Current Research at Kitt Peak

What's This Activity About:

Kitt Peak is a great educational opportunity for students, but its also an active research facility. Many major discoveries in recent astronomy have been made on the host of telescopes at this facility and research is ongoing. In order to introduce students to the reality of astronomy as a field, and to help them understand the application of the scientific method in actual research, students will investigate research currently underway at Kitt Peak. They can look at the concepts being studied, the technology that makes the research possible, the process of discovery, and what the research hopes to accomplish.

What Will Students Do?

Students will select a research topic from a list of projects currently scheduled at Kitt Peak. The Kitt Peak research schedule is available online at http://www.noao.edu/kpno/forms/tel_sched/ and the schedule includes brief abstracts of all projects. Research can be conducted individually or in groups. Students will then present their research to their classmates.

Tips and Suggestions:

- This lesson can be used to start an in-depth research project culminating in a thorough individual paper or presentation, or it can be used as a group project where each group member covers one specific aspect of the topic.
- As an individual project, students can choose or be assigned one current project and they will be expected to investigate all aspects of that project listed on the rubric. They can present their information as a paper, presentation, or both. Since the Kitt Peak schedule changes all the time, students should have a wide variety of current research projects to choose from.
- As a group project, students can choose or be assigned one of the current research projects at Kitt Peak. They can individually research one of the sub-topics listed in the lesson and apply that topic to their assigned project. Students can research their individual topic and then combine their research with other group members for comprehensive coverage. Assignment of these topics can be done in several ways, but here are a few suggestions:
    - Students can be placed in groups and assigned a current project. They can then divide the sub-topics up amongst themselves.
    - Students can choose a sub-topic and current project that interests them, and then be placed in groups based on their choice of project.
    - Students can randomly choose or be assigned a topic or group.
- This activity can be done prior to visiting Kitt Peak to introduce students to the impact of the facility on modern astronomy, or it can be done after. If the project is due after visiting Kitt Peak, students can use their visit to conduct research -- questioning the docents about

the telescopes or projects. This gives them a chance to use interviews as primary sources for their research.

What Will Students Learn?

Concepts: Astronomy concepts related to current research at Kitt Peak
- Communicating research
- Practical application of the scientific method
  - Developing research questions
  - Hypothesis testing
  - Data collection and analysis
  - Development of further research questions
- Types of resources
- Role of and impact of technology in scientific innovation
- Evaluating validity and accuracy of other's research

Inquiry Skills: Evaluating the reliability of research sources
Finding new research questions from existing research

Big Ideas: Science exists in the real world

Arizona State Standards: Strand 1; Concept 1; PO 1
Strand 1; Concept 3; PO 3
Strand 1; Concept 4; PO 1
Strand 1; Concept 4; PO 3
Strand 2; Concept 2; PO 4
Strand 6, depending on topic

Extension: Strand 1; Concept 1; PO 2
Strand 1; Concept 3; PO 7

Current Research at Kitt Peak -- Lesson Plan

Materials:

internet access
library access
presentation materials, if applicable

Preparation

- If students are to choose their won topics, they should be given time in class to look over the Kitt Peak schedule and abstracts.
- If your class does not have internet access, you can assign this as homework or you can print off the abstracts and have them available.
- You may want to select certain research topics and have students chose from those, depending on the level of your class.

Procedure

1. Assign students to research topics, using one of the methods presented in the Tips & Suggestions section.
2. You may allow students some time in class to work on their research, especially if they are working in groups. Much of their research and preparation will probably be done as homework, though.
3. If students are working in groups, they can divide the assigned abstract topic into sub-topics to be covered by each individual. Sub-topics ideas include: the concepts being studied, the technology that makes the research possible, the process of discovery, and what the research hopes to accomplish. For an extension, they might also look at what future research might come from the current project. Students may come up with their own division of research, but their paper/presentation should address those four topics.

Grading

The rubric used for assessing this project will vary depending on whether student's research will be presented to the class or written, and it will vary if the project is assessed as a group grade or an individual grade. Whatever method is used, assessment should include:

- formatting/presentation requirements (for a paper, this might include font, font size, spacing, title page, etc. For a presentation, it might include a visual aide, diagrams, time,

etc.)

- 6 Traits of Writing (Conventions, Organization, Sentence Fluency, Word Choice, Voice, Information). In Arizona, this is a state mandated grading framework for writing assessments, but it makes grading any written work very simple. For a presentation, you can assess a visual aide using the 6 Traits, or you can otherwise adapt those criteria to a presentation.
- Content. This should address whether the student or group has written or presented the required information and that they have demonstrated or communicated an understanding of that information.