Environmental Science Institute
UNIVERSITY OF TEXAS AT AUSTIN

Classifications of Stars

Subject: Science

Grade Levels: 3rd – 5th

Rational or Purpose:
This lesson shows the students the comparisons we make when looking at stars and how we classify them by the HR diagram.

Materials needed: (For the class)

- Pictures of stars. (PowerPoint)
- Small white bead
- Golf ball
- Basketball
- How Stars are born worksheet
- Small flashlight

Lesson Duration: 1 hour

Source:
"How Hot is That Star" The Center of Science Education, UC Berkeley

TEKS:
3rd: 2(e), 3(a), 11(d)
4th: 2(e), 3(a)
5th: 2(3), 3(a), 8(a), 12(d)

Background:
Two astronomers named Hertzsprung and Russell, developed a diagram which plots stars on a system from their light magnitude or brightness against spectral types or how hot the star is. In this system there are various trends. Usually the bigger the star, the cooler it is. Super giant stars are cooler than dwarf stars. However, color is also a factor in the graph. Blue stars are the hottest and red stars are the coolest. Our Sun is in the middle as a medium sized, yellow to red star. This diagram is an easy way to classify new stars and evolving stars.

Activity:
Students will be able to explain how a star is born, describe characteristics of different types of stars, and learn how to use the HR diagram.

Procedure:

1. Ask students to think about our Sun. Is our sun very big or small compared to other stars? Also is it the hottest or brightest star or not? Here are some pictures of stars. (Show pictures on PowerPoint.)

2. Pass out the how stars are born worksheet for the students to read over.

3. Go through the stages of the life cycle of a star for clarification. You might want to use a visual aid like the pictures in the PowerPoint.

4. Lets start classifying some stars. We will begin with the smallest stars. (Hold up the bead) "I have here a small star. This star is really as big as city. These are called Neutrons."

5. (Hold up the golf ball) This is the next largest star. We call these dwarfs. These can range in size from as big as Earth to the size of our sun.

6. (Hold up the basketball) This is the next largest star. These are called giants. They are thirty times larger than our sun.

7. The last type of stars is 100 times larger than our sun. They are called Super giants. Explain that about 1/6th a classroom is about the size of a Super giant. It is huge!

8. The size of the stars is needed for the diagram we will be looking at today. (Show the HR diagram on the PowerPoint.) Size is one way we classify stars. What is another way we could classify the stars? Brightness, Color, and Temperature are other ways we can classify the stars. Let's first talk about Brightness and Temperature.

9. Usually the brighter the star is, the cooler the temperature is. This can be seen on the diagram. The super giants are super bright, but very cool. The white Dwarfs do not emit much brightness, but are very hot. We can look at some examples to see this correlation. A small flashlight is like a White dwarf, it emits some light, but it will not fill the room. It is also very bright when looking into it. Our classroom lights represent the super giants. These single lights are fairly dim, but collectively they emit enough light to light up the whole room.

10. Color is also seen as an indicator where the stars should go in the diagram. White and Blue stars seem to be the hotter stars and the yellow to red stars are much cooler. Yellow seems to be in the middle. Where would our sun be in this diagram?