



Topic/Objective CHAPTER: **1**

NAME:

**14**  
Thunderstorms/  
Lightning.

Pd: 1 2 4 5 other

DATE

Essential Question

What is Lightning? How does it occur?

Cue: Review:

Thoughts: Main Idea

NOTE Taking AREA:

How lightning starts

- Begins from a spark & travels to an opposite charge.

Lightning

- is the transfer of electrical charge.  
- referred to as **Static electricity**.

Static electricity

- is the result of an imbalance b/t negative "-" & positive "+" charges in an object.

i.e.

- walking across a carpet w/socks

**Ions**

- Positive or Negative charged particle

- Build up of **Static electricity** starts from the ice particles bumping into each other.

- That happens b/c the Atmosphere is rubbing against the ground, which begins to separate the charged **Ions**.

Charge differential

- Separation of **Ions** into groups

NOTES CONTINUE ON OTHER SIDE



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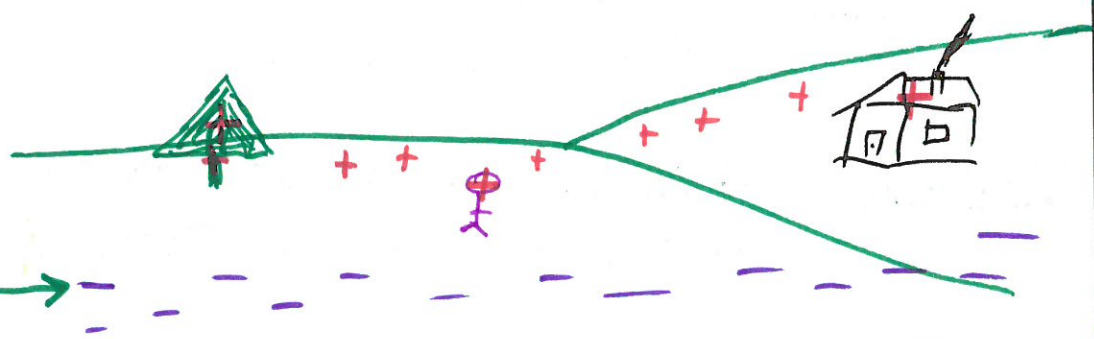
Cue: Review:  
Thoughts: Main Idea

NOTE Taking AREA:

Clouds →

Positive Ion  
Negative Ion

Deep under-  
ground →



- Above diagram shows Charge differential
- This separation is due to friction b/t the updrafts and downdrafts
- like magnets the charges are attracted to each other. The build up of charge is released.
- Negative then seeks out a Positive charge, in 1 of 3 ways.

(see next page)

SUMMARY:





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**Lightning**

Pd: 1 2 4 5 other

DATE

Essential Question

what are 3 ways it occurs?

Cue: Review:  
Thoughts: Main Idea

NOTE Taking AREA:

3 ways  
negative  
seeks positive

- 3 things can happen AFTER the "Spark" of the negative Ion.

1. 1 part of the cloud to another part of a cloud (Intracloud)
2. Some can jump from cloud to cloud
3. Can seek out TOWARDS the ground



STEP  
Leader  
Stroke  
1<sup>st</sup> step of  
branch  
lightning  
\* You can NOT  
see this

Positive  
Streamer  
"Stroke"

- is the Positive Ions extending out from the object.



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Cue: Review:  
Thoughts: Main Idea

NOTE Taking AREA:

Streamer  
Stroke

- any object along the ground is positively charged.
- Taller the object the more "+" charge it can hold.
- The streamer stroke is actually "+" charged Ions "reaching" out toward the step leader stroke.

Why is  
the ground  
"+" charged

- Side note: Why is the ground "+" charged
  - the "-" charge at the base of the cloud has an affect on the ground beneath it.
  - the "-" charge in the ground is pushed further into the ground, leaving "+" charge near the surface.
  - this is charged by induction.
- the "+" charge is concentrated on the point corners of an object.

SUMMARY:





Topic/Objective CHAPTER: Pt 3

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Pd: 1 2 4 5 other

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Lightning

Essential Question

What is a return stroke?

Cue: Review:  
Thoughts: Main Idea

NOTE Taking AREA:

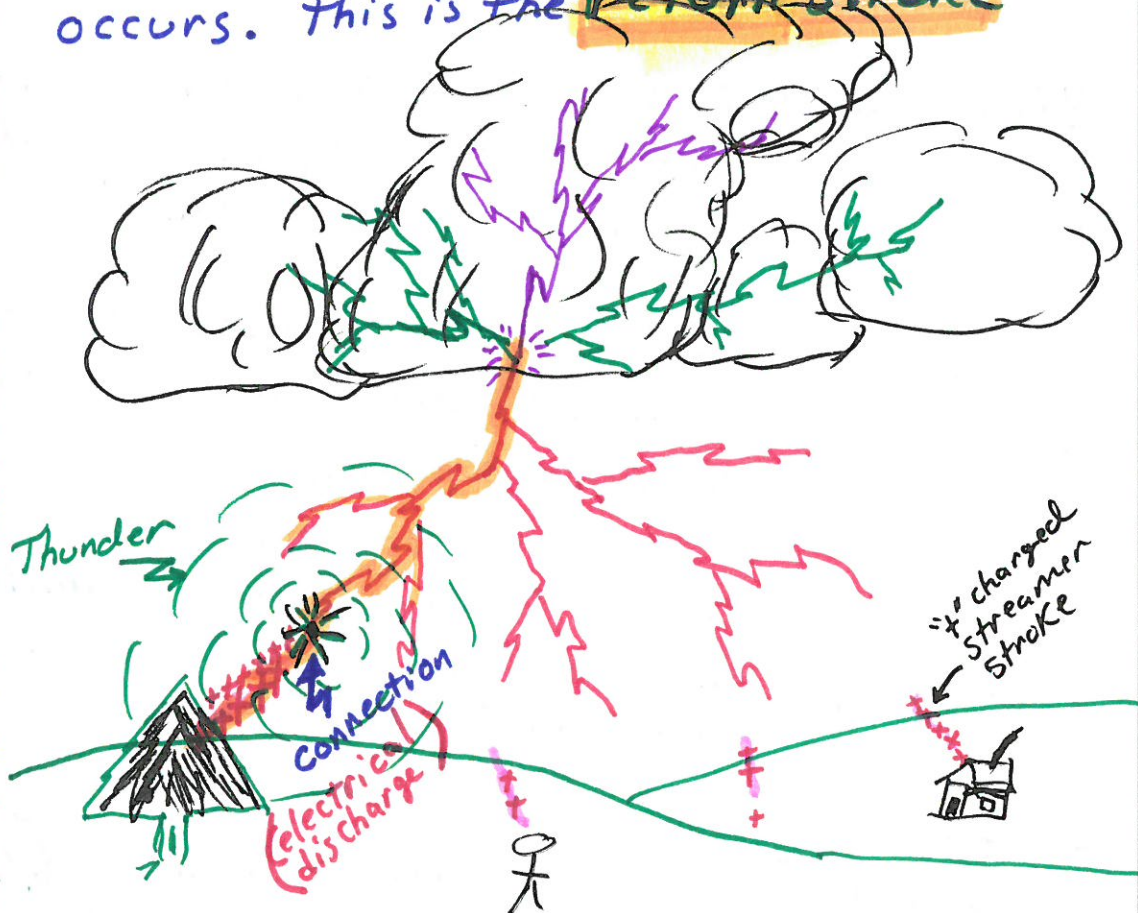
- when a <sup>step</sup> Leader stroke meets the streamer stroke an electrical discharge occurs.

- is the release & transmission of electricity

- the path is connected and bright flash occurs. this is the return stroke

Electrical discharge

this is what you see!



Return stroke

- the charge that rushes upward from the farthest pt. to the spark, in steps, or breaks.

NOTES CONTINUE ON OTHER SIDE



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Cue: Review:  
Thoughts: Main Idea

NOTE Taking AREA:

- the return stroke will illuminate the connection w/ 100 million volts of electricity.

- Lightning bolt heats the surrounding air to over  $50,000^{\circ}\text{F}$  ( $\approx 30,000^{\circ}\text{C}$ )

- 5x hotter than the surface of the Sun.

Thunder

- is the sound you hear because the surrounding air is superheated rapidly due to the expansion & contracts

Lightning  
trivia

- Lastly, the charged ions are redistributed and the buildup starts all over again.

- Lightning can extend outward to at least 4 miles away. 1 mile = 1.6 km

- hits earth an average of 8.6 million x/day or 100 strikes/second

- 2nd cause of death in the U.S. Flooding #1

SUMMARY:

- every 5 seconds = 1 mile (w/in 2 miles in danger)

Heat lightning - does not exist. [sort of]

- It is a storm off in the distance too far away for you to hear thunder.