Lab 17b: sky: severe weather: hurricanes and tornadoes

Sections:

- Where does the energy come from?
- Where is it all going?
- Heat engines: cars, steam engines, hurricanes, tornadoes
- Convection drives everything
- Radiation->conduction->convection
- Coriolis effect
- Where do hurricanes form, where do they go, and why?
- Where do tornadoes form, where do they go and why?

Part one: Sea temperatures

1. look up the surface sea temperatures off the west coast of Africa and Mexico
2. why would hurricanes form there?
3. what is the difference between radiation, conduction and convection
4. solar radiation hit sea water, which is this?
5. warm water heats the air next to it, which is this?
6. warm air rises, which is this?
7. warm air holds more water (evaporated water), is this a form of stored energy?
8. what happens as this warm, moist air rises?
9. if you dribble water from the north pole to the equator while the globe spins, which way will the water go?
10. look up a "heat engine". how is a hurricane like a smokestack?
11. if a storm gets large (like 100 km across), with one part closer to the equator, what will happen?
12. why do storms in the southern hemisphere rotate clockwise, while those in the north rotate counter-clockwise?
13. draw a diagram of a hurricane over water, including temperatures from sea level to 50,000 ft (15 km)

Part two: coriolis effect, hurricanes

1. if you dribble water from the north pole to the equator while the globe spins, which way will the water go?
2. look up a "heat engine". how is a hurricane like a smokestack?
3. if a storm gets large (like 100 km across), with one part closer to the equator, what will happen?
4. why do storms in the southern hemisphere rotate clockwise, while those in the north rotate counter-clockwise?
5. why would a hurricane form off the coast of Africa?
6. where would it go?
7. what about one off the coast of Mexico?
8. why do all hurricanes veer north in the northern hemisphere?
9. why would a hurricane crossing from the Atlantic over Florida as a category 1 storm become a cat 5 when it reaches the gulf of Mexico?
10. what is the ocean surface temperature in each place?
11. look up the Saffir-Simpson scale-how is this similar to the Richter scale?
12. draw a map of several Pacific hurricanes that have reached Hawaii and caused damage: Iwa, Iniki and others.

Part three: tornadoes

1. look up "tornado alley", where is it?
2. look up the ocean sea temperature in the gulf of Mexico
3. look up the air temperature in Canada (say Alberta) in the spring, summer and fall
4. imagine this cooler air moving south, while the warm moist air from the gulf move north-what happens?
5. where?
6. as these happens, is the coriolis effect present?
7. so?
8. why do all tornadoes move in the north east direction (look up the Tri-state tornado of 1925 and others: https://www.thezebra.com/resources/home/worst-tornadoes-in-us-history/)
9. look up the Fujita scale-how is it similar to the Richter scale?
10. Draw a map of three of these huge tornados tracing their path
11. why would folks open all of the windows in their house before running into a storm shelter?
12. watch the opening clips of the film "twister" and find out what Fujita rating this tornado was in the film

---

Migrated from Apple Server Wiki. Original page ID: C3e6v7i

Revision #2
Created 2026-09-29 06:31:00 UTC by Admin
Updated 2026-09-29 06:34:43 UTC by Admin