



## **Science Exemplary Text Student Handout**

The birth began in a young star. A young star is a mass of hydrogen nuclei. Because the star is hot (about thirteen million degrees at the center), the nuclei cannot hold on to their electrons. The electrons wander around. The nuclei of hydrogen—that is, the protons—are moving about very fast too. From time to time one proton runs headlong into another. When this happens, one of the protons loses its electric charge and changes into a neutron. The pair then cling together as a single nucleus of heavy hydrogen. This nucleus will in time capture another proton. Now there is a nucleus with two protons and one neutron, called light helium. When two of these nuclei smash into each other, two protons are expelled in the process. This creates a nucleus of helium with two protons and two neutrons.

This is the fundamental process of fusion by which the primitive hydrogen of the universe is built up into a new basic material, helium. In this process, energy is given off in the form of heat and light that make the stars shine. It is the first stage in the birth of the heavier atoms.

Bronowski, Jacob, and Millicent Selsam. (1965). *Biography of an Atom*. New York: Harper.

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

The birth began in a young star. A young star is a mass of hydrogen **nuclei**. Because the star is hot (about thirteen million degrees at the center), the nuclei cannot hold on to their electrons. The electrons wander around. The nuclei of hydrogen—that is, the protons—are moving about very fast too. From time to time one proton runs headlong into another. When this happens, one of the protons loses its electric charge and changes into a neutron. The pair then cling together as a single **nucleus** of heavy hydrogen. This nucleus will in time capture another proton. Now there is a nucleus with two protons and one neutron, called light helium. When two of these nuclei smash into each other, two protons are **expelled** in the process. This creates a nucleus of helium with two protons and two neutrons.

This is the fundamental process of **fusion** by which the primitive hydrogen of the universe is built up into a new basic material, helium. In this process, energy is given off in the form of heat and light that make the stars shine. It is the first stage in the birth of the heavier atoms.

Bronowski, Jacob, and Millicent Selsam. (1965). *Biography of an Atom*. New York: Harper.

**EFL 5**  
**Word Count 197**

*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. In a young star, why can't the hydrogen nuclei hold on to their electrons?
2. How does a neutron form?
3. When the two light helium nuclei smash together what happens and what forms?
4. Why are helium atoms heavier than hydrogen atoms?
5. What is given off as the result of the process of fusion?

### Performance Tasks for Informational Texts

Explain how this process of atoms forming leads to a star's birth. [RST.9-10.2]

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)