

“Troposphere” (Excerpt)

By Bill Bryson

Thank goodness for the atmosphere. It keeps us warm. Without it, Earth would be a lifeless ball of ice with an average temperature of minus 60 degrees Fahrenheit. In addition, the atmosphere absorbs or deflects incoming swarms of cosmic rays, charged particles, ultraviolet rays, and the like. Altogether, the gaseous padding of the atmosphere is equivalent to a fifteen-foot thickness of protective concrete, and without it, these invisible visitors from space would slice through us like tiny daggers. Even raindrops would pound us senseless if it weren't for the atmosphere's slowing drag.

The most striking thing about our atmosphere is that there isn't very much of it. It extends upward for about 120 miles, which might seem reasonably bounteous when viewed from ground level, but if you shrank the Earth to the size of a standard desktop globe, it would only be about the thickness of a couple of coats of varnish.

For scientific convenience, the atmosphere is divided into four unequal layers: troposphere, stratosphere, mesosphere, and ionosphere (now often called the thermosphere). The troposphere is the part that's dear to us. It alone contains enough warmth and oxygen to allow us to function; though even it becomes uncongenial to life as you climb up through it. From ground level to its highest point, the troposphere (or “turning sphere”) is about ten miles thick at the equator and no more than six or seven miles high in the temperate latitudes where most of us live. Eighty percent of the atmosphere's mass, virtually all the water, and thus virtually all the weather, are contained within this thin and wispy layer. There really isn't much between you and oblivion. . . .

After you have left the troposphere the temperature soon warms up again, to about 40 degrees Fahrenheit, thanks to the absorptive

(Continued)

**[FOR TEACHER
REFERENCE ONLY]**

SAMPLE THINK-ALOUD

Lesson 7. Noticing the Text Structures in Nonfiction Texts:
Putting It All Together

“Troposphere” (Excerpt) by Bill Bryson

Thank goodness for the atmosphere.

*I'm noticing right off the bat that Bryson is making a **direct statement** of generalization about the world. The text structure makes it sound like a claim in an argument that he is going to have to back up. He is going to explain why we should be grateful for the atmosphere. This comment also makes me think that the topic of this chapter is going to involve important characteristics about the atmosphere. I'm also noticing **calls to attention**: beginnings and emotion.*

It keeps us warm.

And just like that, he starts supporting his claim.

Without it, Earth would be a lifeless ball of ice with an average temperature of minus 60 degrees Fahrenheit.

Here is another important detail about what it means to be warm. I'm noticing that the author just compared Earth with an atmosphere to Earth without an atmosphere to help us see why the atmosphere matters. I'm going to be on the lookout for more text structure comparisons like this.

In addition, the atmosphere absorbs or deflects incoming swarms of cosmic rays, charged particles, ultraviolet rays, and the like.

*Again, he is supporting his claim or **direct statement** of generalization with specific details about why we should be grateful to the atmosphere.*

Altogether, the gaseous padding of the atmosphere is equivalent to a fifteen-foot thickness of protective concrete,

Oh! Here is another great text structure comparison—invisible air and thick concrete. I can more easily imagine how concrete protects and blocks. I have to remember to notice comparisons and metaphors.

and without it, these invisible visitors from space would slice through us like tiny daggers.

Yikes! He's comparing tiny particles to deadly daggers. That's another metaphoric comparison, and it really drives the point home with its specificity and visual and emotional effect.

Even raindrops would pound us senseless if it weren't for the atmosphere's slowing drag.

(Continued)



SAMPLE THINK-ALOUD (CONT.)

*Let's put it all together. All the advantages and benefits of the atmosphere are building up in a kind of list. And lists are always a **call to attention**. This latest element in the list adds an important supporting detail and a comparison about how raindrops would act without the atmosphere versus with the atmosphere. This is another **call to attention** through exaggeration and the emotional response I have to being pounded senseless.*

The most striking thing about our atmosphere is that there isn't very much of it.

*Here is a **rupture** with a movement or shift and a surprise: The atmosphere seems pretty big to me.*

It extends upward for about 120 miles,

*Hmm. How far is 120 miles? Seems like a lot. That's how far it is from Boise to Twin Falls. This is a bit of a **rupture**, so it also seems like a key detail that I need to highlight or circle.*

which might seem reasonably bounteous when viewed from ground level,

*The text structure presents an implied comparison. I notice that Bryson just used some language to make me think he is going to challenge an assumption about the size of the atmosphere—"which might seem." This shows he's going to do a comparison and **rupture** my assumption.*

but if you shrank the Earth to the size of a standard desktop globe, it would only be about the thickness of a couple of coats of varnish.

Oh, I really like what he did here! He made a comparison and scaled Earth and its atmosphere down to a size that we can better understand. He shifted our perspective. He continues the throughline of how little atmosphere we have. In fact, let's take a quick look at this using a globe and some clear plastic wrap.

Pause here and use the plastic wrap to cover the globe. Say something like this:

"Plastic wrap is the same thickness as varnish, but much easier to work with. Let's tear off four pieces of plastic wrap—to represent the four layers of the atmosphere—and layer them on the globe."

When you have finished the globe activity, have students continue the think-aloud of Bryson's text in pairs, alternating sentences.

Source: Bryson, B. (2003). *A short history of nearly everything*. New York, NY: Broadway Books.