



# Teacher Guide

## Unit 1 Physics

### Links to the Australian Curriculum: Senior Secondary Physics (Unit 1)

#### Thermal, nuclear and electrical physics

##### *Ionising radiation and nuclear reactions*

##### *Science as a human endeavor concepts include:*

- Science is a global enterprise that relies on clear communication, international conventions, peer review and reproducibility (**ACSPH009**)
- Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines (**ACSPH010**)
- Advances in science understanding in one field can influence other areas of science, technology and engineering (**ACSPH011**)
- Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions (**ACSPH014**)

#### **Purpose**

- To engage students in a citizen science research project
- To expose students to the nature of science as human endeavour

#### **Outcomes**

##### Students

- realise that galaxies, like stars have a life cycle and undergo evolution
- participate in scientific research
- understand the complex nature of scientific research
- appreciate that many individuals from different scientific disciplines cooperate in large-scale projects such as AstroQuest

#### **Getting started – Information for teachers**

In the context of nuclear fusion in stars, students examine galaxies in AstroQuest. Stars form through gravitational collapse of gas and dust. If the collapsing cloud of gas and dust is large enough, nuclear fusion may occur and the stars 'light up'. Gravity binds stars together to form galaxies. Galaxies can also interact with each other in mergers and collisions which results in distorted looking galaxies.

- There is comprehensive information and help available on the website.
- Once registered, you'll be presented with a short video tutorial by Dr Luke Davis. Luke is one of the many project scientists for AstroQuest. He provides a valuable insight into the project. From there, follow the prompts.
- Each webpage has helpful tutorials and information available via the 'i' icon.
- Click on the Help button in the top menu bar to return to the video and view FAQ's or ask your own question.
- Click on the Science button for background information about galaxies, the quest design and discoveries made by citizen scientists in astronomy.

Use the contact us form on the website if you would like some AstroQuest rewards for your students. We have seven different lenticular printed magnets featuring AstroQuest galaxies available.

#### **Student assessment**

This could take the form of a PowerPoint, poster, written report or student presentation to the class or a teacher-led class discussion.

Students select a galaxy and discuss how gravity influenced both star formation and shape of the chosen galaxy. ('The life and times of galaxies' section contains information on this topic). Students should include a discussion of the necessity for many personnel from different scientific backgrounds to collaborate on large-scale projects such as AstroQuest.

Some questions to consider:

- Why have the researchers made their data available to citizen scientists?
- What are the researchers hoping to achieve?
- Do you think that this is a valid method for scientific research?