

CLASSROOM ACTIVITY

SALT: Imaging the Southern Sky

When South Africa decided to build a new telescope, it went big. As in rival-the-world's-best big. With the participation of astronomy groups from all over the world, the Southern African Large Telescope, or SALT, is casting a wide eye on the southern sky. Moreover, it's inspiring future astronomers in the region. This Science Bulletins feature takes you behind the scenes as this bold new telescope brings world-class astronomy to a developing nation.

CLASS DISCUSSION

Establish Prior Knowledge

Point out to students that many of the world's most powerful telescopes are positioned in the Northern Hemisphere. However, many of the Universe's objects can be seen only from telescopes positioned in the Southern Hemisphere. These include our two nearest galaxies, the Large and Small Magellanic clouds, and the center of the Milky Way Galaxy. Up until recently, only a few telescopes in South America were available to astronomers. In 2005, however, the Southern African Large Telescope (SALT) was installed in Southerland, South Africa. This very powerful telescope can observe objects at the very edge of the Universe. Tell students that in the feature they are about to see, they will learn more about the SALT telescope.

Exploration

Have students read the synopsis and then watch the video. As students watch the feature video, ask them to take notes. Have them identify the types of data the SALT telescope is collecting and how that data is used. Use these questions to guide a class discussion.

- How is the SALT telescope different from other telescopes?
- What are the two instruments on the telescope?
- What does the imaging camera do?
- What does the spectrograph do?
- How do you think the data gathered by SALT will add to our understanding of the Universe?

Wrap-Up

Use this question to wrap-up the discussion.

- What would you like to know about the Universe that SALT might help you find the answer to?

Extend

Direct students who wish to know more about spectroscopy to this website:

http://imagine.gsfc.nasa.gov/docs/teachers/lessons/xray_spectra/background-spectroscopy.html

The Scientific Method

Research scientists use the Scientific Method (see page two) to investigate the natural world. You can use *SALT: Imaging the Southern Sky* to illustrate how scientists use technology to collect data, and how the data can be used to examine questions they have about the universe.

Scientific Process

The Scientific Method is a dynamic and open-ended process that scientists use when they investigate a question they have. It is not a series of prescribed steps that scientists follow to prove a hypothesis. Rather, it's a general plan that helps guide their investigation. And while all scientists use the Scientific Method, they might not use all the steps, or they may complete the steps in a different order. For example, a scientist might make observations and collect data about a subject that interests him or her for years before formulating a hypothesis.

DEFINING A QUESTION TO INVESTIGATE

As scientists conduct their research, they make observations and collect data. The observations and data often lead them to ask why something is the way it is. Scientists pursue answers to these questions in order to continue with their research. Once scientists have a good question to investigate, they begin to think of ways to answer it.

FORMING A HYPOTHESIS

A hypothesis is a possible answer to a question. It is based on: observations scientists make, existing theories, and information they gather from other sources. Once they have a hypothesis, scientists can begin to think about how to test it.

TESTING A HYPOTHESIS

Evidence is needed to support or disprove the hypothesis. There are several strategies for collecting evidence. Scientists can gather their data by observing the natural world, performing an experiment in a laboratory, or by running a model. Scientists decide what strategy to use, often combining strategies. Then they plan a procedure and gather their data. They make sure the procedure can be repeated, so that other scientists can evaluate their findings.

ANALYZING THE DATA

Scientists organize their data in tables, graphs, diagrams, and even photographs. If possible, they check the data by comparing it to data from other sources. They are looking for patterns that show connections between important variables in the hypothesis they are testing.

DRAWING CONCLUSIONS

Scientists must decide whether the data clearly support or do not support the hypothesis. If the results are not clear, they must rethink their procedure. If the results are clear, scientists write up their findings and results to share with others. The conclusions they draw usually present new questions for them to pursue.