



## **Science Exemplary Text Student Handout**

Physicists are hunting for an elusive particle that would reveal the presence of a new kind of field that permeates all of reality. Finding that Higgs field will give us a more complete understanding about how the universe works.

Most people think they know what mass is, but they understand only part of the story. For instance, an elephant is clearly bulkier and weighs more than an ant. Even in the absence of gravity, the elephant would have greater mass—it would be harder to push and set in motion. Obviously the elephant is more massive because it is made of many more atoms than the ant is, but what determines the masses of the individual atoms? What about the elementary particles that make up the atoms—what determines their masses? Indeed, why do they even have mass?

We see that the problem of mass has two independent aspects. First, we need to learn how mass arises at all. It turns out mass results from at least three different mechanisms, which I will describe below. A key player in physicists' tentative theories about mass is a new kind of field that permeates all of reality, called the Higgs field. Elementary particle masses are thought to come about from the interaction with the Higgs field. If the Higgs field exists, theory demands that it have an associated particle, the Higgs boson. Using particle accelerators, scientists are now hunting for the Higgs.

Kane, Gordon. (2005). "The Mysteries of Mass." *Scientific American Special Edition*. December 2005.

This is an example of exemplary text found in *Common Core Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects: Appendix B Text Exemplars and Sample Performance Tasks*. Retrieved from [http://www.corestandards.org/assets/Appendix\\_B.pdf](http://www.corestandards.org/assets/Appendix_B.pdf)

## Science Exemplary Text Teacher Resource

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**EFL 6**  
**Word Count 240**

*Teacher introduces the text with minimal commentary and students read it independently. Teacher then reads passage aloud. Give a brief definition to words students would likely not be able to define from context (underlined in text). Teacher guides the students through a series of text-dependent questions. Complete the performance task as a cumulative evaluation of the close-reading.*

### Text-Dependent Questions

1. What unanswered question(s) about mass does the text raise?
2. How does the text define the Higgs field and explain its importance?
3. How does the author use the ant and the elephant to explain that mass is complicated?
4. What do we need to learn in order to understand the interdependence of mass?
5. If the Higgs field does exist, what must also exist in association with it?

### Performance Tasks for Informational Texts

Students analyze the concept of mass based on their close reading of Gordon Kane's "The Mysteries of Mass" and cite specific textual evidence from the text to answer the question of why elementary particles have mass at all. Students explain important distinctions the author makes regarding the Higgs field and the Higgs boson and their relationship to the concept of mass. [RST.11–12.1]

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