

# 6th Grade Astronomers: Warm-up

## 1 Our telescope

The Lynch Observatory has a 16" reflecting telescope, built by Meade corporation. That means the primary mirror is about the size of a large pizza. As a reflecting telescope, the primary mirror reflects light from objects in the sky to a secondary mirror, which focuses the light on to your eye. Because it is so big, we need a computer to control it, as it is very heavy. It operates in essentially the same manner as the giant telescopes in Hawaii, Chile, Australia and South Africa, they just have mirrors that are much larger.

In chapter 1, section 2 of the Holt Astronomy textbook for 6th grade, the telescope in the right panel of Figure 2 is a similar design, except the secondary mirror in our telescope reflects the light back to the bottom of the telescope. This design is very much like the Keck telescope, in Figure 3 and the Hubble Space Telescope, in Figure 4.

## 2 It doesn't look like the pictures.

You and your students have probably seen pictures of various stars, galaxies, nebulae and planets taken by the Hubble Space Telescope and other great observatories. Those observatories use mirrors that are often as large as a whole room and thus gather much more light. They can stare at a single object for many hours, adding up all the light they see over that time period. They are also placed on high mountains (or in space!), far away from city lights. Your eye is only a few millimeters across and it cannot add up light over long timescales. So when you look at objects through this telescope, the colors you see won't be as strong as the pictures from professional telescopes, and details will be harder to identify. But you will be seeing light from many light years away with your own eyes!

## 3 At the dome

I would like the students to work in groups of two, as they will be making drawings and answering some questions. Also, I can only have a certain number of students in the dome itself at any one time, and if they work with partners, it will be easier to manage. Please select (or have them select, whichever you think is most appropriate) these groups before coming to the telescope, so they will be partnered up when you arrive.

I will have handouts and pencils for the groups when they arrive, but if the students have a favorite pen or pencil (colored pencils are good), they can bring that too. Also, if any of the students wear glasses or contacts, please make sure they have them. That way, we won't have to refocus the telescope as much.

Also, the telescope is outside, on the roof of a building. Thus, it can get quite windy on the deck next to the dome, and inside the dome it can get fairly cold during the winter. Make sure and bring a coat, hat and gloves (a scarf too, if it is very cold).

## 4 Questions

Please ask the students these questions before coming, so they have some time to think about them:

1. How many students have previously looked through a telescope, or binoculars, at the sky?
2. How many students have previously seen a planetarium show?
3. What is the farthest object they have seen with their eyes before?
4. Without a measuring stick, or the odometer on your car, how do you tell how far away something is? There are several methods: see how many the students can come up with.

The quick lab on page 37 (chapter 2, section 1) about parallax could be useful for the students to try, while answering question 4. We won't be measuring distances to stars, but I will talk about parallax some.