

Teacher Information

Lightning

I. Objectives

A. Forming Concepts (Introductory) Objectives

1. Explain the causes of lightning and thunder.
2. Describe lightning damage.
3. Describe the most safe and least safe places to be during a thunderstorm.

B. Interpreting Data Objectives

1. Draw the types of lightning.
2. Determine the place and time lightning strikes most often in the United States.
3. Explain first aid for someone struck by lightning.

C. Applying Principles Objectives

1. Calculate the distance from a strike using the flash to bang rule.
2. Calculate the speed of sound in feet per second.
3. Calculate the speed of sound in meters per second.

II. Interdisciplinary Uses

A. Social Studies

1. Describe geographic regions most likely to be hit by lightning.
2. Explain the economic consequences of something being hit by lightning.

B. Math

1. Interpret graphical data
2. Calculate the speed of sound
3. Calculate the distance from a lightning strike.\

C. Language Arts

1. Create written and oral communications about lightning.
2. Develop a safety plan for school students during thunderstorms.

III. Science Standards Coordination

A. Types of Lightning

The Lightning activity has been designed to incorporate science standards as specified by the National Science Education Standards (NSES) and the National Science Teachers Association (NSTA) Scope, Sequence, and Coordination (SS&C) of Secondary School Science. Only the major topics are listed. For further explanation of each standard see the complete documents:

NSES - National Academy Press, 2101 Constitution Ave, NW,
Washington, DC 20481

NSTA - 1840 Wilson Blvd, Arlington, VA 22201-3000

NSES	SS&C
Structure of earth systems	Heat, light, electrical energy
Earth in the solar system	Conductivity
Transfer of energy	Sparks and lightning
Understanding about science and tech	
Science and technology in society	

IV. Advanced Preparation

A. Materials

1. One computer per two or three students is a recommended minimum,
2. One copy of the Student Activity Book for each student or group of students.

B. Time Required Completing the Activity

1. The *Get Info* Section takes 20 to 30 minutes
2. The *Gather Data* Section takes 30 to 40 minutes
3. The *Application* section takes about 30 minutes

C. Teacher Familiarity with Lightning Activity

Preview these materials thoroughly. As with all these activities, before using this activity in class, review the sites and work through the activity yourself to learn about lightning so you can answer questions or direct students to the answers.

The activity is set up so students are taken to pages containing information that will be used to answer questions regarding lightning. The sites contain either the answers or the information from which the students can infer the answers. At the end of the activity, there is a list of enrichment activities and related web sites.

D. Select Questions for Students to Answer

It would be prudent for you to read the questions students will be expected to answer. These questions are in order of ascending difficulty. Depending on grade level and ability level, you might want to assign specific questions for your students.

E. Student Grouping

These activities can be done individually or in small groups of two or three students. Students who have Internet access can also do them at home for extra credit.

F. Software Requirements and Duplication Preparation

1. Adobe Acrobat Reader is required to download the pages. Click the "Tech Info" link on the Science with NOAA Research homepage to download Acrobat Reader.
2. Download the Teacher Information, Teacher Key, and Student Activity Book PDF files from the "Teacher Info" web page.
3. Duplicate and distribute student pages. Ideally, each student should have a copy of the Student Activity Book that should be distributed and discussed the day before the exercise.