ASTROPHYSICS

WITH PROFESSOR SNEŽANA STANIMIROVIC

Talking *points*

KNOWLEDGE

1. What do the acronyms GASKAP and LGLBS stand for?
2. Roughly, how many gigabytes of data will each survey produce?

COMPREHENSION

3. What makes the ASKAP and VLA telescopes more powerful than traditional telescopes?
4. What is stellar feedback, and how does it inhibit star formation?

APPLICATION

5. Snežana will use powerful telescopes to study the atomic hydrogen distribution in her target galaxies. What questions might this help her answer?

ANALYSIS

6. What advantages do next generation radio telescopes, like ASKAP and the VLA, have over traditional telescopes?
7. Both of Snezana's projects will produce an enormous amount of data. What are the advantages and disadvantages of this?

SYNTHESIS

8. Snežana and other astrophysicists are investigating why the process of star formation is so inefficient. Stellar feedback is one possible explanation. How else could this be explained?

EVALUATION

9. As well as producing practical applications, it is often said that astrophysics can help us better understand our origins and place in the Universe. To what extent do you agree with this?

CREATIVITY

10. As well as stars, astrophysics also explores the formation and evolution of exoplanets. What kind of questions could a survey like GASKAP or LGLBS explore, and how could they be answered?

Activities

Star formation timeline

The formation of a star is only the first stage of its lifecycle. Stars last for billions of years and go through many changes before eventually dying.

Watch these two videos recommended by Snežana:

www.youtube.com/watch?v=gXWsH65EH6A

www.youtube.com/watch?v=mkktE_fs4NA

Consider and discuss:

- What are the common stages of the star formation process?
- How long does each stage last?
- Why are stars born only in cold, dense clouds?
- Do all protostars have disks around them, and why?
- What effects does the protostar have on its surroundings?

Looking at the stars

The ASKAP and Very Large Array (VLA) telescopes mentioned in Snežana's article are interferometers.

The US's National Radio Astronomy Observatory (NRAO) has a page explaining interferometry.
public.nrao.edu/radio-astronomy/the-technology-of-radio-astronomy/

It has also produced a brilliant video about the VLA: **vimeo.com/70554007**

Create a presentation – either a poster, talk or PowerPoint – about these amazing instruments.

Consider:

- How do interferometers work?
- Why are most recent radio telescopes interferometers?
- How does Snežana's research make use of them?
- What have you learned – and what have you found particularly fascinating – about telescopes and astronomy?

More *resources*

- You can read Snežana's Annual Review of Astronomy and Astrophysics article here: **http://export.arxiv.org/pdf/1810.00933**
- The Astronomy Department at the University of Wisconsin has an outreach programme called UW Space Place: **www.spaceplace.wisc.edu**
- The Very Large Array (VLA) telescope is named the Karl G. Jansky Very Large Array after Karl Jansky who earned his physics degree from the University of Wisconsin in 1927. Read more about his life and achievements: **en.wikipedia.org/wiki/Karl_Guthe_Jansky**
- Have you ever wondered what you would need to build a telescope? The Haystack Observatory at the Massachusetts Institute of Technology (MIT) has developed the Small Radio Telescope (SRT) to show you! **www.haystack.mit.edu/haystack-public-outreach/srt-the-small-radio-telescope-for-education**