Project Learning Tree®

GREENSCHOOLS
FOR EARLY CHILDHOOD

Environmental Quality Investigation

PLT GreenSchools

Table of Contents

First Edition

Introduction

Overview
Get ready to engage young learners while investigating the environmental quality at your early childhood center! This Investigation focuses on four areas: 1) the effects of transportation and idling of vehicles on indoor air quality (IAQ), 2) the effects of temperature, humidity, carbon dioxide levels, mold, and mildew on IAQ 3) the effects of cleaning products on IAQ, and 4) the best safety practices to follow regarding the use of hazardous materials.

Early Childhood Learning Objectives
- Explore the different transportation modes that people use to get to the early childhood center.
- Learn which transportation modes are best for the environment and student health.
- Learn about classroom temperature.
- Explore simple ways to improve the quality of the air we breathe.

Word Bank
WB Air quality, pollution, humidity, temperature, thermometer

Related PLT Education Activity
The following PLT activity can be used to supplement this Investigation.

PreK-8 Environmental Education Activity Guide
Activity 36 – Pollution Search – Part B: Cat with an Attitude. Through a reading of The Cat in the Hat, young students learn about pollution and discuss what they can do to make their world a cleaner, safer, and healthier place.

Background for Educators

Most people know that outdoor air pollution can damage their health, but many do not know that indoor air pollution can also have harmful effects. It may surprise you that many buildings harbor pollutants that can affect the health of children and others in the building. For example, some indoor air pollutants, such as carbon monoxide, molds, or excessive fumes from cleaning products, can trigger asthma or chronic headaches.

According to the Centers for Disease Control and Prevention, asthma is one of the leading causes of school absenteeism. Many studies have shown that absenteeism and illness affect a child's overall ability to perform. In addition, children are more vulnerable to indoor air pollution than adults are because of their smaller body size and developing lung capacity.

Why Study Environmental Quality at Early Childhood Centers?

Even at an early age, children can appreciate why it's important to have clean indoor air. In addition, children can be a powerful influence on their families. They can bring the ideas they learn at school to their homes and help their families improve air quality as well.

Types of Indoor Air Pollutants

Indoor air pollutants come from a variety of sources. They can originate in the building or be drawn inside through air intake vents, doors, and windows. Fortunately, most indoor air pollution issues can be resolved with simple, inexpensive measures. The following chart lists some common indoor air pollutants, their sources, and their possible health effects:

COMMON INDOOR AIR POLLUTANTS		
POLLUTANT	**POSSIBLE SOURCES**	**POSSIBLE HEALTH EFFECTS**
Carbon monoxide	Engines, heating equipment, cooktops, ovens, tobacco smoke	Headaches, drowsiness, dizziness, nausea (high levels can cause death)
Volatile organic compounds (VOCs)	Gases emitted from certain paints, adhesives, cleaning supplies, pesticides, and certain types of new carpets, furnishings, ceiling tiles	Eye, nose, and throat irritation; headaches; confusion; loss of coordination; cancer
Biological contaminants such as molds, mildews, mites, bacteria, and viruses	Dust, wet moist surfaces, humid air, infected humans or animals	Asthma; allergies; headaches; colds and flu; eye, nose, and throat irritation
Radon gas	Earth and rock under buildings, some earth-derived building materials	No immediate symptoms, but can cause lung cancer

Volatile Organic Compounds (VOCs)

VOCs are chemicals that evaporate at room temperature. VOCs are emitted by a wide array of products used in buildings, including cleaning supplies, paints, lacquers, varnishes, air fresheners, pesticides, building materials, and furnishings. VOCs are released from products into the air both during use and during storage. VOCs can cause eye, nose, and throat irritation; headaches; nausea; respiratory issues; and additional health problems with high levels of exposure.

When purchasing products such as paints and cleaners for use in schools, check labels for no VOCs or low VOCs. Several green label certifications are now available to help consumers purchase such products.

Radon Gas

Radon is a cancer-causing, radioactive gas that is found throughout most of the United States. It is both colorless and odorless. When you breathe in air containing radon, you can get lung cancer. Radon comes from the natural breakdown of (radioactive) uranium in soil, rock, and water and gets into the air you breathe. It can get into any type of building, typically seeping into holes and cracks in a building's foundation, and result in a high indoor radon level. Testing is the only way to know whether radon is present in a building. The EPA recommends testing all homes and schools below the third floor for radon. Testing is simple and inexpensive. If radon is found in a building, radon reduction measures can be taken.

SAFETY ALERT: Keep all hazardous chemicals in locked cabinets away from children.

Room Temperature, Relative Humidity, and Carbon Dioxide (CO_2) Levels

How comfortable a room feels to those in it is a function of the room's air temperature, relative humidity, and CO_2 level. CO_2 is released every time we exhale. It is also released by the combustion of fuels. To keep the level of CO_2 in a building within an acceptable range, outside air must be mixed with air that is recirculated through the heating, ventilation, and air conditioning (HVAC) system.

CO_2 levels are used as an indicator of proper ventilation. High levels of CO_2 in a room may indicate blocked or clogged fresh air return vents and filters. Proper maintenance of a building's HVAC system is critical to maintaining good indoor air quality. A person's comfort, alertness, and ability to think are affected by room temperature, relative humidity, and CO_2 levels. People in a room with high levels of CO_2 often report feeling drowsy and lethargic.

To help children be safe and healthy at school, it is critical to ensure that they have clean indoor air and to prevent their exposure to hazardous chemicals.

Plants as Air Fresheners

Long-term exposure to some chemicals in room air fresheners may be harmful to health, and young children may be particularly vulnerable. (http://www.nrdc.org/media/2007/070919.asp) An easy way to freshen the air in rooms without using air fresheners is to increase ventilation by opening windows when the weather permits or by increasing the amount of fresh air circulating through the heating and cooling system.

Another natural way to purify the air in rooms is to add plants. The leaves of plants not only take up CO_2 and give off oxygen, they can also capture toxic gases from cleaning supplies, furnishings, and building materials. NASA researchers found that one potted plant per 100 square feet of space was needed to create a healthier environment.

Some plants are more effective at cleaning the air than others. A few plants that have been shown to purify the air include the following:

1. Boston fern
2. Lady palm
3. Bamboo palm
4. Rubber plant
5. Areca palm
6. Gerbera daisy

In early childhood centers, it is important to select plants that are not toxic. For example, English ivy is good at purifying the air, but it is toxic when ingested, so it was not included on the list above.

To learn more about improving the environmental quality at your center and to see how other GreenSchools across the country are taking action, watch PLT's short videos **Investigating Environmental Quality** and **GreenSchools in Action: Environmental Quality**. These videos are available on PLT's YouTube channel: https://www.youtube.com/user/ProjectLearningTree.

The Boston fern helps to remove indoor air pollutants such as formaldehyde.

Environmental Quality Investigation Terminology

The following definitions may be useful to adult leaders as they conduct the Investigation. The terms preceded by the Word Bank logo WB are terms that you may want to introduce to young learners.

WB **Air quality**
A gauge of the concentration of one or more chemicals in the atmosphere that could be harmful to humans, other animals, vegetation, or materials.

Carbon monoxide (CO)
A colorless, odorless, poisonous gas that is formed when carbon is not completely burned (for example, in a car engine, lawn mower, or portable generator).

Combustion
The process of burning; a chemical process that produces heat and usually light.

HVAC
Abbreviation for Heating, Ventilation, and Air Conditioning.

WB **Humidity**
The amount of moisture (water vapor) in the air.

Idling
Allowing a vehicle engine to continue running when the vehicle is not moving.

Pollutant
A substance that pollutes something; a substance that makes air, water, or soil impure or unsafe.

WB **Pollution**
The contamination of air, water, or soil by substances that are harmful to living organisms.

Radon
An odorless, colorless gas that is produced naturally from the radioactive decay of radium.

Relative Humidity
A ratio, expressed in percent, of the amount of atmospheric moisture present at a specific temperature relative to the amount that would be present if the air were saturated.

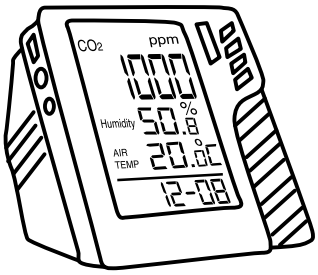
WB **Temperature**
A measure of the hotness or coldness of something.

WB **Thermometer**
An instrument for measuring how hot or cold something is; a tool that measures temperature.

Volatile Organic Compound (VOC)
Chemicals that evaporate at room temperature and that are emitted by a wide array of products, including cleaning supplies, paints, lacquers, varnishes, air fresheners, pesticides, building materials, and furnishings. VOCs are released from products into the air both during use and during storage. VOCs can cause eye, nose, and throat irritation; headaches; nausea; respiratory issues; and additional health problems for people who experience high levels of exposure.

Air Quality Monitoring Equipment
Indoor air quality monitoring equipment may be available from your state agency that is responsible for environmental quality in buildings. You may be able to borrow this equipment, or the agency may send a professional to your school to assist with air quality assessments.

Indoor air quality monitors are also available for purchase online. Some monitors have multiple functions. In this investigation, you will assess air temperature ranges, carbon dioxide levels, and the relative humidity of various rooms throughout the school. For more information, see the **Fact Sheet: Environmental Quality Tools and Instruments**, available by logging into your GreenSchools account at www.greenschools.org.



Getting Ready

Use the following checklist as you complete each part of the Investigation:

- ☐ Review the *PLT GreenSchools for Early Childhood Educator Guide* and obtain any necessary permissions.
- ☐ Gather the following documents and supplies to complete the Environmental Quality Investigation:
  - Standard or infrared thermometer
  - Air Quality Monitoring Equipment:
    - » Large thermometer
    - » Carbon dioxide meter
    - » Relative humidity meter
  - Written plans and policies concerning environmental quality issues for the early childhood center. These may include chemical storage and handling policies, indoor air quality policies, and a list of cleaning supplies and procedures.
- ☐ Introduce the theme to your children.
- ☐ Conduct the Environmental Quality Investigation.
- ☐ Assess your results and take action.

Introduce the Theme

1 Reading Connections

To get young learners interested in learning about environmental quality, read one or more children's books to them on the topics of green transportation, air quality, and temperature.

Transportation

- *OK Go* by Carin Berger. Greenwillow Books, 2009. ISBN-10: 0061576662.
- *Martha Speaks: Martha Go, Go, Goes Green!* by Susan Meddaugh. HMH Books for Young Readers, 2013. ISBN-10: 054797017X.

Air Quality

- *Kids Can Keep Air Clean* by Cecilia Minden. Cherry Lake Publishing, 2010. ISBN-10: 1602798710.
- *Air (Environment Collection for Kids)* by David Palatnik and Israel Felzenszwalb. CreateSpace Independent Publishing Platform, April 2013. ISBN-10: 1483983862.

Temperature

- *Temperature (Blastoff! Readers: First Science)* by Kay Manolis. Scholastic, 2011. ISBN-10: 0531284603.
- *Too Hot? Too Cold?: Keeping Body Temperature Just Right* by Caroline Arnold. Charlesbridge, 2013. 1580892779.

Introduce the Theme

2 Learning through Observation

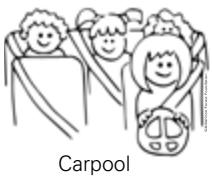
Early learners may have difficulty understanding what air is—after all, you can't see it or taste it. You can help them understand what air is by blowing up a balloon, blowing on a pinwheel or whirligig, or turning on a fan so they can feel how the air moves across their skin or see how it moves an object like a ribbon. You can also use the adaptation in Activity 36: Pollution Search, from the *PLT PreK-8 Environmental Education Activity Guide*, to introduce early learners to this topic.

Once they have an understanding of what air is, ask the children whether any of them has used an inhaler to help breathe. Explain that some people are more sensitive than others to dust, molds, and smoke in the air, and that when the air isn't clean, it can cause people to cough, get headaches, and have trouble breathing. That's why it's important to have clean air. Explain to children that they are going to look for things in the room that may affect how clean the air is in the room.

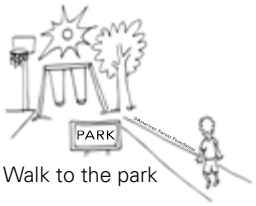
SAFETY ALERT: Keep balloons out of reach of young children as they can be a choking hazard.

3 Bulletin Board: Improve Your Air!

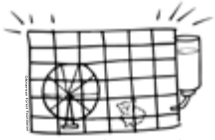
The graphics below can be used to create a bulletin board on how to improve air quality. The graphics can be downloaded and scaled to whatever size you require by logging into your account at www.greenschools.org. Discuss each action with your early learners and talk about why each action helps to improve the air they breathe. You can also have children use the pictures in their **Classroom Action Book**, completed during the **Taking Action** part of the Investigation.



Carpool

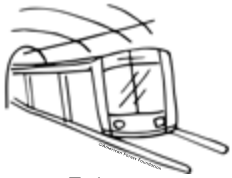


Walk to the park



Keep animal cages clean

Open the window



Train

No idle zone

Walk

Plants clean the air

Walk to school day

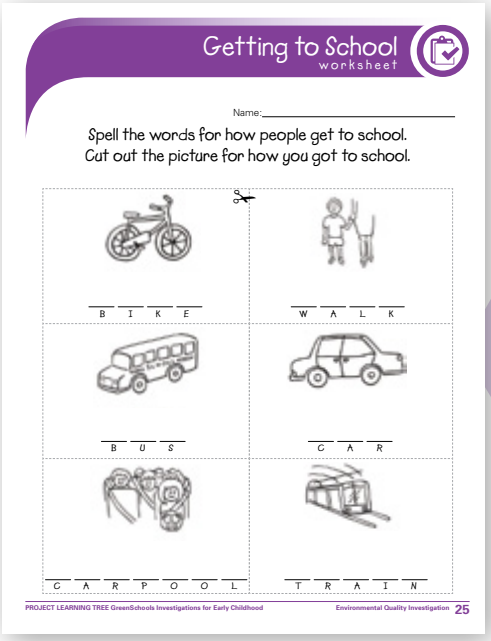
Conduct the Environmental Quality Investigation

Name(s):_____ Date:_____

Directions: Adult leaders should complete this questionnaire, involving their students in the Early Childhood Engagement activities.

Part I Transportation

Vehicles can release emissions into the air that cause air pollution and lead to health problems. The survey that follows will reveal the transportation choices that children and staff members are making. The results will help you determine whether alternative choices exist that would be better for people and the environment.


Getting to School worksheet

Name:_____

Spell the words for how people get to school.
Cut out the picture for how you got to school.

B I K E

W A L K

B U S

C A R

C A R P O O L

T R A I N

PROJECT LEARNING TREE GreenSchools Investigations for Early Childhood Environmental Quality Investigation 25

EARLY CHILDHOOD engagement

Getting to School

Have your early learners complete the "Getting To School" worksheet found on page 25 to show how they typically get to school.

Then create a bulletin board with the pictures of the various transportation options at the top. Have learners cut out the graphic of how they got to school and tape it on the board under the appropriate category. You can download the individual graphics for your bulletin board headers by logging into your account at www.greenschools.org. Your early learners can then count the number of items under each heading. Record your results on the **Individual Room Transportation Chart**.

Discuss why some transportation modes are better for the environment than others.

Conduct the Environmental Quality Investigation

Transportation Survey

Directions: Survey children, teachers, and staff members to find out how they most often get to and from the early childhood center, and record your results on the **Individual Room Transportation Chart**. Have each classroom participating in the survey complete this chart. Tally all of the results on the **Schoolwide Transportation Tally Chart** found on page 10.

Individual Room

INDIVIDUAL ROOM TRANSPORTATION CHART

*Date:*_____ *Room # or Name:* _____

*Teacher/Leader(s):*_____ *Grade or Use:* _____

Method	Number of Children	Number of Staff	Totals
Walking			
Biking			
Taking a Bus			
Car (non-carpool: 1 staff member or 1 child with a driver)			
Carpooling (2 or more children or staff members per car)			
Taking a Train/Subway			
Other			

1. What is the most common way that children get to the early childhood center?_____
2. What is the most common way that staff get to the early childhood center? _____
3. What changes could be made in how people get to the center that would be better for people and the environment?

Conduct the Environmental Quality Investigation

Schoolwide

SCHOOLWIDE TRANSPORTATION TALLY CHART			
If more than one classroom completed the transportation survey, you can tally your results here.			
Method	**Number of Children**	**Number of Staff**	**Totals**
Walking			
Biking			
Taking a Bus			
Car (non-carpool: 1 staff member or 1 child with a driver)			
Carpooling (2 or more children or staff members per car)			
Taking a Train/Subway			
Other			

1. What is the most common way that children get to the early childhood center?_____
2. What is the most common way that staff get to the early childhood center? _____
3. What changes could be made in how people get to the center that would be better for people and the environment?

Conduct the Environmental Quality Investigation

Transportation Questions

1. Do buses idle their engines for longer than 3 minutes while parked outside the school building? (For information on idling, see the **Fact Sheet: Idling Reduction** available by logging into your GreenSchools account at www.greenschools.org). . . . . ☐ Yes ☐ No

2. Are other vehicles (cars and after school activity vehicles) allowed to idle for longer than 3 minutes? . . ☐ Yes ☐ No

3. Does your center participate in any activities or programs that promote safety for children and staff who walk or bike to the center? . . . . . ☐ Yes ☐ No

4. Does your center hold bike- or walk-to-school days? . . . . . ☐ Yes ☐ No

5. Brainstorm and then record a list of ways that your early childhood center could encourage transportation choices that improve air quality, increase safety and accessibility for walking and biking, and reduce traffic and air pollution in the vicinity of the center.

Conduct the Environmental Quality Investigation

Part II Indoor Air Quality (IAQ)

Indoor air quality refers to how clean the air is inside a building. Relative humidity, temperature, and CO_2 levels affect personal comfort, alertness, and ability to think clearly. Unusually high levels of CO_2 may indicate blocked or clogged fresh air return vents and filters. For this part of the Investigation, adults and children will look around the center for things that affect indoor air quality, such as blocked air vents. Children will learn how the temperature of a room affects how comfortable they feel. Adults will also assess humidity and CO_2 levels, as they have important impacts on environmental health and children's abilities to learn.

EARLY CHILDHOOD engagement

Temperature

Engage your early learners in a sensory exploration of hot and cold by feeling items of varying temperature, such as ice, warm water, or the sun warming their hands. Have a discussion about how they feel when they are too warm or too cold and how they adjust when the temperature changes.

Go on a guided discovery of your classroom or center to see whether certain areas (near doors or windows) are colder or warmer than the rest of the room or building. Discuss how this might change in different seasons.

Obtain a large thermometer on which your early learners can easily see the temperature. Take the temperature of your classroom in the morning and the afternoon. Discuss whether the temperature is too hot, too cold, or just right and why this is important.

Have your early learners complete the "My Classroom Temperature" worksheet found on page 26. You can have children create a workbook for the week showing how the temperature changed in their classroom. You could also laminate the picture depicting the temperature reading for your classroom and create a bulletin board display to show how the temperature changed during the week.

Conduct the Environmental Quality Investigation

Directions: Make a copy of the **Individual Room IAQ Measurements Chart** for each room that will be assessed. Try to include as many rooms as possible. Record the results for each room on its own chart. If possible, take the measurements at two different times of the day. Record the time of each reading.

Individual Room

INDIVIDUAL ROOM IAQ MEASUREMENTS CHART

*Date:*_____ *Room # or Name:* _____

*Teacher/Leader(s):*_____ *Grade or Use:* _____

Reading/Time	Temperature* (°F/C)	Relative Humidity (%)*	CO_2 Level (ppm)*
Reading 1 (morning) Time: _____			
Reading 2 (afternoon) Time: _____			

*** Acceptable Ranges:**

Temperature

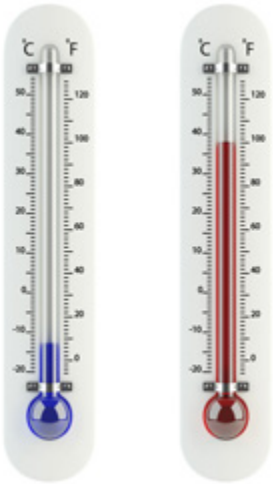
Summer: 74–79°F (23–26°C) if building is occupied; can be raised to 80°F (27°C), if unoccupied.
Winter: 68–75°F (20–24°C) if building is occupied; can be lowered to 66°F (19°C) if unoccupied.

Relative Humidity

Relative humidity should be in the range of 30–60 percent. Humidity levels above 60 percent can encourage the growth of molds and mildew and are thus a health concern.

Carbon Dioxide (CO_2)

Indoor CO_2 levels should not exceed 1,000 parts per million (ppm).



Individual Room Analysis

1. Is the room temperature within acceptable ranges for an occupied building?
   ☐ Yes ☐ No

2. Is the relative humidity in the room within the acceptable range of 30-60 percent?
   ☐ Yes ☐ No

3. Is the CO_2 level below 1,000ppm?
   ☐ Yes ☐ No

Conduct the Environmental Quality Investigation

Individual Room IAQ Observations

Directions: Using the chart below, look for items in the room that affect indoor air quality. Record answers and observations on the chart. Questions that are easier for early learners are grouped at the beginning of the chart.

EARLY CHILDHOOD engagement

Go on a guided discovery tour of the classroom and have children help answer some of the questions on the **Individual Room IAQ Observations Chart**.

Individual Room

INDIVIDUAL ROOM IAQ OBSERVATIONS CHART

*Date:*_____ *Room # or Name:* _____

*Teacher/Leader(s):*_____ *Grade or Use:* _____

Questions	Yes	No	Comments and Observations
TO COMPLETE WITH CHILDREN:			
Are air supply vents covered by papers or other items or blocked by furniture? (Covered air vents restrict the flow of air, which causes the heating and cooling system to work harder and use more energy. Covered vents also affect the comfort of the room because air flow and temperature regulation are impacted.)			
If there are live animals in the room, are the cages regularly cleaned? (Dirty cages emit increased allergens into the air.)			
Are there live plants in the room? (Many plants improve indoor air quality.)			
TO BE COMPLETED BY ADULTS:			
Are air supply vents dusty? (Dusty vents increase allergens in the air.)			
Are there any signs of ongoing water damage in the room? (Look for water stains on the ceiling, walls, and floor.)			

continued on page 15

Conduct the Environmental Quality Investigation

Individual Room

INDIVIDUAL ROOM IAQ OBSERVATIONS CHART (cont.)			
Questions	**Yes**	**No**	**Comments and Observations**
Are there signs of mold/mildew in the room? (Look for black, gray, brown, or white spots on the ceiling, walls, and floors; mold/mildew often has a moldy smell.)			
Are there air fresheners of any type in the room? (Air fresheners may contain harmful chemicals and cause respiratory issues.)			
Is food, including food for pets, stored in airtight containers? (Food that is not in sealed containers may attract pests and cause respiratory issues.)			
Are items that are infrequently used stored in cabinets or containers? (Storing such items prevents clutter that could accumulate dust.)			
Is there an odor from cleaning products? (Odors from cleaning products can trigger respiratory problems, nausea, headaches, and eye, nose, and throat irritation.)			
If paint has recently been applied, is there an odor? (Odors from paint can trigger respiratory problems, nausea, headaches, and eye, nose, and throat irritation.)			
Are there new furnishings in the room that are causing an odor? (New carpet, ceiling tiles, furniture, and computers can release volatile organic compounds that cause respiratory problems, nausea, headaches, and eye. nose, and throat irritation; see Part III Cleaning and VOCs.)			

Conduct the Environmental Quality Investigation

General Questions on Indoor Air Quality

1. Does your early childhood center have an indoor air quality plan? . . . . . ☐ Yes ☐ No

2. Have spaces that are regularly occupied (45 minutes/day or more) at or below ground level been tested for radon? . . . . . ☐ Yes ☐ No
   If yes, was any remediation needed to bring the level of radon into an acceptable range? . . . . . ☐ Yes ☐ No

3. Are furnace and ventilation filters cleaned or replaced on a routine maintenance schedule? . . . . . ☐ Yes ☐ No

Locate and examine the outside air intake vents. Then answer the following questions:

4. Are ventilation units on? . . . . . ☐ Yes ☐ No
   If yes, is air flowing into the outdoor intake? . . . . . ☐ Yes ☐ No

5. Are outdoor air intakes free from blockage or obstruction? . . . . . ☐ Yes ☐ No

6. Are bird or animal droppings near air intakes? . . . . . ☐ Yes ☐ No

7. Are sources of vehicle exhaust accumulation (parking lots, loading docks, bus loading, and so on) located near air intakes? . . . . . ☐ Yes ☐ No

8. Are garbage dumpsters located near air intakes or windows and doors that are frequently open? . . . ☐ Yes ☐ No

9. Brainstorm and then record ideas for ways that your early childhood center could improve indoor air quality.

Conduct the Environmental Quality Investigation

Part III Cleaning and VOCs

Assess the cleaning practices and the presence of VOCs in the building.

Schoolwide

CLEANING CHART

Directions: Adult leaders can work with the custodial or maintenance supervisor to help complete this chart. For each type of cleaning performed, note how frequently it occurs (for example, two or more times a day, daily, weekly, monthly, or once a year, and so forth). A sample is provided.

Type of room	Floors (Indicate "C" if carpeted; "H" if hard surface)	High-contact hard surfaces (desks, chairs, tables, etc.)	Ceilings, walls, air vents	List cleaning products used and note if they are "green"	Comments
Sample: Classrooms	H - cleaned daily	Cleaned once a week	Cleaned twice a year	Floor wax, window cleaner (green), disinfecting cleaner	Window cleaner is nontoxic and has no VOCs.
Classrooms					
Other Instructional Rooms					
Library					
Offices					
Bathrooms					
Cafeteria					
Kitchen					
Hallways					
Auditorium					
Other:					
Other:					
Other:					

Conduct the Environmental Quality Investigation

General Questions on Cleaning and VOCs

1. According to your observations, is the cleaning frequency for the various types of rooms adequate? . . . . . ☐ Yes ☐ No

   If no, list the areas where the cleaning is not adequate:

   _____

   _____

2. Are green cleaning products used? . . . . . ☐ Yes ☐ No

   Who is responsible for purchasing cleaning supplies?

   _____

3. Are maintenance and janitorial staff members trained in 'green' cleaning techniques? . . . . . ☐ Yes ☐ No
   (For example, when possible, is the building cleaned when it is unoccupied or using nontoxic cleaning products that have low VOCs? See the fact sheets on **Green Cleaning** and **VOCs**, available by logging into your account at www.greenschools.org, for more information.)

4. Is indoor painting done when children and teachers are on break to prevent them from being exposed to paint fumes? . . . . . ☐ Yes ☐ No

5. Is the installation of new materials, such as carpets and ceiling tiles, done when children and teachers are on break to prevent them from being exposed to fumes? . . . . . ☐ Yes ☐ No

6. Brainstorm and then record ideas for improving the cleaning practices and use of cleaning products at your center.

Conduct the Environmental Quality Investigation

Part IV Hazardous Materials

Safety: This chart should be completed by adults. Do not handle items containing hazardous chemicals or mercury. You may want to ask a maintenance staff member who is familiar with the location and storage of hazardous materials to accompany leaders. If you find anything containing mercury, label it so it will be properly handled in the future. A thermometer, gauge, thermostat, or barometer likely contains mercury if it has a silvery substance in the tube or bulb.

Schoolwide

HAZARDOUS MATERIALS INVENTORY CHART

Directions: Visit each room or area where hazardous materials may be used or stored.

Item	Number of items or amount	Is it labeled? (Yes/No)	Is it in a locked cabinet or closet? (Yes/No)
Toxic cleaners			
Paints and varnishes			
Pesticides/herbicides			
Hazardous chemicals			
Mercury thermometers			
Blood pressure gauges containing mercury			
Mercury-based thermostats			
Mercury barometers			
Fluorescent light bulbs: CFLs or tubes*			
Other:			
Other:			
Other:			

** Because fluorescent bulbs contain small amounts of mercury, indicate whether extra bulbs are labeled and securely out of reach of children.*

Conduct the Environmental Quality Investigation

Hazardous Materials Questions

(To be completed by adult leaders.)

1. Does your early childhood center keep an updated inventory list of all chemicals present in the building, as well as where they are stored? . . . . . ☐ Yes ☐ No

   If yes, how often is an inventory of chemicals conducted?

   ☐ Once every 2–3 months (or more often)
   ☐ Once every year
   ☐ Once every 2 years
   ☐ Other: (explain) _____

2. Are Material Safety Data Sheets (MSDS) available for all chemicals used in the center? . . . . . ☐ Yes ☐ No

   If yes, where are sheets located?

   _____

3. Are staff aware of and allowed to purchase and use the less-hazardous or green chemical substitutes for products containing mercury or other chemicals? . . . . . ☐ Yes ☐ No

4. Are hazardous chemicals disposed of as outlined by their MSDS sheets? . . . . . ☐ Yes ☐ No

5. If there are any mercury-containing devices in the building, does your center have a written procedure for handling mercury spills? (Mercury-containing devices may include thermometers, barometers, thermostats, and fluorescent bulbs.). . . . . ☐ Yes ☐ No

   If yes, where is it kept?

   _____

6. How does your center handle "burned out" fluorescent bulbs?

   ☐ Recycled
   ☐ Thrown in the trash
   ☐ Disposed of as hazardous waste
   ☐ Other _____

   (Visit the following website for information on the proper disposal or recycling of fluorescent bulbs, which contain small amounts of mercury: www.epa.gov/epawaste/hazard/wastetypes/universal/lamps/index.htm.)

7. Brainstorm and then record ideas for improving the storage and use of hazardous materials at your center.

Taking Action

Complete the **Environmental Quality Action Plan** on the next page. You can engage young learners by creating a **Classroom Action Book** on ways to improve the environmental quality at your early childhood center.

EARLY CHILDHOOD engagement

Classroom Action Book

Your learners can create a classroom book filled with simple ways to improve the air they breathe. A template for making the book that highlights their art and ideas is provided on page 24.

Directions: Have children draw a picture of how they can improve air quality. Alternatively, provide a variety of pictures for them to cut out and use. Have the children paste their picture to their My Action Plan worksheet. Then write, or help the children write, their responses to the prompt. Each child can contribute one page and then the pages can be combined into a book.

The finished book can be shared in the classroom or scanned and uploaded on a website so that it can be shared with other classes and family members. In addition, please share your book with PLT at information@plt.org or via our **PLT Facebook Page**. The book is a wonderful way to capture what the children have learned from this Investigation.

Before children begin their pages, review some of the things they discovered that might be appropriate for the book. Some ideas include:

- Walk or bike to reduce air pollution.
- Carpool to reduce air pollution.
- Get buses and cars to turn engines off outside the building.
- Put plants in rooms to help clean the air.
- Keep air vents clear of books and other items.
- Keep animal cages clean to reduce dust and allergens in the air.
- Recycle to reduce energy use and air pollution.

Taking Action

Environmental Quality Action Plan

Directions: Review the list of ideas that you brainstormed for improving the environmental quality at your early childhood center. Prioritize the ideas and decide on a few action projects that you can do to improve the health and safety of children and staff members at your center. See the next page for action project ideas.

List your action project ideas for each section of the Environmental Quality Investigation:

A. Transportation

B. Indoor Air Quality

C. Cleaning and VOCs

D. Hazardous Materials

Taking Action

Environmental Quality Action Project Ideas

Here are just a few ideas to help get you started. You can check out what other PLT GreenSchools are doing by watching PLT's short video GreenSchools in Action: Environmental Quality (available on PLT's YouTube channel at https://www.youtube.com/user/ProjectLearningTree) and by reading stories posted at https://www.plt.org/project-learning-tree-greenschools-stories.

A. Transportation

- Develop a "no idling" campaign for buses and cars near your center; hand out fact sheets or note cards to drivers or parents with information about why idling is harmful.
- Sponsor a walk- or bike-to-school day.

B. Indoor Air Quality

- Develop a policy for inspecting HVAC filters every month, and replace or clean them as needed, especially during peak heating or cooling months. Changing filters improves efficiency and helps reduce allergens in the air.
- Create a plan to "declutter" a room, a space, or the whole building. Too much clutter, especially around air vents, affects the flow of clean air. Clutter can also make it hard to keep spaces free of dust, which is a major allergen for some people. Host a "clean your space" event.

C. Cleaning and VOCs

- Work with administrators to encourage the use of green cleaning products that do not expose children and staff members to toxic chemicals.

D. Hazardous Materials

- Work with administrators to phase out hazardous materials in your building, including mercury in equipment such as thermometers and thermostats.
- Make sure that all hazardous materials are labeled as such and stored in locked cabinets away from the reach of children.

My Action Plan
worksheet

Name:_____

I can help the air I breathe by:

_____

Getting to School
worksheet

Name:_____

Spell the words for how people get to school.
Cut out the picture for how you got to school.

_____ _____ _____ _____
B I K E

_____ _____ _____ _____
W A L K

_____ _____ _____
B U S

_____ _____ _____
C A R

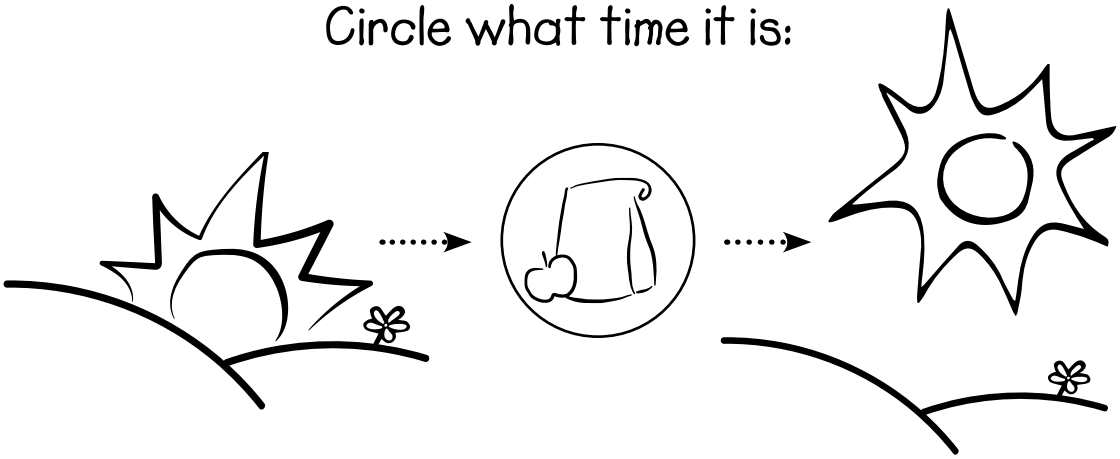
_____ _____ _____ _____ _____ _____ _____
C A R P O O L

_____ _____ _____ _____ _____
T R A I N

My Classroom Temperature
worksheet

Name:_____

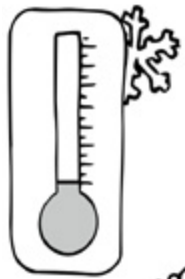
Circle what time it is:



Morning

Afternoon

Color the picture for your classroom temperature:



Too Cold

Just Right

Too Hot