

 **POWER BASICS**[®]

Earth and Space Science

Teacher's Guide

Table of Contents

<i>To the Teacher</i>	<i>vi</i>
<i>Classroom Management</i>	<i>viii</i>
<i>Application Activity Rubric</i>	<i>ix</i>
<i>Use Chart</i>	<i>x</i>

Unit 1: The Universe Around Us

Unit Overview	1
Additional Activity Suggestions	3

Unit 2: The Atmosphere Around Us

Unit Overview	4
Additional Activity Suggestions	6

Unit 3: The Ground Beneath Us

Unit Overview	7
Additional Activity Suggestion	9

Unit 4: Earth's Water Systems

Unit Overview	10
Additional Activity Suggestion	12

<i>Answer Key</i>	13
<i>Graphic Organizers</i>	19
<i>Student Book Appendixes</i>	24
<i>Student Book Glossary</i>	26

Unit 2: The Atmosphere Around Us

In this unit, students learn about Earth’s atmosphere, weather and winds, and climate. Lesson 5 helps students understand how Earth’s atmosphere protects and supports life on Earth. In Lesson 6, students are introduced to the tools that meteorologists use to predict weather. Lesson 7 compares and contrasts the winds that flow over Earth. In Lesson 8, students explore how weather systems form and why weather changes.

Lesson 5—The Atmosphere: Our Life Support System

Goal: To understand how Earth’s atmosphere protects and supports life on Earth

WORDS TO KNOW

altitude	mesopause	stratosphere
contract	mesosphere	thermosphere
energy budget	ozone layer	tropopause
expands	scattered	troposphere
gas	sea level	uniform gases
greenhouse effect	solar energy	vacuum
ionosphere	solid	variable gases
liquid	stratopause	volcanic outgassing

Lesson 6—Weather in the Atmosphere

Goal: To understand the tools that meteorologists use to predict weather

WORDS TO KNOW

air pressure	fog	specific humidity
barometer	frost	stratus
cirrus	humidity	temperature
condensation	isobars	temperature inversion
cumulonimbus	millibars	thermometer
cumulus	nimbostratus	water cycle
dew	precipitation	weather
dew point	relative humidity	wind chill factor
evaporation	saturated	

Lesson 7—Winds in the Atmosphere

Goal: To compare and contrast the winds that flow over Earth

WORDS TO KNOW

convection cell	monsoon winds	specific heat
Coriolis effect	planetary winds	trade winds
doldrums	pressure gradient	westerlies
jet streams	prevailing winds	

Lesson 8—The Changing Weather

Goal: To understand how weather systems form and why weather changes

WORDS TO KNOW

air mass	hurricane	temperate
climate	ice age	thunder
cold front	lightning	thunderstorms
continental air mass	low-pressure areas	tornado
El Niño	maritime air mass	tropical air mass
eye	occluded front	tropical depression
front	polar air mass	tropical storm
global warming	squall line	warm front
high-pressure areas	stationary front	wind shear

Notes on Application Activities in Student Text

Activity	Skills Applied	Product(s)
Heating Earth's Surface	collecting data, taking measurements, making graphs, interpreting data from one graph	graph, chart
The Weight of Air	constructing a working instrument, collecting data, drawing conclusions	model, chart

Additional Activity Suggestions

- Have learners research the four major types of air masses that affect weather in the United States. Each type of air mass brings different weather conditions. Have learners create a map of the United States that illustrates the areas for each of these four air masses.
- Visit the On-line Meteorology Guide ([ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/home.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/home.rxml)). Students can learn about clouds and precipitation, air masses and fronts, weather forecasting, severe storms, and much more. The site also includes classroom activities and student projects.



Thinking Skills

- In this unit, learners discovered that uneven heating of the atmosphere causes wind patterns. Have students apply this information to explain what causes the wind that spins the blades on wind generators (such as windmills). Have learners speculate about energy production based on blade size.

Hierarchical Diagram

Write the root of the hierarchy in the box at the top. Write the next level in the hierarchy in the boxes below the top box. Continue until you have added all the levels in the hierarchy. Add or delete lines and boxes as needed.

