

Lightning Strikes!

A WebQuest for Ch. 20 Electricity Unit



Designed by
Mr. Beebe, Ms. Blessing,
Mrs. Michaels, Ms. Nelson
Adapted by Mr. Rita

Introduction



It is a Friday night and you are home with your basset hound *Flash*, eating a pepperoni Hot Pocket, watching the movie Twister. All of a sudden, the wind swirls and you hear the leaves rustling against the house. The rickety stop sign at the end of the street crashes to the ground! Flash jumps up from the hardwood floor and waddles to the door in a panic. However, you are more interested in watching the rest of the movie and finishing your snack without burning the roof of your mouth. “Stop barking and lay back down!”, you scold Flash. Flash reluctantly obeys your command, plops down on the floor, and slowly drifts to sleep.

In the movie, a storm is brewing. You put down your half eaten Hot Pocket as you inch toward the edge of the couch watching more intensely. The main characters grab their video cameras out of their old pick up truck and race toward the center of the storm.

A crash of thunder booms outside your window. Flash awakens and urgently skattles to the door. Getting more annoyed, you scold Flash again, but this time he disobeys your commands. He remains glued to the door and barks without ceasing. You turn back to the movie to see the characters retreat back to their car as the storm creeps closer and closer. Suddenly, there is another boom near your house and a streak of lightning illuminates the evening sky. Flash relentlessly yelps in fear. The lights flicker on and off around you. The TV suddenly goes out along with the rest of your household power. You are left alone, in the dark, in a cold sweat, with the remains of your Hot Pocket smeared across your face.

You can not call your parents because the phone lines are down, and your cell phone was confiscated at school. The streets are beginning to flood due to the heavy rains. This is the first time you have been home alone during a thunderstorm. Flash will not stop barking. Despite all of this, the scientist in you wonders, “What makes lightning?”



Using this WebQuest you will

- Collect information from several online sources.
- Examine and interpret information in maps and bar graphs.
- Support your findings of lightning by coming up with descriptions and explanations using evidence and observations.
- Communicate your information visually by creating a lightning animation slide

Task

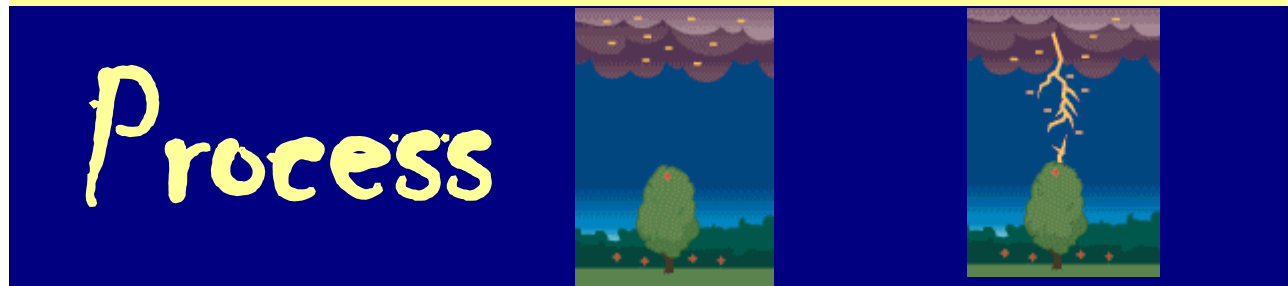
© Original Artist
Reproduction rights obtainable from
www.CartoonStock.com



Your task is to discover as much as you can about lightning and share your findings with others. You will learn about the characteristics of lightning, lightning statistics, lightning myths and lightning safety. You will also use a lightning detection system to view the current occurrences of lightning in the United States.

Your task has four main parts:

1. Explore the links that will take you to websites with exciting and interesting information about lightning.
2. Complete the *Lightning Strikes!* Worksheet to record your findings.
3. Test your knowledge of lightning by taking the Lightning Strikes Challenge.
4. Create or find an animation that shows how lightning occurs.



Get the “Lightning Strikes” worksheet to begin your quest.

You are now ready to begin! Read the following questions, fill in the worksheet and explore the websites to guide you toward becoming a lightning expert!

What is Lightning?

After facing the storm last week, you and Flash both realize that lightning is a natural phenomenon that needs to be appreciated and taken seriously. In order to fully be aware of the power of lightning it is important to understand what lightning is made from, how lightning is produced, what conditions are necessary for lightning to take form, and how lightning causes thunder. Once you and Flash know these answers you can spread the word so that everyone will know what lightning is all about.

1. What [charge](#) does the lightning bolt carry when it leaves the cloud?
2. How does charge build up in a cloud?
3. How does charge build in the ground?
4. Can lightning strike from [ground to cloud](#)? Cloud to cloud?
5. What characteristic of lightning create the explosion of sound known as [thunder](#)?
6. What does a [Lightning Rod](#) do?

Lightning Statistics

After learning about what lightning is, you want to find out where and when lightning occurs the most often so you will not be as surprised by a storm again. By reading and interpreting graphs of lightning information, you can answer these questions.

1. Which state experiences the most thunderstorm days each year? What is the least number of thunderstorm days recorded in this state? What is the greatest number of thunderstorm days reported in this state?
2. During what month do the most deaths caused by lightning occur?
3. Approximately, how many people died from lightning in Pennsylvania during the summer (June, July and August)? Approximately how many people were injured from lightning during the summer?
4. What factor do you think could be responsible for the most lightning occurring in PA and during these months?
5. The Empire State building in NY is struck by lightning 100 times a year. What other Freaky Fact can you find out about lightning?

Lightning Explorer

Wouldn't it be cool if you could see where there is lightning all across the United States right now? Using Lightning Explorer, you can! Lightning Explorer uses a lightning detection system to detect lightning discharges to the ground.

Login in to <http://thunderstorm.vaisala.com/explorer.html> Each dot on the map represents one recorded flash.

Use [Lightning Explorer](#) to answer the following questions:

1. What time did you use lightning explorer?
2. Which states showed evidence of lightning?
3. Which state had the most lightning activity?
4. Which state(s) had the most recent lightning?
5. How can you tell this from looking at the map?
6. Did Florida experience any lightning in the last two hours?

Things to Know About Lightning Safety

Since lightning is a very dangerous, there are certain safety tips you should be familiar with in case you or someone you know is involved in a lightning situation. If you and Flash would have known what actions to take to stay safe, you wouldn't have been so scared during the storm. Think about these lightning safety questions on your own and then explore the links to check your ideas.

1. If you are [outside](#) where are places you should AVOID seeking shelter?
2. Why shouldn't you be near [trees](#) during a thunderstorm storm?
3. How would you use the [30-30 lightning rule](#) to protect yourself from the dangers of lightning?
4. Sound travels at 1,087 ft/sec. If you see a lightning strike and 10 seconds later you hear the thunder; how far away was the strike?

Lightning Related Injuries and Deaths

Although the peak season for lightning is during the summer, lightning related injuries and deaths can occur throughout the year. This means that you and Flash need to be prepared to make use of your lightning knowledge at any time and be alert to threatening weather conditions. There are certain activities that cause more lightning related accidents than others and should be avoided during stormy weather conditions. Unfortunately, if a lightning injury does occur it is important to recognize the symptoms so that proper medical care can be given. If something would have happened to you or Flash, would you have known what symptoms to look for?

1. What are the top five activities that result in lightning injuries?
2. What are symptoms that occur after being struck by lightning?

Lightning Myths (Fact or Fiction?)

Generation after generation, people all over the world have passed on the same stories about lightning and its effects on people, objects, and the environment. There is nothing wrong with these stories because many of them happen to be true. However, there are plenty of stories that are fictitious or filled with half-truths about the topic of lightning. These types of fictitious stories are called myths. Your job now is to find out which stories are real and which stories are myths.

Below, you will read several statements about lightning. Use the internet to find out whether the statement is a fact or a myth. Write either “fact” or “myth” below the statement on your paper, and include a 2-3 complete sentences on why the statement is a myth or fact.

1. Lightning can strike the same place twice. Fact or myth?
2. If someone is struck by lightning, the person instantly dies.
Fact or myth?
3. If lightning is going to strike, the best way to protect yourself is by lying flat on the ground. Fact or myth?
4. If you touch an electrocuted person, you will also become electrocuted. Fact or myth?

Evaluation



Test your knowledge of lightning by taking the [Lightning Strikes Challenge!](http://portfolio.educ.kent.edu/michaelsc/lightningstrikes_files/frame.htm)
http://portfolio.educ.kent.edu/michaelsc/lightningstrikes_files/frame.htm
After successfully completing the challenge, you will be a certified Lightning Expert! Show the teacher the screen, do not print it out.

Conclusion



You have discovered characteristics of lightning, lightning statistics, lightning myths and lightning safety. You used a lightning detection system to view the current occurrences of lightning in the United States. To benefit your friends and family you have created a lightning bumper sticker that shares a fascinating fact about lightning. Bring this to class to display your findings.

Finally, if you are ever confronted with a situation like the one presented in the introduction you may not feel completely helpless. You are now aware of the events that cause lightning to occur and the best ways to protect yourself!

Assignments:

1. Create a PowerPoint slide animation, find a simulation or movie that shows how lightning is formed and discharged. Save it to My Documents and send it to Mr. Rita's Drop Folder.
2. Turn in the completed Lightning Strikes worksheet.

Credits and References



The following websites were used in the creation of this WebQuest:

<http://www.wxdude.com/page5.html>

<http://www.srh.noaa.gov/eyw/HTML/tstmhazards.htm>

<http://www.sun-sentinel.com/news/weather/sfl-lightningdeaths,0,1065090.graphic?coll=sfla-home-headlines>

<http://www.lightningstorm.com/tux/jsp/gpg/lex1/mapdisplay.jsp>

<http://www.srh.noaa.gov/mlb/ltgsafety/slide27.html>

<http://www.floridadisaster.org/hwaw/day1/lightning.htm>

https://www.patrick.af.mil/45og/45ws/LightningSafety/Ltng_Tips.htm

<http://www.nationalgeographic.com/lightning/4a.html>

https://www.patrick.af.mil/45og/45ws/LightningSafety/Ltng_Myths.htm

<http://images.google.com/images>

<http://portfolio.educ.kent.edu/michaelsc/lightningworksheet.htm>

<http://www.nationalgeographic.com/lightning/3a.html>

<http://portfolio.educ.kent.edu/arharj/webquests/InterdisciplinaryWebquest.doc>

Thank you to the Kent State University professors who provided us with a template and guidance in creating this WebQuest.

[Back to the Top!](#)