

- Ask students to record both the high and low temperatures for one week and observe whether the sky is cloudy or clear. Make a chart that illustrates the data, and have students discuss the integral relationship between cloud cover and temperature.
- Referring to descriptions and pictures of the different types of clouds, have students identify clouds in the sky.
- Have students observe cloud movement over several days and keep a record of how the clouds are moving, noting if they are moving at different speeds during different kinds of weather.
- Have students read and discuss Carl Sandburg's poem "Fog." As a creative exercise, encourage students to write their own poems about different kinds of weather conditions and set aside time to read them aloud in class.

## Internet Resources

Periodically, Internet Resources are updated on our web site at [www.LibraryVideo.com](http://www.LibraryVideo.com)

- [www.ucar.edu/educ\\_outreach/webweather/cloudhome.html](http://www.ucar.edu/educ_outreach/webweather/cloudhome.html)

This site is all about clouds. Excellent photographs and illustrations are used to explain the different types of clouds and how they can impact our lives. It also covers thunderstorms and includes science activities to help students understand condensation and the formation of fog.

- [ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/home.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/home.rxml)  
The University of Illinois at Urbana weather site provides a section on clouds as part of its well-organized and complete meteorology information guide. Descriptions, definitions and excellent photos of clouds are presented. This site also has a severe weather section which covers thunderstorms and a classroom activity section.
- [www.usatoday.com/weather/tg/wsevstm/wsevstrm.htm](http://www.usatoday.com/weather/tg/wsevstm/wsevstrm.htm)  
The USA TODAY Online - Weather site has a wealth of information presented in an appealing format with many graphics and animations. The severe storm section has animation showing differences between a severe thunderstorm and a normal thunderstorm and another showing the development of a lightning stroke. A separate section on this site provides descriptions, definitions and facts about clouds.

## Suggested Student Resources

- Bunday, Nikki. *Storms and the Earth*. Lerner Publishing Group, Minneapolis, MN; 2001.
- Rodgers, Alan and Angella Streluk. *Cloud Cover*. Sagebrush Educational Resources, Minneapolis, MN; 2002.
- Simon, Seymour. *Lightning*. William Morrow & Company, New York, NY; 1999.
- Staub, Frank. *The Kids' Books of Clouds & Sky*. Sterling Publishing Company, New York, NY; 2004.



# CLOUDS

## Grades 4-7

Students in grade 4-7 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers for these grades need all the help they can get! This guide has been designed to help science teachers in grades 4-7 by providing a brief synopsis of the program, pre-viewing and followup questions, activities, vocabulary and additional resources.

**Before Viewing:** Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create a "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words and have students raise additional questions that they hope will be answered.

**After Viewing:** Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts that they put on their "Everything We Think We Know About..." list. Discuss what else they learned and use the followup questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.

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## Program Summary

Meteorologists classify clouds according to their shape, size, color and location in the sky. This program depicts the three main types of clouds (cirrus, stratus and cumulus), the variations of clouds that occur in combination with each other, how clouds form and the important role they play in weather and the water cycle. During the day, cloud cover keeps the Earth cooler by providing shade, while at night, they keep it warmer by holding down the warm air. This program compares fog and mist, and discusses the causes of smog. Students learn about “cloud seeding,” a method of producing artificial precipitation on a more frequent basis in order to maintain an ongoing supply of water for irrigation and everyday use. A science experiment shows students how to create a cloud in a jar. Thunderstorm clouds and the thunder and lightning associated with them are reviewed through footage and animation, along with a breakdown of thunderstorm activity in different regions of the United States.

## Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

**condense** — To change a gas into a liquid by cooling.

**cirrus clouds** — High-altitude clouds that are white and wispy. Cirrus means “curl” in Latin.

**stratus clouds** — Clouds extending in long, low, gray layers. Stratus means “spread out” in Latin.

**cumulus clouds** — Thick, puffy, white clouds floating low in the sky. Cumulus means “heap” or “pile” in Latin.

**alto** — Latin word for “high.”

**nimbus clouds** — Any rain-producing clouds.

**noctilucent clouds** — High-altitude clouds in the stratosphere that can be seen after sunset. Dust from meteors and ice form these clouds.

**lenticular clouds** — Lens-shaped, smooth-edged clouds that may form near hills or mountains.

**fog** — A large, thick mass of water vapor condensed to fine particles just above the Earth’s surface (clouds that form at ground level).

**smog** — Air pollution that contains a mixture of fog and smoke.

**mist** — Very fine water vapor that forms over lakes and ponds. Mist consists of water droplets smaller than fog that appear thinner in the air.

**electrons** — Any of the negatively charged particles that form a part of all atoms.

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**molecule** — The smallest particle into which an element or compound can be divided without changing its physical or chemical properties.

**Doppler radar** — A radar tracking system that sends out pulses of radio waves to provide detailed pictures of the location, direction and speed of weather elements such as wind and precipitation.

## Pre-viewing Discussion

Before students generate their list of “Everything We Think We Know About...” for this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

1. What is a cloud?
2. What are the three main types of clouds and the defining characteristics of each?
3. What is a front?
4. What causes lightning and thunder?

After the class has completed their “Everything We Think We Know About...” list, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

## Focus Questions

1. How do clouds form?
2. Under what conditions will clouds form?
3. According to height, from highest to lowest, in what order would you list stratus, cirrus and cumulus clouds?
4. What name is given to low-altitude winter clouds?
5. What materials make up noctilucent clouds?
6. Lenticular clouds appear near what types of land formations?
7. What do cold front clouds look like?
8. What do warm front clouds look like?
9. What do we call clouds that form at ground level?
10. How does fog form?
11. What is smog? Why does it occur in cities that lie in bowl-shaped valleys?
12. Where can mist usually be seen?
13. What are signs of an approaching thunderstorm?
14. During which two seasons of the year and two times of the day do most thunderstorms occur?

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15. Why does thunder make a rumbling noise? Why does it produce different sounds?

16. How can we estimate how far away a lightning strike will be?

17. Why are thunderstorms the most common weather event?

## Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their “Everything We Think We Know About...” list. It might also be helpful to review the list by marking each entry with a “+” or “-” to show which facts were correct and which were incorrect.

Discussions that ensue from thought-provoking questions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion questions.

1. Discuss the importance of clouds, focusing on rainfall and how clouds keep the Earth’s temperature higher than it would be if the skies were clear.
2. Discuss the science behind thunderstorms, talking about how they form, why they are more common in warmer weather and how the combination of positive and negative charges produces lightning. In addition, have students discuss how they react when caught outside during a thunderstorm and what measures they should take to ensure their safety.
3. Ask students to explain how silver iodide helps in the rain-and-snow producing process of cloud seeding. Discuss the reasons people would have for creating such weather conditions.

## Follow-up Activities

- Create a Venn diagram to compare and contrast the characteristics of fog and mist.
- The National Weather Service issues both “watches” and “warnings” for the approach of severe weather such as thunderstorms. Working in groups, have students find out what the difference is between these terms and use this information to develop pamphlets that offer explanations of both classifications as well as thunderstorm safety tips.
- Nephelococcygia means the identification of shapes (animals, objects, people, etc.) in cloud forms. Have students sketch shapes from clouds that they observe outside and share their drawings with the class.

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