

Learning about Air Masses

Air masses are large volumes of air that have the same temperature and humidity. Air masses are always moving and changing but some places are more likely to have a certain type of air mass. Take a look at these four places and the types of air masses that they usually have:



Canada

Has cold and dry air masses that make you feel really cold.

Oregon

Has cold and humid air masses that make you feel really chilly.

Arizona

Has hot and dry air masses that make you feel hot and really thirsty.

Florida

Has hot and humid air masses that make you feel hot and sticky.

Learning about Air Masses (cont.)

How do air masses cause changes in weather?

When air masses meet, they cause big changes in the weather. Here are some examples of what can happen when two air masses meet.

This Air Mass	Hits → This Air Mass	How Air Moves	Change in Weather
Hot & Dry	Cold	Hot air gently cools as it glides above cold air.	Gentle winds, no clouds, or small puffy clouds.
Hot & Humid	Cold	Hot air gently cools as it glides above cold air.	Gentle winds, lots of grey clouds, gentle rain or snow.
Cold	Hot & Dry	As cold air slams into hot air, hot air rises and cools really fast.	Strong winds, no clouds or small puffy clouds.
Cold	Hot & Humid	As cold air slams into hot air, hot air rises and cools really fast.	Strong winds, strong rain or snow, storms or even tornadoes.

Steps to Become an Expert Witness

Step 1: Choose a Case

There are two cases described below. Read about each case and decide which one you want to provide an expert testimony for.

Case #1: Did Heavy Rains Cause a Sheep Breakout?

- Background Information:
 - On Monday, the owner of a small farm went into the police station to report that something had crashed through his gate and all of his sheep had escaped. The police investigated and found a car several miles downhill, flipped over and completely drenched with water. The car had pieces of wood from the farmers gate sticking out of it. When police talked to the owner of the car, he claimed to have left it on a road near the farm after getting a flat tire late Sunday night. He claims that he went back the next day and his car was gone. He claims the recent heavy rains must have washed his car down the side of the hill through the farmers gate. There is currently a trial being held to determine if the owner of the car is responsible for the farmer's wrecked gate.

- Your Job:
 - Prepare a testimony to present during the trial about whether or not poor weather conditions could have washed the car down the hillside or if something else must have happened.
 - Use the information below on air masses to decide if you think the owner of the car is telling the truth.

- Information on Air Masses:
 - The air masses in the area were as follows:
 - Sunday - Hot and humid air mass over the area
 - Monday- Hot and humid air mass over the area
 - Tuesday - Cold air mass moves into the area
 - Wednesday - Cold air mass over the area

Case #2: Man Accused of Murder

- Background Information:
 - A man is currently on trial for murdering his neighbor. A key piece of evidence in the case is that the accused man had a large scratch on his hand the day after the murder. The accused man claims that the scratch on his hand happened when he was walking his dog in the rain and he slipped and fell. The prosecutor is arguing that there is no way it rained the day the murder happened and the scratch occurred when he killed the neighbor.

- Your Job:
 - Prepare a testimony to present during the trial about whether or not the accused murderer could have gotten the scratch due to slipping and falling on wet ground.
 - Use the information below on air masses to decide if the accused murderer is telling the truth.

- Information on Air Masses:
 - The air masses in the area were as follows:
 - Two days before the murder- Cold air mass over the area
 - One day before the murder- Cold air mass over the area
 - The day of the murder- Hot and humid air mass moves over cold air mass
 - The day after the murder- Hot and humid air mass over the area

Step 2: Prepare Your Testimony

You will now prepare your testimony. A testimony is similar to a speech. During a testimony, a person shares his or her opinion that can help in the court's decision. You will say your testimony out loud in front of the court and explain whether or not you think the people accused of a crime are telling the truth or not.

Requirements for your testimony:

- Must be written down or typed out on a piece of paper.
- Must be at least one minute long when you read it out loud during a trial.
- Must use professional language.
- Must include the following information:
 - Statement about why you are qualified to give your opinion during a trial. Remember, you are a meteorologist!
 - A summary of your interpretation of the evidence. Based off of what you know about air masses, do you think the insurance company should pay for the damage? Why or why not?
 - An explanation of what air masses are and how they can be used as evidence to understand how the air masses involved in this case typically act (what would you expect to happen when those two air masses meet?)

Other requirements:

- Do not use absolute statements. An absolute statement promises that things will happen the exact same way every time, which is not true. This means you should not make statements like “in all cases” or “every time.” Instead use terms like “most often” or “typically.”
- Do not take sides. While your testimony should explain what you think happened, you should explain the facts clearly and without including your own opinion. For example, do not say things like, “He/she is a liar!” Instead say things like, “In my experience, I do not think it could have happened as he/she claims.”
- Use words that the jury will understand. If you need to discuss things that many people are unfamiliar with, be sure to define them. Do not assume that the jury knows what you are talking about. For example, you may need to define vocabulary terms like air mass.

Teacher Key

Case #1: Did Heavy Rains Cause a Sheep Breakout?

Answer: The owner of the car was most likely lying. Air masses show that the weather was hot and humid with no changes from other air masses. The cold air mass moving in could have caused heavy rain and floods to push the car down the hill, but that didn't happen until Tuesday. The farmer noticed that his gate was wrecked on Monday. Something else must have happened for the car to end up crashing through the farmer's gate.

Case #1: Did Heavy Rains Cause a Sheep Breakout?

Answer : The murderer may have slipped while he was walking his dog during the rain. There had been a cold air mass over the area. And, on the day of the murder, a hot and humid air mass moved over the cold air mass. This would cause a gentle rain that many people would still walk their dogs in. The day after the murder, the air was still hot and humid. If it had been raining really hard, the hot and humid air mass would have lost all its moisture and become a hot and dry air mass. The accused man might be telling the truth about how he got the scratch on his arm. The jury will need to look for other evidence to see if he might still be the killer. The scratch is not enough evidence.