

Name: _____ Class: _____

How far away was that lightning?

By Becky Bolinger
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When lightning strikes, it's reassuring to know just how far that bolt of electricity is. In this informational text, Becky Bolinger discusses how you can calculate how far away lightning is. As you read, take notes on the difference between seeing lightning and hearing thunder.

- [1] You probably do it. It might be ingrained¹ from when you were a kid, and now it's almost automatic. You see the flash of lightning — and you immediately start counting the seconds till it thunders.

But does counting really get you a good estimate for how far away the lightning is? Is this one of those old wives' tales,² or is it actually based on science? In this case, we have physics to thank for this quick and easy — and pretty accurate — calculation.



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So what happens when a big storm rolls in?

The lightning you see is the discharge³ of electricity that travels between clouds or to the ground. The thunder you hear is the rapid expansion of the air in response to the lightning's intense heat.

- [5] If you're really close to the lightning, you will see it and hear the thunder simultaneously.⁴ But when it's far away, you see and hear the event at different times. That's because light travels much faster than sound. Think of sitting in the nosebleed seats at a baseball game. You see the batter hit the ball a second before you hear the crack of the bat.

When observing an event on Earth, you see things almost the instant they happen — the speed of light is so fast you can't even detect the travel time. The speed of sound is much slower, which gives us time to do our calculation.

Let's simplify the speed equation: Sound travels a little over 700 miles per hour, or 700 miles in 3,600 seconds. That means 7 miles traveled every 36 seconds. Make this even easier and round down to 7 miles every 35 seconds... or 1 mile every 5 seconds! Count to 5: if you hear thunder, the lightning occurred within 1 mile.

1. **Ingrained** (*adjective*): firmly fixed; difficult to change
2. a traditional belief that is usually unscientific or incorrect
3. to allow something to release from where it's been contained
4. **Simultaneous** (*adjective*): happening at the same time

Now that you know how far away that lightning strike was, is it far enough to be a safe distance from the storm? That's actually a trick question. Thunder can be heard up to 25 miles away, and lightning strikes have been documented to occur as far as 25 miles from thunderstorms — known as a “bolt from the blue.” So if you can hear thunder, you're close enough to be hit by lightning, and sheltering indoors or in an enclosed car is your safest bet.

And don't count on the folk wisdom⁵ that lightning never strikes the same place twice to protect you. That one is just plain wrong. For example, lightning strikes the top of the Empire State Building an average of 23 times per year.

[10]

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Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which sentence describes the central idea of the text?
 - A. The higher you're able to count between when you see lightning and hear thunder, the safer it is to go outside to witness that event in nature.
 - B. Counting how many seconds pass between when you see lightning and hear thunder can tell you how far away it is because sound and light travel at different speeds.
 - C. While light and sound usually travel at the same speed, the light from lightning strikes so fast that we struggle to process it and end up processing sound first.
 - D. The widely held beliefs that you can calculate the distance of lightning by counting and that lightning doesn't strike twice are actually supported by science.

2. PART B: Which detail from the text best supports the answer to Part A?
 - A. "But does counting really get you a good estimate for how far away the lightning is? Is this one of those old wives' tales, or is it actually based on science?" (Paragraph 2)
 - B. "The lightning you see is the discharge of electricity that travels between clouds or to the ground. The thunder you hear is the rapid expansion of the air in response to the lightning's intense heat." (Paragraph 4)
 - C. "When observing an event on Earth, you see things almost the instant they happen — the speed of light is so fast you can't even detect the travel time. The speed of sound is much slower, which gives us time to do our calculation." (Paragraph 6)
 - D. "So if you can hear thunder, you're close enough to be hit by lightning, and sheltering indoors or in an enclosed car is your safest bet." (Paragraph 8)

3. What is the relationship between the speed of light and the speed of sound?
 - A. The speed of light is faster than the speed of sound on Earth.
 - B. Light travels faster than sounds in the eye of a storm.
 - C. The speed of sound is faster than anything else on Earth.
 - D. Light and sound usually travel at the same speed.

4. How does paragraph 9 contribute to our understanding about lightning?
 - A. It shows how dangerous lightning can be and that we shouldn't underestimate its power.
 - B. It proves that no one is ever truly safe from lightning.
 - C. It shows how it's dangerous to be on high ground during any type of storm.
 - D. It stresses how most of the "facts" about lightning are actually legends.

5. What is the relationship between determining how far away lightning is and safety?
