

UNIVERSITY LOWBROW ASTRONOMERS VISIT

The **University Lowbrow Astronomers** club is a diverse group of over 100 astronomers, ranging from amateur telescope makers to professional rocket scientists. The club is associated with the University of Michigan and consists of students, alumni, members of the university community and the community-at-large. The **University Lowbrow Astronomers** generously donate their time and expertise by conducting outreach programs in schools and in the community. The **University Lowbrow Astronomers'** website is: www.umich.edu/~lowbrows/

A limited number of in-school programs are conducted each year for **5th grade students (15-30 per visit)**, by appointment. Visits are scheduled on a first-come, first-served basis, by contacting the club's President, Mr. Charles Nielsen, at: (734) 747-6585

The **Pre-Program Preparation** must be completed before Astronomers arrive in order for the Astronomy program to be conducted, so ***it is essential that teachers carefully read the In-School Program Agenda and the Pre-Program Preparation sections below.*** The astronomers will report directly to the school office upon arrival.

In-School Program Agenda

Grade Group/Class Size: 5th grade/16-30 students.

School Space/Equipment Required: (1) **A Multi-Purpose Room (with a stage)** and the following equipment: 3 long tables on the stage, a computer projector on a cart, a projection screen, and a tall ladder (so that Astronomers can post pictures on the wall directly opposite to the stage). (2) **One classroom** with the following equipment: computer projector and projection screen. (Note: The classroom windows should have drapes or shades so that the room can be fully darkened.)

Program Schedule: The program consists of two separate parts (presentations). **Part A (Using Telescopes)** will be conducted in the Multi-Purpose Room. **Part B (Learning How to Use Planispheres to View the Night Sky)** will be conducted in the designated classroom. **Program time: 1:30 p.m.-3:30 p.m.**

1:30pm - Introduction: All will gather in the Multi-Purpose Room. The Lowbrow President will introduce the astronomers to the students and then tell students what astronomers do. Each Lowbrow Astronomer will be wearing a Lowbrow shirt and a name tag. **Students should bring their Planispheres, or Star Wheels, to the program. See "Pre-Program Preparation" below.**

1:40pm - Students will be divided into two equally-sized groups.

Group #1 will remain in the Multi-Purpose Room for Part A of the program, and Group #2 will go to the classroom for Part B of the program. The groups will switch places at 2:30 p.m. **A teacher, or a parent or professional assistant appointed by the school should accompany each of the groups at all times.**

Part A: Using Telescopes (Multi-Purpose Room)

Firscope, Funscope or Starblast telescopes will be set up at several stations (on tables) on the stage, with one astronomer at each station. Target pictures will be posted in the distance (i.e. on the wall directly opposite to the stage).

The presenter will begin engaging students by asking questions such as: "*How many of you have ever used a telescope?*"

Telescope slides (PPT) will be presented to investigate basic questions:

What is a telescope?

What does a telescope do? (Two functions: gather light and magnify.)

Why do astronomers use telescopes? (Galileo used a telescope to look at the night sky 400 years ago.)

How does a reflector telescope work? (By reflecting light with a mirror.)

Students will be divided into several equal groups; one group will go to each of the telescope stations on the stage.

The Astronomer at each station will demonstrate how telescopes are used, focusing first on safety/warnings, such as: *Never look at the Sun through a telescope! Handle telescopes carefully; they are fragile. Never touch the optical surface.* Astronomers will give explanations and basic instructions on how to use a telescope: How to move and aim a telescope, how to look into a telescope, and how to focus a telescope. Each group will be looking at scaled-down photos of planets, galaxies, and so on (hung on the wall directly opposite to the stage). Each student, assisted by an astronomer, will have an opportunity to use the telescope. Astronomers will ask questions to make sure that students understand how telescopes work, such as: *What did you see? Were objects larger or smaller than they appeared? Were objects upside down or right-side up?*

Part B: Using Planispheres to View the Night Sky

Chairs or desks in the classroom should be facing the projection screen so that all students are able to view the screen easily. Each student will need his or her *Planisphere* (Star Wheel) for this part of the program.

The presenter will introduce ***Indoor Star Gazing***; that is, how to use a computer projector, a screen, and a computer program called “***Stellarium***” (or other similar Astronomy software) to learn how to view the night sky.

The presenter will begin engaging students through questions such as, “*How many of you have actually seen stars or been able to identify constellations?*”

The presenter will then show the Ann Arbor night sky on the screen and instruct students on how to use their ***Planispheres***. Students will learn how to hold (position) their Star Wheels in order to use them for identifying celestial bodies in the night sky.

With the Southern sky projected on the screen, students will be asked to identify the constellations they see in the night sky. (A laser pointer will be used by the presenter to identify heavenly bodies on the screen.)

The following types of questions/information will be addressed in the presentation:

- *Aside from the Southern exposure, which constellations do you see in other directions? [East, West, North, or Top (Zenith)]*
- *Why are planets not on the Star Wheel?*
- *Why do all stars appear to revolve around Polaris?*
- *Do the shapes of constellations remain the same over time?*
- *How far away from us are the stars?*
- *Why are some stars brighter than others?*
- *What are the best conditions for star gazing? (A dark, clear night, lying on a comfortable, reclining lawn chair.)*

For fun, students will have the opportunity to request that the presenter use his/her computer program to zoom ahead or backward (up to millions of years!) to see (on the screen) what the night sky and the constellations would have looked like in the distant past or what they will look like far into the future.

Pre-Program Preparation

Preparing the School Space/Equipment Required: (1) **A Multi-Purpose Room (with a stage)** and the following equipment: 3 long tables on the stage, a computer projector on a cart, a projection screen, and a tall ladder (so that Astronomers can post pictures on the wall directly opposite to the stage). (2) **One classroom** with the following equipment: computer projector and projection screen. (Note: The classroom windows should have drapes or shades so that the room can be fully darkened.)

Making the Planispheres (Star Wheels)

For printing the Planisphere materials (click on [Uncle Al's Star Wheels](#)), teachers will need two pieces of white 8.5" X 11" cardstock and one piece of 8.5" X 11" copy paper (for the instructions) for each student. Prior to the Lowbrow Astronomers' visit, teachers should direct students in making their Planispheres. This will entail cutting, folding, and stapling and will require about 15 minutes. After assembling the Planispheres, students will fold and tuck their instruction sheet into their Planisphere for taking home after the program. Students should write their names on their Planispheres. (Note: After constructing the Planispheres, we suggest that teachers collect them and then redistribute the Planispheres to students directly prior to the program.) Following the program, students can take their Planispheres home to share with their families.