

**NOTE:**

This document contains both the pre- and post- test and the pages are labeled accordingly.

Before giving the pre-test, please inform the students that you do not expect them to know all or even many of the answers, but that the pre-test is simply to gauge their previous knowledge of the subject.

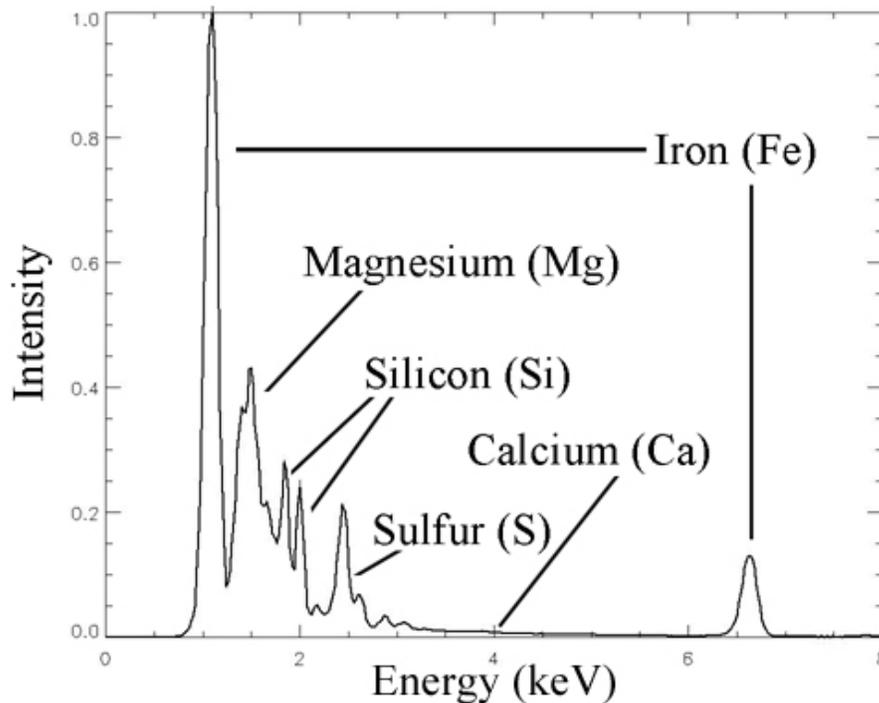
# Dying Stars and the Birth of the Elements

## Pre -Test

Name \_\_\_\_\_ Major \_\_\_\_\_  
Graduation Date \_\_\_\_\_

Circle the correct answer or fill in the blank.

1. Where did the iron in the Earth and in your blood come from?
  - a) It was created in the Big Bang.
  - b) It has always existed.
  - c) It was created in supernova explosions.
  - d) It is not known where it came from.
2. X-ray spectra from a supernova remnant (the gas expanding after a star explodes) can tell us
  - a) the temperature of the gas.
  - b) the elemental composition of the gas.
  - c) the amount of absorbing material between us and the gas.
  - d) none of the above
  - e) all of the above



**Figure 1:**  
An X-ray spectrum of  
a supernova remnant

3. Figure 1 shows a spectrum of a supernova remnant. If the amount of silicon in the gas were to increase, the two bumps in the spectrum labeled “silicon” would
- be higher.
  - be lower.
  - remain unchanged.
  - disappear.
4. Looking again at Figure 1, if you measured the x-ray spectrum of *a different part* of the supernova remnant, the intensities (heights) of the peaks shown in the figure would
- stay the same.
  - all increase.
  - all decrease.
  - some peaks would increase and some would decrease
  - all of the above are possible
5. Massive stars explode because they
- contain oxygen which is flammable.
  - run out of fuel.
  - collide with other stars.
  - massive stars don't explode
6. What happens to the iron in a supernova remnant?
- It all falls back onto the newly formed black hole.
  - It combines to form a new star at the center of the remnant.
  - It gets dispersed into the Galaxy and becomes part of newly forming stars and planets.
  - It disappears.

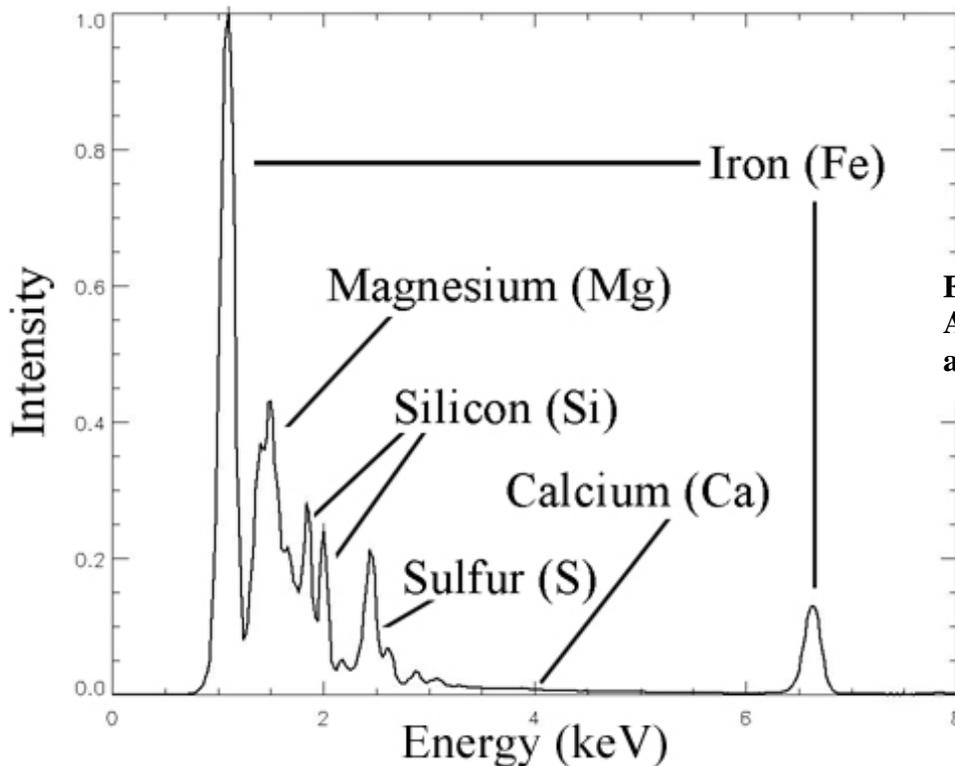
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Graduation Date \_\_\_\_\_

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