

***Decoding Starlight* Exhibit**

Making the Most of your Students' Field Experience

Introduction

The *Decoding Starlight* exhibit was designed to help the public, teachers, and students learn how astronomers “know what they know” about celestial objects like stars, nebula, planets, and galaxies. In order to answer questions about distance, temperature, velocity (rotating or moving toward / away), and composition of celestial objects, astronomers analyze the spectrum of light that the objects emit. We have written TEKS based Student Exhibit Guides for several grade levels to help focus and stimulate students' interaction with the exhibit. The Teacher Exhibit Guides are the “teacher editions” of the Student Exhibit Guides. They provide background information about the exhibit topic, the big ideas in science that are embedded in the exhibit, and hints to nurture students' exhibit interaction as they work through their Student Exhibit Guides.

Using the Student Exhibit Guide

The SEG is not a test! Getting the “right answer” is not the goal. The SEG is primarily a tool to help students interact with and think about the exhibit in a meaningful way that is related to the science they are learning in school and their everyday life. Relax and have fun! Typically, student groups spend about 40 minutes to an hour inside the exhibit. Student Exhibit Guides (SEG) cover three grade level ranges: K – 3, 3 – 6, and 6 – 12. We recommend that students work in pairs on a single exhibit guide as they explore *Decoding Starlight*. The Visitors Center will provide clipboards and colored pencils (if necessary) for students to answer questions and draw pictures in their SEG. As students explore the exhibit, you have opportunities to:

- * remind them of what they already know or help them recall experiences at school and everyday life that are related to the exhibit.
- * guide their exploration of the exhibit according to your field trip goals.

Using the Teacher Exhibit Guide

You can use the Student Field Experience to reinforce, enrich, and extend your science instruction at the Observatory. Carefully read through the Teacher Exhibit Guide as a preview for what students can learn as they explore *Decoding Starlight*. Look for exhibits that match the TEKS or NSES you are covering at school. Imagine what kinds of questions you students will ask as they explore the exhibit. Consider what simple pre-visit activities students can do to “warm-up”. For example:

- * All grades: Make rainbows (a spectrum) with water mist and sunlight. Make a spectrum using a compact disc, soap bubbles, or diffraction grating.
- * K – 3: Identify objects in the sky that are near (clouds, birds) and far away (Sun, Moon, and stars).
- * 3 – 6 and 6 - 12: Brainstorm as a whole class or in small groups about examples of objects in everyday life that emit light in each region the electromagnetic spectrum: radio, microwave, infrared, visible, ultraviolet, x-ray, gamma-ray.
- * 6 – 12: Find out what astronomers are doing at McDonald Observatory (<http://mcdonaldobservatory.org/research/>). How many astronomers are using some form of a spectrograph to get a spectrum of their object? What are these astronomers trying to figure out?

Helpful Hints

Do the post-visit activities: Bring a digital camera to take pictures of the exhibits and students using the exhibits. These images will help you and your students connect their responses on the SEGs to their exhibit experience during the post-visit activities associated with *Decoding Starlight*.

Try “Cracking the Code”: In the back of the exhibit hall is an interactive set of exhibits called “Cracking the Code”. These exhibits directly address the ways astronomers “crack” the code of absorption and emission features in a spectrum to get information about temperature, velocity, distance, and composition. Experimenting with these exhibits will help students understand what astronomers are doing at McDonald Observatory, and how it is related to the science they learn at school.

What are Astronomers Doing at McDonald Observatory?: A computer kiosk inside the “Behind the Scenes at McDonald Observatory” section features the current research occurring at the Observatory, both the astronomers and what they are doing. Look for ways that the astronomer's research and observations are tied to spectroscopy. You can find another version of this material on the web at <http://mcdonaldobservatory.org/research/>. The material changes weekly, so what you preview may not be what is available during your visit.