In this video, I'm going to summarize the life cycle of a single-cell thunderstorm. Basically, single-cell thunderstorms have three stages: the cumulus stage, the mature stage, and the dissipating stage.

In the cumulus stage, the cloud is dominated by updrafts as cumulus congestus, or towering cumulus, cloud develops. As updrafts accelerate, low-level air converges in from miles around to feed the updraft.

Eventually as the cloud grows very tall and cold, the top of the cloud becomes glaciated, and a cumulonimbus cloud is born. The glaciated top of the cumulonimbus cloud is a sign that the storm is about to reach the mature stage, which formally begins when precipitation reaches the ground. In the mature stage, the storm cloud contains both prominent updrafts and downdrafts.

When the downdraft splashes down on the ground, it spreads out laterally, much like water from a kitchen faucet hitting the sink below. The gathering area of rain-cooled air spreading out along the ground is called the "cold pool,” and its leading edge is called a **gust front** or **outflow boundary. If you've ever felt a rush of cooler air and gusty winds before a shower or thunderstorm, you've noticed the passage of the gust front.**

**The mature stage is really the most intense part of the storm.** Updrafts attain their fastest speeds. Lightning is most frequent. Rain is heaviest. Radar reflectivity is greatest. Cloud tops are highest, and the glaciated anvil that forms near the tropopause becomes most prominent.

But, after about 10 minutes or so in the mature stage, the cell transitions to the dissipating stage as the storm's cold pool expands and cuts off the updraft's access to buoyant, warm, moist air. As the updraft fades, the cloud becomes dominated by downdrafts in the dissipating stage as the storm "rains itself out" and dies.

The birth, life, and death of a single-cell thunderstorm typically takes less than 45 minutes. As a final summary, here's a 2-part schematic showing the evolution of a single-cell thunderstorm. The top panel shows a time sequence of a cross section through a single-cell thunderstorm, showing idealized radar composite reflectivities. The bottom panel shows a corresponding time sequence of idealized radar base reflectivities, with the observer looking down on the top of the single-cell storm.

The first 15 minutes or so are spent in the cumulus stage as a towering cumulus cloud develops and precipitation-sized targets develop within the cloud toward the end of the cumulus stage, which generates some radar reflectivity within the cloud. By 20 minutes or so, we're into the mature stage, and rain reaches the ground, while the downdraft splashes down and the gust front spreads out from the storm. You can sometimes see gust fronts on radar images because the radar detects things like bugs, and small airborne particles like dust and dirt, which collect along the boundary because of low-level convergence. After about 25 minutes, the storm begins to transition to the dissipating stage, as the gust front spreads farther out from the center of the storm and the updraft fades. Now dominated by downdrafts, the storm is essentially in the process of raining itself out and dying.