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Astronomy 101: An Open Letter to First-Year Astronomy Teachers

by Dennis Hands

This issue of our newsletter is not written by astronomers sharing scientific research, but by two teachers who have words of encouragement and inspiration for those who may be new to teaching or new to teaching astronomy.

First is an open letter to first-year astronomy teachers from Dennis Hands, a veteran teacher who is new to the astronomy classroom at Grimsley High School in Greensboro, North Carolina. Then there are some words of encouragement from Kevin Murphy, Illinois Teacher of the Year 2000 who shares his sense of wonder and appreciation of the night sky with his students in LaGrange, Illinois.

Dear Friend,

Congratulations on your new astronomy teaching assignment. For the last 25 years I've enjoyed the challenges of teaching social studies to junior and senior high students. But when my principal asked me to teach an astronomy course last year, I was a bit apprehensive. I'll be glad to share some of my first-year experiences with you and I hope you will do the same when you've finished your year.

So here's my first piece of advice: Take the astronomy assignment with a thrill in your heart. Many teachers don't always get to decide what subjects to teach, and if you feel unprepared or unsupported, hesitation is understandable. Even though I've been an active amateur astronomer for several years, I took a week to talk with others and think, before accepting the offer. Take your time deciding, but my advice is to go for it.

Your community can probably be a big help to you. If you have a planetarium nearby, use it. There are many astronomy concepts more easily explained there than in the classroom. At the Greensboro Natural Science Center, Roger Joyner is the curator for Zane Planetarium. Roger and I planned a series of monthly visits for my astronomy class. Together we developed a list of topics for the visits, then Roger took care of the details. From coordinate systems to changing of the seasons, Roger did a great job. My students gave our planetarium visits the highest rating on my year-end survey.

There might be an astronomy club nearby, so be sure to contact them. Along with star parties and lecture programs, there may be other club activities that could inspire your students. One of my students is currently planning a presentation to the Greensboro Astronomy Club on the effects of solar activity on telecommunication.

Remember "extra-credit." It still amazes me how high the level of student interest is when extra-credit is offered for quality participation. Also, take time at the beginning of the school year to establish an Astronomy Award. Many high school students can use recognition (and money if possible) when applying for college.

Be sure to check with other science teachers, both on and off your campus. Colleagues can clue you in on all sorts of opportunities available for teachers and students. Guilford Technical Community College (GTCC) has an observatory available for the public and special groups. Aaron Martin, the Director of GTCC's Cline Observatory, also organizes teacher workshops and outreach programs for school groups. Reading about astronomy and looking at pictures is good, but not much can beat actually looking through a telescope.

If you get the chance, take a course at your local college. My appreciation for the challenge our students face while trying to both "have a life" and study dramatically increased when I took an astronomy course several years ago. Taking my first test provided a healthy dose of reality.

There are some good astronomy textbooks on the market. I encourage you to visit the next conference of the Astronomical Society of the Pacific (ASP) to examine some of the items on display. It seems that textbooks generally take either a "near-to-far" or "far-to-near" approach. I was more comfortable with the later because of earlier experiences, but find the one that suits you and your students.

Two scenes from the vendor's area of the 2000 Annual Meeting of the ASP in Pasadena, California. Images courtesy of ASP.

At the 1999 ASP conference in Toronto, textbook vendors helped me decide which book was best for my students, and other vendors offered many exciting products. From the American Association of Variable Star Observers I ordered the kit "Hands-On Astrophysics" with activities to help students learn more about variable stars. We used a variety of those activities during the year in class.

Among the products I've ordered from the ASP Catalog is The Universe at Your Fingertips, a collection of activities for students on many aspects of astronomy. My kids most enjoyed the "Thousand Meter Walk," combining a scale model of the Sun and planets to the same scale, with the distances between them. That activity is an eye-opener for students and teachers. When word of the "Walk" got around school, I was asked by the science teachers to take them on the walk as part of our staff-development program.

An astronomy conference is not only a shopping trip, but also a good opportunity to talk with astronomers and astronomy teachers from around the world. Take lots of notes at the demonstrations and seminars; you'll probably get some excellent teaching ideas there. Become active in astronomy. Not only will that give your students a good role model, but I bet you'll end up having a great time, too.

Stay in touch with your students during the academic year. They will tell you, sometimes subtly, what they've enjoyed and what they haven't. Maybe you'll want to prepare a survey for your students to complete at the end of the school term. I asked my students which activities they would most recommend I keep for the following year, and which activities I should revise or abandon (and you can imagine how "taking tests" ranked.)

Finally, keep the excitement alive in your classroom. Sprinkle in the appropriate amount of videos, discussions, out-of-doors activities and slides, and your new astronomy class can be an exciting beginning in a teaching career. There are so many wonderful images in astronomy – share their beauties with your class as often as you can. There are many great materials that might fit your budget.

So that's it. Reach out to your community, find good materials with stunning images, and participate. I hope you'll have fun teaching your new astronomy course. Please let me know what you learn during your first year.

Best wishes,

Dennis Hands

Dennis Hands teaches Humanities and Astronomy at Grimsley High School in Greensboro, North Carolina and serves as a regular host for the public observing nights at Cline Observatory. He welcomes your questions and comments at handsd@guilford.K12.nc.us

THE UNIVERSE IN THE CLASSROOM

Sharing the Night Sky with Your Students

by Kevin Murphy

It's going to be cold out," I said, pulling a hat down over my ears. Dressed as though headed out on an arctic expedition, I pulled on my gloves and headed out the door. My wife gave a quick, "Have fun," and shut the door quickly behind me.

I marched to my truck and loaded a few telescopes into the back, wondering if anyone would be at the soccer field to greet me. It was a beautiful night, the clearest in weeks. But it was cold. My truck must have sensed what I was feeling because the engine hesitated before roaring to life.

As I pulled up to the field where we were doing our observing at the time, I could see the constellation Orion dominating the sky. Below him I could see the shadowy figures of students who had already arrived. A few jogged to the truck to help me unload the telescopes. Others crowded tightly together, shielding themselves from the wind.

One of the students asked the temperature. I looked to the thermometer hanging from my ski coat and replied, "5 below." A low groan came from the crowd.

The two dozen or so students who braved that cold night saw, all for the first time, the Orion Nebula in its full glory. It seemed to hang in three dimensions with clarity unusual for suburban Chicago.

School star party. Image courtesy of author.

While unusual in its extremes, that observing experience is just one of many I've had with my high school students. From the routine instruction of locating Polaris or aligning a telescope to the shouts that accompany each meteor, our night observations have become the cornerstone of the astronomy course. It is also, without question, the most popular part of the course.

It is sometimes difficult for people to believe that 50 or more high school students and their teachers could gather, in the dark, to learn and have fun. But that is exactly what we do. In all the years that I have been leading nighttime observations, I have never had a single problem with my students. Even more than an astronomy teacher, I am an advocate for our young people. We cannot provide our society's children enough healthy, safe, and motivational activities.

Because of the size of our program – between 120 and 150 astronomy students each year – we've been able to try and test many astronomy activities. If you're thinking about sharing the night sky with your students, let me offer some things that have worked for our school.

1. Pick a spot on school grounds. Although it may not be an ideal place, it's simply the soundest professional choice.

2. Treat it like a field trip: get approval from your principal, send permission slips home, take attendance. Allow only authorized students to attend. You know the routine.

3. Start slowly. When I started teaching astronomy we took the students out once a quarter. In later years it became once a month and then twice a month. We now offer weekly observing sessions, but we were able to grow into the role.

4. Enlist some help. We always try to have at least two teachers at the observations. On nights when we expect larger numbers of students (eclipses, meteor showers, etc.), we invite parents to attend.

5. Telescopes are optional, really! We usually don't even bring them out until after our 3rd or 4th observation, some time in mid-October. So few students have ever taken the time to look up, I want to encourage them to see the beauty of the night sky.

6. Before bringing out the telescopes, plan classroom practice. Most students have never touched a telescope. Allow them to see and touch them in a classroom where you can provide instruction and ample light!

7. Consider offering a morning observation. Some of our most attended sessions have actually been before sunrise on a school day.

8. Have a 'poor weather' plan. In the past we've used an answering machine to inform students as to whether the observation was canceled. We now have access to a meeting area inside the building and meet rain or (star) shine. Our poor weather options include working in the computer lab, watching astronomy-related movies (*Deep Impact, Contact*, etc), using a portable planetarium (Star Lab), or simply using the time as a study session.

9. Provide the students with specific tasks. At the beginning of each year we provide the students with a laminated card with about 30 astronomy-related objectives. These include: identify Polaris, identify six ancient constellations, state the phase of the Moon, identify any visible planets, use a telescope to find M57, etc. If the student completes one during an observation, we use an odd-shaped hole punch to mark the card. We've found this the best way to keep students on task in the evening. At the end of the term the students have a record of their accomplishments (some turn it into a competition) and receive extra credit for each punch.

10. And finally, don't forget to celebrate the excitement of your students' astronomy experiences. You and I may not find great satisfaction in identifying Arcturus or separating Albireo in a telescope, but your students will.

I remember, as a boy, sitting and looking up for hours into the stars and wondering what was out there. A neighbor owned a telescope and, every now and then, he would let us look at Jupiter, Saturn or the Moon. As an astronomy teacher, I want to stir that same curiosity in my students. As an astronomy enthusiast, I know few of us have been inspired by a textbook or web page. We live for clear nights when the seeing is good. For that reason I've made the commitment to share the excitement of the night sky with my students. It's not so much the stars in the sky that take me out to the soccer field on cold winter nights anymore. It's the excitement in my students' eyes.

Kevin Murphy is currently on leave as Illinois Teacher of the Year 2000 from Lyons Township High School, LaGrange, Illinois.