



## STUDENTS are WINNERS with SPACE TO GROW



For several years S2G team member Dr David Frew has been eager to investigate the enigmatic and little-studied nebula known as K1-6, imaged left. Together with staff and students at a Sydney high school associated with S2G, this aim was finally realised. Narrow-band colour images taken this year on Faulkes Telescope North conclusively showed it to be an old, very faint planetary nebula.

The central "ionizing" star of this nebula is moving through the interstellar medium causing a bright rim (or bow-shock) to be seen on the south side. In fact the central star is part of an unusual binary system thought to comprise of a very hot star that ionizes the gas causing it to glow together with another star about 20 times as bright as our Sun. The teacher and students played an active role in the reduction and analysis of the data. The paper has just been accepted for publication in a peer-reviewed refereed astronomical journal with students and teacher as co-authors! A major international press release will be out shortly to celebrate this milestone S2G result.

Further study of the object will be carried out in the wider astronomical community to fully unravel the mysteries of the central binary system once the paper is published.

## Student competition - music vouchers up for grabs!

Teachers and students have been adding to the data for the Senior Secondary Science Questionnaires (SSSQ) and Astronomy Diagnostic Test (ADT). At the end of National Science Week, overall completions are still only at 25%. These responses are key research data for the project.



**Important:** Changes to the SSSQ and ADT now allows separate submission of each page as data is entered.

As an incentive to fully complete responses, students could now win a \$15 iTunes music voucher (or similar). A special email address has been set up to let students know about the prize offer. Winners will be notified by email and the voucher will be sent (upon verification of details) directly to the student at school. To be eligible:

- ✿ 80% of that Year group overall must fully submit SSSQ and ADT data for any student in that class to go into the draw

- ✿ Names will be drawn randomly from that 80+% group. *Each school 'Year' can be awarded up to 3 prizes, depending upon the student numbers:*

1 to 10 pupils = 1 prize      11 to 20 pupils = 2 prizes      21 to more pupils = 3 prizes

**Features:** Star Project Partner, Feature Teacher, Team support and training, Quiz, News, Quiz answers

## Star Project Partner – CEO Parramatta



The Diocese of Parramatta is located in Sydney's west – from the Dundas Valley to Katoomba, Luddenham and Richmond, it is one of the fastest growing and diverse areas of New South Wales. The 76 Catholic systemic (54 primary and 22 secondary) schools in the diocese have a total of over 41,000 students. There are also six congregational (independent Catholic) schools.

Greater use is made of embracing technology to improve learning outcomes. Schools strive to integrate all students to engage in their community and beyond. By modeling collaboration through teamwork by teachers, students are encouraged to utilise critical learning and to create, develop and take ownership of their educational experience.

The *Space to Grow* project fits naturally for the Diocesan vision for learning in the 21st Century. It encourages teachers to involve their students in authentic study and promotes the idea that the student's schooling is an integral part of their formation as young person. The project supports the fact that teachers make the difference in student learning.



Teachers of the Diocese have been provided with expertise from professional astronomers at Macquarie and Charles Sturt Universities. In addition to training days, professional learning opportunities have been very generously supported in individual school contexts. This assistance in classes with individual implementations creates a highly rewarding and motivating experience for both teachers and students.

*Thanks to Paul Stenning, Teaching Educator, for his contribution to this article*

## Feature Teacher

**Ross Gawthorne, Physics and Science teacher at St Columba's College, Springwood is proud of the science faculty's passion that is transferred to the 1000 students in all years. These students attend from a wide catchment and appreciate the science teachers' enthusiasm. Astronomy is one factor for the steady increase in Year 11 Physics students, now second most popular science - 20 students in 2010, 28 in 2011.**



Ross has been at the school since 1997 and took over the role of 'caretaker' for a 14-metre decommissioned radio telescope at the school from the previous HToS upon his departure. The dish was 'gifted' on a school excursion to CSIRO Radio Telescope at Narrabri. Students use it to detect and monitor solar flare activity, then confirm it online from Narrabri and overseas sources. The confirmed flare is named after the student making the discovery, and the results are published in the school newsletter, together with a graph of the solar activity.

Ross encourages the faculty to engage in broader science interest via *Café Scientia* presentations from science and maths teachers, plus community members in their area of expertise, on a rotational basis at lunchtime fortnightly and attended by around 50 students.

## Team member 'on tour'



PhD student, Michael Fitzgerald, met with teachers from Blayney, Canobolas, Lithgow and Orange High Schools and La Salle College at the beginning of National Science Week. Teachers were keen to discuss their aims, ideas, concerns and suggestions for the project.

Apart from feeding into Michael's Phd thesis, this helps the team to develop project strategies and tailor future training.

## Personalised Professional Development

Mr Jim Fanning, School Principal of Terra Sancta College, thanked Space to Grow team members for attending to guide physics and science teachers through the project on 21<sup>st</sup> August. The training day was arranged with Paul Stenning, Catholic Education Office, Parramatta.



Teachers began with entering their responses in the SSSQ and ADT database. Michael Fitzgerald explained the research methodology and various pathways to using the project, while David Frew presented Astronomy Basics and K1-6 (see front page article).



Teachers worked through *Making Colour Images* as an introductory module for students. Attendees felt better equipped with background knowledge and 'hands-on' experience to schedule the project in the classroom.

Head Teacher of Science - Raquel Sheehy discussed telescope filters, as well as the new modules and how these would work in the school's timetable.

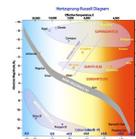


## A national first for Macquarie University

Macquarie University has become the first in Australia to have a specifically named *Physics and Astronomy* department from 1 July 2010 in recognition of the growth in astronomy staff and student numbers.

## Quick Quiz – Star Clusters (answers back page)

- 1) Name the two main types of star clusters
- 2) True or False - stars in the same cluster are the same age
- 3) Stars in the same cluster all formed from the same what?
- 4) Which type of star evolves faster - massive or low-mass?
- 5) Why is the study of star clusters important for learning about stellar evolution?
- 6) What characteristics can be used to plot a Colour Magnitude diagram (CMD) for a cluster?



## A New Star is born



***Congratulations and best wishes to Dr Lena Danaia and family for the safe arrival of Siena on 8 August from the Space to Grow team.***

*Lena will be following the progress of the Space to Grow project while on maternity leave.*

## Feedback in action: new IT support team member



**The team is directly addressing one of the main areas of teacher concern across the project – that of information technology (IT). Dr Milorad 'Joe' Stupar has now been appointed as a part-time but dedicated IT Support and liaison person. His role is to test project software, assist teachers with project-related IT and data issues in the classroom, and perform general IT support as required across the project.**

'Joe' obtained his Astronomy PhD on Supernova Remnants at Macquarie University and had a similar IT support role with the FT DEST ASISTM 'pilot' project. The part-time position allows him to continue his Radial Velocity Experiment (RAVE) observing at Siding Spring Observatory.

If you would like Joe's assistance with IT, or other team support, please contact Project Manager, Carolyn Dow 0407 668 027 or 9850 8675 [cdfaulkes@gmail.com](mailto:cdfaulkes@gmail.com)

## Ning site access – opinions sought

**The Space to Grow team is investigating the continued viability of the networking *Space to Grow* Ning website over the coming few months due to policy changes to free educational-use access by Ning providers and the relative lack of use by our community.**

*Your comments/feedback on the influence of this Space to Grow Ning networking site are requested.*



Information currently on the website will be backed up and retained on a regular basis until all options are investigated.

## Quick Quiz answers

**1) Open and globular 2) True 3) Cloud of gas 4) Massive 5) All stars in a cluster lie at about the same distance from Earth, which helps to determine the cluster's age and other fundamental properties 6) Two properties are needed: *Relative luminosities* (as the stars that are the brightest in *apparent* magnitude are also the most luminous) and spectral type (or temperature).**

*Images:* Student competition: <http://www.google.com/imgres?imgurl> Quiz: H-R Diagram, Rob Hollow CSIRO

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