Stellar Evolution In Orion - Activities (Ages 16-18)

Today we are going to investigate:

- How to identify the constellation Orion
- Investigate the different colours of its stars
- How a star's colour changes as it evolves
- Find out where new stars are formed

1

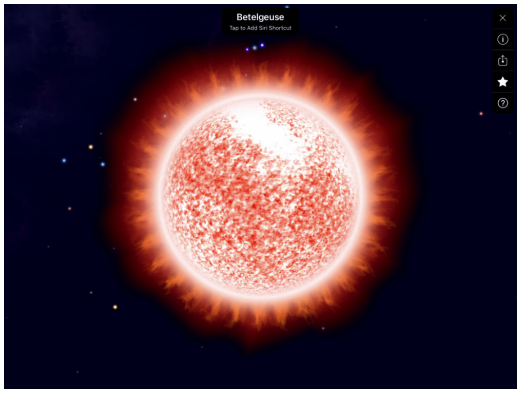
Activities

Start up Night Sky and use your finger to move around the sky. Find the constellation Orion, use the Search box in the Main Menu to find this constellation in the sky if you need to.

Question: Why do you think this constellation is so well known?

2

Look at the main stars in Orion. Tap on each star to see their names. Identify the star Betelgeuse and tap on it to see a close up 3D view. Note its colour. Close the 3D view by tapping the ⊠ in the corner. Find the star Rigel and repeat this. Note its colour.



Questions: a) Can you suggest what the difference in colour between these two stars tells us about their temperatures?

b) Our Sun is yellow, what does this suggest about its temperature compared to these two stars?

3

Betelgeuse and Rigel have similar masses and are at comparable distances from us. The major physical difference is one is more advanced in its lifetime. Astronomers call the lifecycle of a star **stellar evolution.**

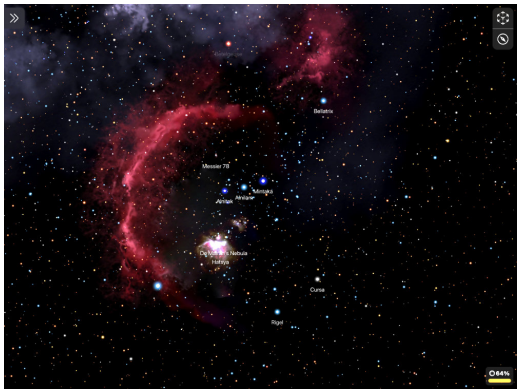
Question: Which of the two stars do you think is older?

4 As stars age their surface swells and cools. This means they give out more light in the red region of the spectrum. This is called the **red giant** phase. Rigel and Betelgeuse are examples of two similar stars at different stages of their lifetimes.

Question: Why do you think a star's surface cools as it swells?

5 The constellation of Orion also contains regions where many new stars are forming from clouds of gas and dust. Open the Main Menu and use the Search Box to find Messier 42 (The Orion Nebula). This is an example of a **stellar nursery**. Astronomers have found over 500 newly formed stars in this nebula.

Question: What physical process causes the gas in this nebula to glow?



What we have discovered:

- Orion contains stars at different stages of their lifecycles
- Stars ages can be estimated using the colour of light they emit.
- At the end of its life a star enters the red giant phase
- New stars form in clouds of gas and dust called stellar nurseries