



Luminosity – Energy Output of the Star

Evolution of Stars. Activity 5

Classroom Activity

Material List:

- Worksheet

Outline

By using a presentation and a computer animation you will explore the connection between the apparent brightness, absolute brightness and the distance of stars to understand the different luminosity classes of stars.

Procedure:

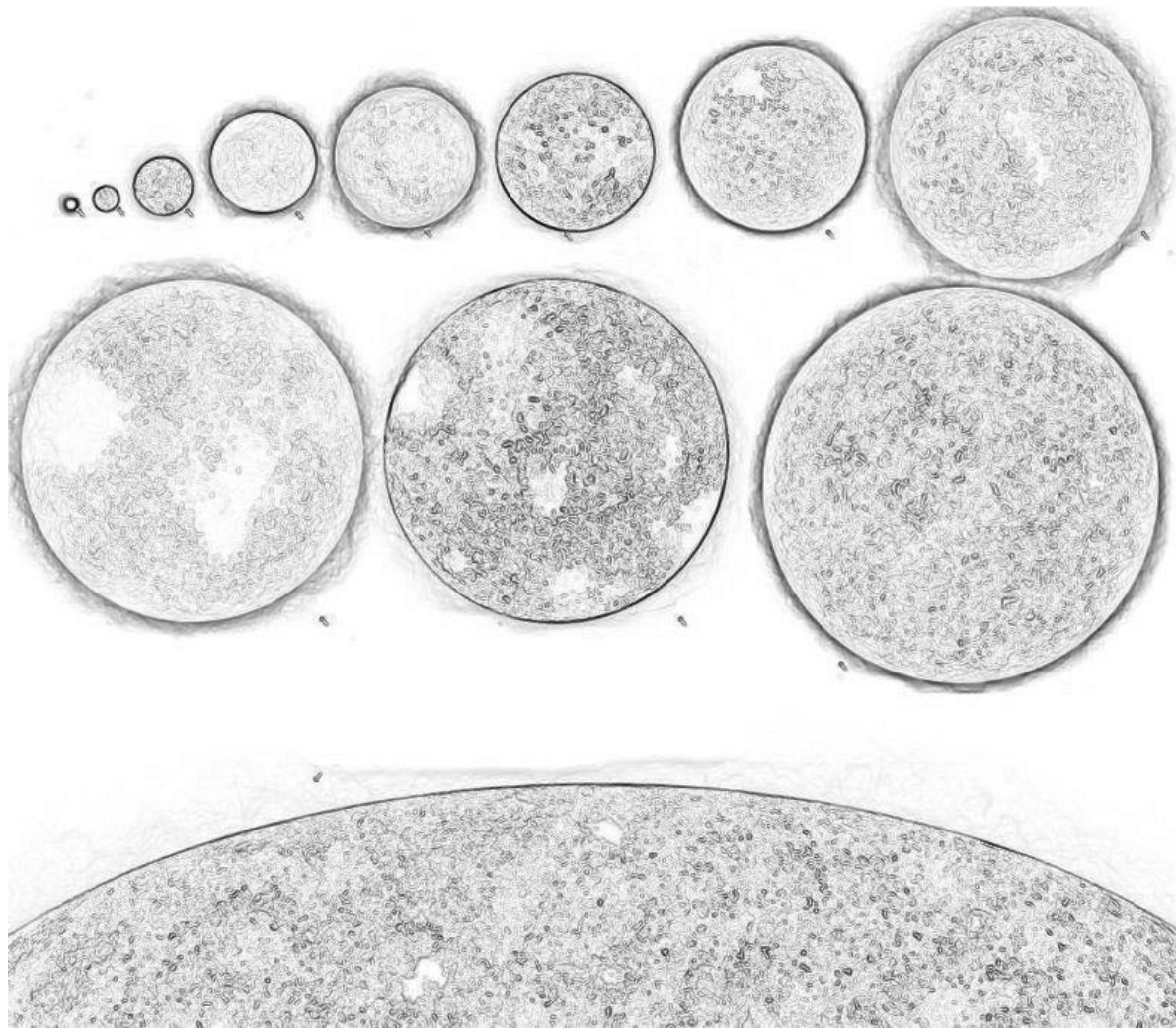
Step 1. To Do:

Watch the *Powerpoint* presentation. Write down the definitions:

Apparent magnitude is _____

Luminosity is _____

Absolute magnitude is _____



Label the stars on the picture, write down their luminosity classes!

Assessment:

Answer the questions:

1. Why is not possible to determinate the luminosity of the star from its apparent magnitude alone? _____
2. Spectral designation of the Sun is G5V. To which luminosity class it belongs?

3. Deneb is a white supergiant of spectral class A2. What is the spectral designation of this star? Use the Roman numeral of luminosity class! _____

Step 2. To Do:

Run the *ClassAction* software and open the animation *Stellar Properties/Distance Modulus Explorer*. Note that one of the rulers is always locked. If you want to input data, corresponding ruler must be unlocked.



Input the distance and the absolute magnitude of the star from the table and read the apparent magnitude from the animation. Fill the empty places at worksheet table and discuss the results with the teacher.

Table. Examples of different stellar luminosity classes

Luminosity Class	Example	Luminosity, solar units	Absolute magnitude, m	Distance, pc	Apparent magnitude, m
0; hypergiant	Rho Cassiopeiae	500 000		1000	2,0
I; supergiant	Gamma Cygni	33 000	-5,5		2,2
II; bright giant	Theta Scorpil	1800	-2,7	90	
III; giant	Arcturus	170		11	-0,1
IV; subgiant	Procyon	7	+2,7		0,1
V; main sequence dwarf	Tau Ceti	0,5	+5,7	4	

Assessment:

Answer the questions:

1. Are the stars mentioned in the table visible by the naked eye? _____

2. Gamma Cygni and Theta Scorpil have almost the same apparent magnitude. How many times the distance to Gamma Cygni is larger and luminosity higher?

3. Procyon is a very bright star. Does its luminosity is high as well? _____