**PAESTA Podcast Series – You Asked, We Answered!**

**Episode 33 – What is a thunderstorm?**

Alexis Davis, Undergraduate Student, Penn State Brandywine

Hi everyone! My name is Alexis and I am an undergrad student at Penn State Brandywine. Today I will be answering a question for you. The question I will be answering for you is “What is a Thunderstorm?” First off here is a basic definition. A thunderstorm is a localized storm that is produced by a cumulonimbus cloud and always contains thunder and lightning. [1] They form in conditionally unstable environments, which means there is a cold, dry air aloft over warm, moist surface air. For a thunderstorm to form there needs to be three key ingredients. [2] First there must be moisture. Moisture must be present in the lower levels of the atmosphere. Next there needs to be cold air. The cold air must be present in the upper atmosphere. And finally there must be a catalyst to push the warm air into the cold air. The catalyst is usually in the form of a front, which is the interface between air masses at different temperatures. Thunderstorms also can be measured as strong or severe. Some thunderstorms can also be neither. [2] A severe thunderstorm has winds greater than or equal to 58 miles per hour. If a thunderstorm is severe enough they can become a supercell thunderstorm. A supercell thunderstorm is the type of storm that will most likely spawn into a tornado. [2]

Thunderstorms usually go through a series of stages from birth to decay. The first stage is cumulus stage, which is dominated by updrafts. [1] The updrafts bring in warm, moist air, which cools and condenses as it rises. When the clouds develop more and precipitation starts to fall, a downdraft is produced. Next is the mature stage. This is the most intense stage. The mature stage brings a strong updraft which is still present. [2] This will supply the warm, moist air, but the strong downdraft is also evident. The following final stage is the dissipating stage, which is due to the deprivation of energy from the updraft. The storm doesn’t have a supply of warm moist air to maintain itself. Light rain and weak outflow winds may remain for a while during this stage. [3]

Even though we have plenty of information on thunderstorms there are still some unanswered questions about them. For example, we still do not fully understand how nighttime thunderstorms form. We have a clear understanding of daytime thunderstorms, but nighttime thunderstorms are still a mystery. Forecasts still struggle to predict when a nighttime storm will appear and how bad it will be. [4] Nighttime thunderstorms can be more unpredictable than hurricanes! Meteorologists know when a nighttime thunderstorm will form, but they don’t know how bad they’ll get for the most part. [4] We have a hard time understanding nighttime thunderstorms because we can’t see them as easily as the daytime thunderstorms. Daytime and nighttime storms have the same ingredients but are mixed very differently. One big reason we can’t see nighttime thunderstorms is because all of the action happens in a layer of the atmosphere that we can’t observe easily. [4] If we could get a better idea on how to predict a nighttime storm we could help residents in a particular location prepare for the worst. We could also help farmers know whether their crops will be getting enough water or not.

In conclusion thunderstorms aren’t just rain and lightning, there is a lot that goes into making them happen. And even though we know much about them, some concepts are still a mystery today! Thank you all for listening to me answer the question, “What is a Thunderstorm?” I hope I answered some of your questions. Once again this is Alexis from Penn State Brandywine I hope you all a have a great day!

(This audio file was recorded by Alexis Davis on 11/9/16)

**Work Cited**

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[4] Lee, J. J., 29, N. G. P. J., & 2015. (2015, July 29). Chasing Nighttime Thunderstorms, Trying to Crack Their Mysteries. Retrieved September 6, 2016, from <http://news.nationalgeographic.com/2015/07/150729-nighttime-thunderstorms-severe-weather-atmosphere-science/>