believe that the indoor air can also

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be polluted. Explain to students that indoor levels of pollutants may be two-five times (occasionally more than 100 times) higher than outdoor levels and that we spend 90% of our time indoors. Tell students that they will be participating in an activity that will help them learn about indoor air pollution.

### **PHASE 2 - LISTING**

Tell students they will be brainstorming about indoor air pollution. Write the topic on the board. Ask students to brainstorm about sources of indoor air pollution. Have them discuss the question with a partner or a small group. This will help them feel comfortable to verbalize their answers during the large group brainstorm. When the whole class gives you ideas record the responses on sentence strips with masking tape on one side. Post the ideas under the header on the board. At this point accept all answers. Guide their thinking as necessary by building your own background about the subject using the chart from the [Reference Guide](#) (section 2, page 4) (see Materials section) from the [EPA's IAQ Tools for Schools Action Kit](#). Try to get around 25 ideas for pollution sources from the students.

### **PHASE 3 – GROUPING/LABELING**

Have the students look on the board at the ideas they have brainstormed. Ask them to look for patterns or categories of ideas that seem to go together. Give them a few minutes to look over the ideas themselves. Then have them discuss the possible patterns or categories with a partner or small group for about five minutes. Next, ask the students to tell you the connections that they see. Move the ideas (sentence strips) around by *grouping* them together to represent what the students are telling you. At this point try to direct the students towards the four categories for typical sources of indoor air pollution (outside sources, building equipment, components/furnishings, and other indoor sources) without telling them the categories. After the sentence strips have been grouped together, ask the students to come up with *labels* for the groups that they have created. They may have more groups than the four categories represented on the chart found in the [EPA's IAQ Tools for Schools Action Kit Reference Guide](#). You can guide their thinking for the labels so that they have the correct understanding of the categories for typical sources.

### **PHASE 4 – WRAP-UP**

Have the students copy the List/Group/Label final product from the board into their own notes. Give each student a copy of the chart from [Reference Guide](#). Have them compare the two independently. Have them write a summary paragraph outlining the similarities and differences between the chart they developed on the board and the one that was created by the EPA.

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### MATERIALS

chart from the [Reference Guide](#) (section 2, page 4) from the [EPA's IAQ Tools for Schools Action Kit](#) (one per student), sentence strips, masking tape, white board, dry erase markers

*\*To order EPA's Indoor Air Quality Tools for Schools (IAQ TfS) Action Kit or any of the supplemental materials found in the Kit, contact IAQ INFO at 800-438-4318 or visit <http://www.epa.gov/iaq/schools/actionkit.html>.*

### GROUPING

whole class, small group, pairs, independent

### ASSESSMENT

Teacher can observe for active participation during the activity. Teacher should observe the student's ability to accurately identify similarities and differences between the ideas and to appropriately make connections about the ideas in order to form the groups. Teacher can evaluate the student's independent writing sample to check for understanding.

### MODIFICATIONS/EXTENSIONS

Make this lesson an independent, partner or center activity. Write each indoor air pollution source on an index card or list the sources on a blank piece of paper (photocopy and cut out). Place the index cards or slips of paper into envelopes. On colored paper or sentence strips write the four headings (outside sources, building equipment, components/furnishings, and other indoor sources). Have the students place the four headings on their desks and sort the words into the appropriate categories. Provide an answer key for them to check their work.

### CURRICULUM CONNECTIONS

Reading and Language Arts, [International Reading Association and National Council of Teachers of English Standards, Standards for the English Language Arts](#)

- 4: Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
- 5: Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes
- 6: Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and nonprint texts
- 7: Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience

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- 8: Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge
- 12: Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information)

**Social Studies, Center for Civic Education, National Standards for Civics and Government**

- Content Standard K-12, V: What are the Roles of the Citizen in American Democracy? /What are important responsibilities of Americans?

**Health, American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD), National Health Education Standards**

- Health Education Standard 1, Grades PK-12: Students will comprehend concepts related to health promotion and disease prevention

**Math, National Council of Teachers of Mathematics, Math Standards**

- Data Analysis and Probability  
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer

### RESOURCES

- [EPA's IAQ Tools for Schools Action Kit](#), Reference Guide, chart (section 2, page 4)