

Science 7 work

fill out 9.1 notes with book

9.1 section review in book

fill out 9.2 notes with book

9.2 section review in book.

9.1-9.2 practice quiz

9.1 Thunderstorms, Lightning, and Tornadoes

_____ - localized storms involving lightning, thunder, strong winds, heavy rain, and sometimes hail or tornadoes

- Represent LARGE amounts of _____ → sometimes as much as an _____
- _____ occur yearly; _____ occurring at any given moment around the world
- Start with strong _____

• Stages of a Thunderstorm

1. _____ - *marked by updraft forming cumulus to cumulonimbus clouds*

- Updraft of air _____ as it moves upward → forms a _____ cloud
- Warm, moist _____ air causes cumulus cloud to continue growing upward
- _____ & supercooled water _____ form inside cloud
- Stage lasts → _____ minutes
- At end of stage → a huge _____ has formed BUT no _____

2. _____ - *marked by the arrival of precipitation at earth's surface*

- Ice crystals & water droplets fall from cloud → too _____ for updraft to hold in air
- Precipitation arrives at earth's _____
- Heavy _____, lightning, hail, _____ may develop
- Sometimes create: _____ - concentrated blasts of cool downward blowing wind up to 130 mph
 - _____ - smallest, most intense downburst at almost 170mph
 - creates severe damage to _____ or _____
- Stage lasts → _____ minutes

3. _____ - *the updraft disappears, cutting off the thunderstorm's power supply*

- Downdrafts suppress flow _____ = no more rising _____ = no further creation of _____
- Clouds _____ due to no more flow of _____ air
- Gentle _____ may follow until storm disappears

• 2 Types of Thunderstorm

1. _____ - consist of one _____ (an updraft system)

- Storm described above
- _____ → most powerful thunder
- storm
 - usually occur in spring, summer
 - tower to 65,000 feet
 - 5-10 miles long with anvil or mushroom shape

2. _____ - consist of one or more cells

- _____ - long advancing line of multiple-cell thunderstorm

_____ - an abrupt discharge of electricity through the air that produces a quick flash of bright light

- Every second → about _____ lightning strikes happen in the world
- Each year in U.S. → kills about _____ people / injures _____ of others

- Lightning Formation

1. In cumulonimbus cloud → huge amounts of _____ form (possibly from _____ between ice crystals & hail)

2. Some electricity with _____ charge collects at _____ of cloud (strong negative region)

3. Cloud then moves over an area → _____ charge develops on the _____
❖ Large _____ charge in cloud is attracted to _____ charge on ground
BUT the _____ keeps the two charges apart
❖ Eventually, attraction is too _____ for air to keep apart

4. From cloud → a _____ - the first electron (negatively charged) stream moving jerkily toward the ground
❖ Comes within _____ of feet of ground

5. From ground → a _____ rises from the ground to meet the stepped leader

6. At meeting point → a _____ - the upward flow of positive charge back toward the cloud
❖ This is the brilliant flash of light that can be _____
❖ FACTS → 1. _____ inches wide
2. 2 trillion _____
3. heats air in stroke to over _____ (5 time the temp. of the _____)

7. From cloud → a _____ - second huge electrical charge that travels down the channel of the first strike
❖ Does not travel as jerkily as _____
❖ Initiates a second _____

8. Up to _____ dart leader / return strokes can happen in less than a _____
→ gives appearance of single _____ bolt

- Types of Lightning

1. _____ - lightning travels from a negative region of the cloud down to the ground
❖ described above

2. _____ - lightning travels from the positively charged upper region to strike a negatively charged portion of the ground
❖ Less common than negative cloud-to-ground
❖ More dangerous → releases more _____ & can strike up to _____ miles away

3. _____ - lightning occurs between two clouds or between negative & positive sections of the same cloud
- ❖ _____ - entire sky flickers but bolts are obscured by clouds
 - ❖ _____ - reflected light from high-altitude cloud-to-cloud strikes of distant thunderstorms
- storm is too far away to hear its _____
4. _____ - lightning originates from a tall, positively charged object on the ground

_____ - shock wave of sound formed from the return stroke causing the air near it to expand explosively

- Can be heard up to _____ miles away
- _____ travels faster than sound → lightning can be _____ before thunder is heard

_____ - a narrow funnel of rapidly whirling wind that stretches from a cloud to the ground

- Each year → about _____ in the U.S.
- 1 out of every _____ thunderstorms produces one

• Shapes of Tornadoes

1. _____ → most common shape
2. Narrow _____
3. Giant, swirling _____

• Color

- Starts out _____ or _____ → due to condensed water vapor
- Darkens as it picks up _____

• Formation of Tornado

1. Starts with _____ rotating winds at earth's surface
2. _____ picks up rotating "cylinder"
3. The above two merge → creating a _____ - rotating updrafts found in many supercell thunderstorms
4. As supercell grows → mesocyclone draws _____ up through itself (like a pipe) causing it to widen and grow taller
5. First visible sign of possible tornado → formation of _____ - a large rotating cylindrical extension from the base of the supercell
 - ❖ Even after wall cloud formation → only a few supercells produce _____
6. An inner "cylinder" of rotating air spins within _____
 - when this reaches the _____, it becomes a tornado

7. _____ → the swirling, condensed air that is the distinctive visual feature of the tornado

- _____ - *best suited place for tornado formation in the world*
 - **Location?** The Mississippi Valley and the eastern Great Plains of the U.S.
 - **What happens?** Warm, moist air moves north from _____ as cool, dry air moves east from _____. Air masses collide creating ideal conditions for supercell storms

- _____ - a tornado that forms over the water
 - Not usually associated with _____ thunderstorms

- _____ - rotating column of air that begins on the ground and carries dust and light debris high into the air
 - Differs from tornado → 1. tornadoes _____ from cloud to ground
2. dust devils not associated with _____

9.2 Hurricanes – intense low-pressure systems that develop in the _____

- Its massive size & power is _____ by any other meteorological phenomenon
- Release the energy of a _____ every _____ minutes
- Known by different names world wide
 - in Western Pacific & Indian Oceans - _____
 - in the Philippines - _____

• 2 Ingredients to Form a Hurricane

1. warm _____ (at least _____)
2. a region where the _____ is pronounced
 - ❖ between _____ & _____ latitude north and south of equator

• Hurricane Formation → Movement → Death

1. Start as a _____
 - Regions of _____ move west across ocean due to _____
 - _____ develop causing the moist, warm air to form _____
 - Winds begin to _____ due to Coriolis effect

NOTE → *at this point it becomes a _____ (hurricane)*

2. The warm ocean air “_____” the tropical cyclone → increasing its strength and _____

3. It moves in the direction of _____ winds (at speeds of 10 up to 70 mph)

4. Hurricanes:

- as it leaves Tropics → _____ as its cutoff from the warm ocean & moist air
- as moves onto a continent → it _____ into a mass of _____ showers

• Cyclone Stages

1. _____ → sustained speed of less than _____ mph
2. _____ → wind speeds reach _____ mph
 - it's given a _____
3. _____ → wind speeds reach _____ mph

• Saffir-Simpson Hurricane Wind Scale – scale by which hurricanes are _____

- Ranked into _____ possible categories based on wind _____
- **EX** Hurricane _____ (1992) → a category _____ hurricane (wind speeds greater than 155mph)

• Hurricane Structure

- Center of the hurricane → _____ - a region of very low pressure a few miles wide about which the storm rotates
 - the eye of the storm is _____
 - WHY?** Surface winds spiral inward _____ the eye but are deflected by the _____
 - typically _____ in diameter
- _____ - the cylinder of thick whirling clouds that surround the eye
 - Formed by _____
 - Up to _____ miles high

- _____ - long, narrow lines of thunderstorms around the lower eye wall
 - Rotate around the _____
 - _____ near the eye; _____ near the edge of the storm

- Hurricane Dangers

- _____ → one of the hurricane's most destructive forces
- _____ - elevated water levels caused by a hurricane's winds pushing water ahead of the storm
 - Can cause ocean levels to rise _____ feet above usual level (_____ stories of water)
 - Brings great _____

NAME: _____

1-3. Name the three stages of a thunderstorm and give its brief description.

1. _____ - _____

2. _____ - _____

3. _____ - _____

4. The smallest most intense downbursts are called _____.

5. Why does a dart leader/return stroke combination give the impression of a single flickering bolt? _____

6. What two ingredients are needed to form a hurricane?

1. _____

2. _____

7. What is the difference between a tornado and a dust devil? _____

8. What is the most powerful thunderstorm known as? _____

9. Why do we see lightning before we hear thunder? _____

10. Name the scale by which meteorologists rank hurricanes. _____

11. How many categories does the above scale have and what are they are based upon?

1. _____ 2. _____

12. What is the first visible sign that a tornado may be forming from a mesocyclone? _____

13. At least what temperature must ocean water be for a hurricane to form? _____

14-17. Name and describe the four types of lightning.

1. _____ - _____

2. _____ - _____

3. _____ - _____

4. _____ - _____

18. What "fuels" a tropical cyclone? _____

19. What is Tornado Alley? Explain. _____

20. What is a storm surge? _____

21. Give the name for each stage of tropical cyclone based on its rotating speed:

1. less than 39 mph = _____

2. 39-73 mph = _____

3. 74 mph or more = _____

22. The _____ is the swirling, condensed air that is the distinctive visual feature of a tornado.

23. The _____ creates the brilliant flash of light that be seen when lightning strikes.

24. Why is the eye of the storm (hurricane) calm? _____

25. What is heat lightning? _____

26. What terms are used for "hurricanes" in other parts of the world?

- In the Western Pacific & Indian Ocean → _____

- In the Philippines → _____

27. A _____ is long advancing line of multiple-cell thunderstorms.

28. Describe the eye wall:

- Define it - _____

- What's it formed from - _____

- How high can it reach - _____

29. At what point does a tropical disturbance become a tropical cyclone? _____

30. What is a stepped leader? _____
