1. Read the article carefully.
2. Highlight passages where you have a strong reaction (positive or negative).
3. Circle words you don't know.

**After asteroid hit, a giant cloud of smoke led to dinosaurs' demise, study says**

Source: Megan Daley, *Los Angeles Times*, July 15, 2016

It is widely acknowledged that the dinosaurs were obliterated by the massive Chicxulub asteroid smashing into Earth around 66 million years ago — yet the exact details of what caused the extinction have remained a mystery.

Now scientists have a new theory about how that catastrophe caused the demise of so many creatures but left others comparatively unscathed.

Researchers from Japan argue that the 6-mile-wide chunk of rock slammed into an oil field in the present day Yucatán Peninsula and triggered a burning inferno that launched a massive cloud of smoke into the sky.

The resulting layer of soot that enveloped the globe would have been just the right thing to kill the dinosaurs and most other land-dwelling creatures, said study lead author Kunio Kaiho, a paleontologist at Tohoku University in Japan.

But the cloud would have let in enough sunlight to allow some animals to survive, he and his colleagues wrote in Scientific Reports.

Previous studies have postulated that the asteroid sparked the mass extinction by releasing high levels of sulfuric acid particles in the atmosphere. The particles would have caused complete darkness, near-freezing temperatures and acid rain.

A study published in 2014 found that sulfuric acid particles don't hang around for very long after an asteroid impact. Even if they did, Kaiho and his colleagues hypothesize that the resulting conditions would have likely wiped out all creatures on Earth, not just the dinosaurs.

So the researchers began to look elsewhere for answers.

Soot from the immense fire caused by the Chicxulub impact was a prime candidate. The powdery substance is primarily made of black carbon that results from incineration of organic matter. The tiny particles are about a million times more light-absorbing than carbon dioxide.

The Japanese team collected samples of sediment along the Cretaceous-Paleogene boundary — a thin band of rock that marks the timing of the extinction of dinosaurs — in locations about 600 miles outside the crater in Haiti and about 3,700 miles away in Spain. Samples from both locations had the same composition of soot, indicating that they came from the same source, Kaiho said.

The researchers hypothesize that soot was slowly deposited on land in the five years following the massive collision. Based on the samples they collected, they estimated a range of values for the amount of soot that could have risen into the sky and coated the atmosphere. Then they plugged those estimates into global climate models to see how the air and ocean water temperatures, rainfall and sunlight would have changed during the 15 years after the impact.

They found that a mass of 1,500 teragrams — the equivalent of about 300 Pyramids of Giza — would have been just right to make life on Earth nearly intolerable for the dinosaurs, while sparing smaller mammals and crocodilian creatures.

The soot would have started wreaking havoc almost immediately after the asteroid crashed into land, shooting high into the atmosphere. From there, it would have spread around the planet in a matter of months, Kaiho said.

The layer of soot would have blocked about 85% of sunlight from reaching Earth and cut rainfall by nearly 80%, creating near-drought conditions. And because the sunlight decreased so drastically, temperatures would have plunged by up to 60 degrees Fahrenheit.

In this post-asteroid wasteland, plants began to die off, cutting off the food supply to creatures higher up the food chain — such as the dinosaurs.

Although the amount of soot in the atmosphere would have dropped by nearly 50% within the first year, it would have taken about seven years for the climate to return to normal, Kaiho said.

Crocodilians, birds, small mammals, and most ocean creatures survived because their habitats afforded them protection from the chilling temperatures. Also, they were able to maintain a diet lower on the food chain.

But this may not be the whole picture, said Andrea Dutton, a geochemist at the University of Florida who wasn't involved with this study.

The researchers modeled just the short period after the asteroid impact, but previous studies have shown there was a lot more going on at the time, she said.

Lava had been flowing from the Deccan traps in India for about 250,000 years before the asteroid hit, and a study published in 2015 found that the impact may have instigated an additional eruption there.

A volcanic eruption of this sort would have added a significant amount of carbon dioxide to the atmosphere, Dutton said. That would have caused temperatures to rise, not fall.

"So what someone really needs to do now is do the modeling to combine these two things together and see how they superimpose," she said

**Possible Response Questions:**

*Remember to support your claim with at least three pieces of evidence.*

- Do you agree with this theory? Explain?
- Select a passage and reflect on it.