Telescope Allocation Committee
Teacher Guide

Objectives

This activity acquaints the students with the telescopes and instruments available at an astronomical observatory: McDonald Observatory. Students serve as members of the Telescope Allocation Committte (TAK) to review (sometimes amusing) research proposals from imaginary astronomers, and then write acceptance/rejection letters to the astronomers.

Texas Essential Knowledge and Skills, Grades 9-12

Astronomy:

112.33(c)-2(I) use astronomical technology such as telescopes, binoculars, sextants, computers, and software.
112.33(c)-4(D) explain the contributions of modern astronomy to today's society, including the identification of potential asteroid/comet impact hazards and the Sun's effects on communication, navigation, and high-tech devices.
112.33(c)-14(C) analyze the importance of ground-based technology in astronomical studies.
112.33(c)-14(D) recognize the importance of space telescopes to the collection of astronomical data across the electromagnetic spectrum.
112.33(c)-14(E0 demonstrate an awareness of new developments and discoveries in astronomy.

Materials:

Computer running an Internet browser (e.g., Internet Explorer, Netscape, Safari)
StarDate scripts (online or in print)
Proposal abstracts
McDonald Observatory Telescopes and Instruments table

Introduction

An important committee at most telescopes around the world is the Time Allocation Committee, or TAC. This committee reviews all requests made for use of their telescopes. The TAC then decides who gets to use the telescopes and how much time they get. They also have the unfortunate job of telling some scientists that their proposals will not get time.

The first part of a proposal is the abstract. An abstract is a summary of the proposal. It is short and summarizes the proposal. After the abstract comes the science justification. The astronomer has to convince the TAC that this is a scientifically important project. Figures are often included to help the astronomer make his or her case. A plan for what is going to be looked at and explanation of the telescope and instrument needed comes next. Finally, if the astronomer has been at the McDonald Observatory before, an update on the previous research is included.

Engage

Tell students that they will serve on a special McDonald Observatory committee called the Telescope Allocation Committee (TAC). Pass out the student sheet "Tic TAC Introduction" that helps explain to students the role they will play.

Ask them to read some of the following StarDate scripts that are related to the research projects under review:

StarDate script: June 26, 2003 "Cygnus X-1"
StarDate script: February bonus "Spectroscopy"
StarDate script: November 26, 2003 "McDonald's 107-Inch Telescope"
StarDate script: February 18, 2003 "How to Find a Planet"
StarDate script: December 31, 2003 "Saturn at Opposition"

Please note that these scripts were written to provide not only interesting factual information, but also may give directions for how to find the objects in the sky around the time this script aired on the radio. For instance, the StarDate December 31, 2003 script describes Saturn, and its position in the sky during that week in that year.

The McDonald Observatory Telescopes and Instruments table provides an overview of the telescopes and instruments available to astronomers at the Observatory. Students may also visit the "What Are Astronomers Doing" web site

http://mcdonaldobservatory.org/research/

for more detailed information.

After reading the StarDate scripts and reviewing the table, ask students to think about how they will evaluate the new research proposals. Students should list the important criteria to consider when they review the proposals.

Explore

Divide students up into small committees with 3 to 5 members. Distribute a set of proposal abstracts to each group. Students may want to read through the proposals before inventing a rubric to evaluate them. Some of the proposals purposely contain spelling and grammatical errors for students to find and incorporate into their evaluation rubric design and their decisions. Let students find these errors on their own. While students are building their rubrics, encourage them to think about:

1. How will we score each proposal?
Students must pick out what variables to measure and how to measure them. For instance, "communicates objectives clearly" or "effective use of the telescope" on a scale of 1 to 5. They may want to include more qualitative criteria, like "Reviewer comments".

2. How will we determine the two winning proposals?
Students should consider how to choose the two winning proposals in a manner they think is fair. Will the committee add up the quantitative scores, with the greatest two scores winning time on the telescopes? How does the committee resolve a tie?

Once each group has constructed their rubric, they may review and evaluate the proposals. Circulate among groups and check on their progress as they review proposals.

Explain

After committees have completed their reviews and chosen winning proposals, ask each group to briefly announce their selections and explain how they chose the winners. Others may ask questions regarding the rubric and decision making process that the presenting group employed.

Closure:

Ask students to summarize their criteria for selecting the winning proposals.

Elaborate:

1. Now that students have selected the winning proposals, ask them to compose letters to the scientists, both those who were awarded telescope time and those who were not. This extension has proven to be a popular and interesting way to wrap up this activity. Students take their letter writing seriously, and often write good critiques of the proposals. See the "Tic TAC Letters" page.

2. Ask students to review the McDonald Observatory TAC documents located at http://www.as.utexas.edu/mcdonald/policy/.

Specifically, they should look at the three following sections:

- Telescope Allocation Committee
- Proposal Evaluation Criteria for McDonald Telescope Time
- Hints for Writing Successful Observing Proposals

3. How do the McDonald TAC evaluation criteria match up with the rubrics each group constructed?

Student may want to see what a finished Observatory schedule looks like. They may visit the following page

http://www.as.utexas.edu/mcdonald/observers/mcdobserver.html,

then select the "Observing Schedules" link. Please note that a file list will appear, with short names for the individual observing schedules like "04Apr.gif" which means "this is the observing schedule for the month of April, 2004, in GIF image format". Selecting this link begins a download of the GIF image, which can be displayed in the internet browser. Other file formats are available, such as PDF (".pdf" suffix) or Excel spreadsheets (".xls" suffix).

4. What Are Astronomers Doing at McDonald Observatory
Match events on the observing schedule with events on the What Are Astronomers Doing at McDonald Observatory WWW site. Describe the relationships between the astronomer's interest, his or her research project, and the way the astronomer is using the telescope to collect data.

Evaluate:

Ask students to make recommendations about how they would improve their committee's evaluation rubric.