

Teacher Exchanges

DUST EXPLOSION

The following demonstration illustrates the environmental conditions necessary to produce a dust explosion. The following equipment is required:

- A new 1 gallon paint can with lid
- 1 candle
- Matches
- 2 feet of rubber hose
- Lycopodium powder or starch
- Rubber bulb

The experimental procedure follows:

1. Drill a hole in the bottom (center) of the paint can so a 1/4 brass tubing can be soldered to the can.

2. Solder a thimble on the top of the 1/4 brass tubing that will serve as a reservoir for the lycopodium powder. A hole needs to be drilled in the bottom of the thimble.

3. Connect a rubber hose and bulb to the outside end of the brass tubing.

4. Load the thimble full of lycopodium powder.

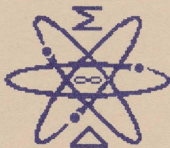
5. Set the candle inside the paint can and light with a match.

6. Set the can on three large rubber stoppers and close the paint can.

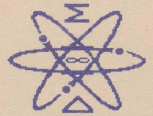
7. Quickly pick up the bulb, move away from the can as far as possible, and squeeze the bulb firmly.

An explosion accompanied by flame, will blow the lid high in the air.

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ENGINEERING TECHNOLOGY



INTERFACE

Ideas for Science Teachers

A Kansas College of Technology NEWSLETTER

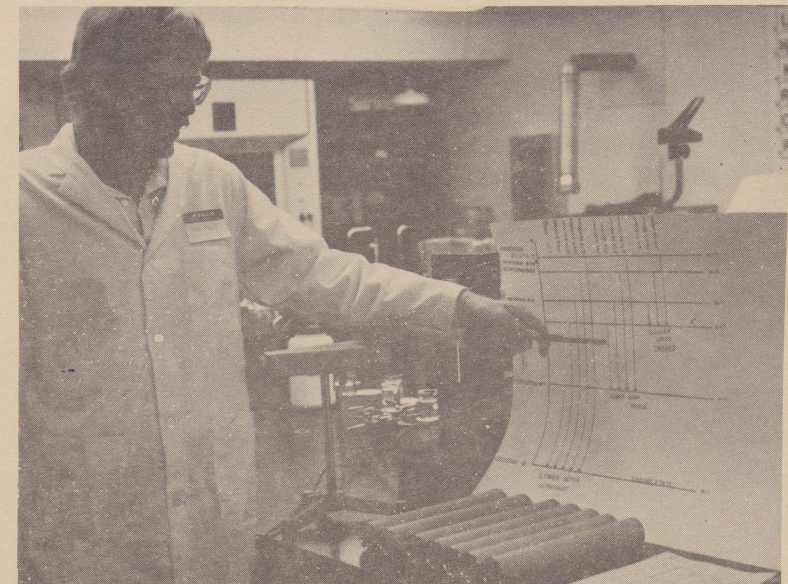
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2+2 TECH / PREP. PROGRAM & PRINCIPLES OF TECHNOLOGY CLASSES

Kansas College of Technology representatives are currently visiting high schools that are offering Principles of Technology courses in Kansas. These physics courses were developed by the Center for Occupational Research and Development (CORD) at 601 C Lake Air Drive, Waco, Texas 76710.

These high schools have been visited to date: Bazine, Chaparral, Dodge City, Garden City, Hugoton, Inman, LaCrosse, Lyons, McPherson, Flint Hills (Rosalia) and Victoria.

During the visit KCT representatives talk with the Principles of Technology instructor about the (CORD) physics classes and discuss the 2+2 TECH PREP Cooperative Programs that are presently sweeping across the U.S.



Tim Meitl, Hoxie, demonstrating the energy levels for different light sources.

The hands-on approach of teaching physics using equipment that technicians would use in the industrial field have encouraged marginal students to enroll in more math and science classes while in high school. In fact, some high schools are experiencing 20 % enrollments in the physics area compared to 4 % for the national average.

If you would like more information about the Principles of Technology classes and the 2+2 TECH/PREP Program, please contact: Loren E. Riblett, Dean of General Studies at the Kansas College of Technology, Salina, Kansas 67401

KCT Develops New Geographic Information Systems (GIS) Program

The Civil Engineering Technology Department at Kansas College of Technology is developing a two-year curriculum in Geographic Information Systems (GIS).

The proposed GIS curriculum will be submitted to the Kansas board of Regents for approval at their January, 1990 meeting. If the curriculum is approved, the first course offerings for an Associate degree program in GIS will begin in the fall of 1990.

An introductory course in GIS is already being offered this fall.

A National Science Foundation Grant application has been submitted by the faculty. If approved, the grant application will allow the department to acquire a Global Position Satellite (GPS) surveying system as well as total station surveying instruments and related software.

The GPS system and total station surveying systems would be added to the existing, well-equipped surveying lab and used to support the Civil and Surveying programs as well as the GIS program.

In addition to these recent developments, the Civil Department in conjunction with the Continuing Education Department at the college, hosts an annual Surveyor's Conference in January of each year in Salina for the Kansas Society of Land Surveyors. The conference is attended by Surveyors from all over Kansas and several adjoining states.

At the present time the Civil Engineering Technology Department offers Associate degree programs in Civil Engineering Technology and Surveying Technology.

If you are interested in these activities at Kansas College of Technology, and would like more information, please contact Steve Thompson by phone at (913) 825-0275 or write to: Kansas College of Technology, Civil Engineering Technology, 2409 Scanlan Avenue, Salina, KS 67401.

Science Olympiad date set for February 15 th in Salina

Kansas College of Technology will host the first annual Northwest Regional Science Olympiad contest on February 15, 1990. The Northwest Region includes all schools West of Topeka to the Colorado border and from McPherson North to the Nebraska border.

The Science Olympiad contest is devoted to improving the quality of science education, increasing student interest in science and providing recognition for outstanding achievement in science education by both students and teachers. These goals are accomplished through classroom activities, research, training workshops and the encouragement of intramural, district, regional, state and national tournaments.

The Science Olympiad tournaments are academic interscholastic competitions which consist of a series of approximately twenty-three individual and team events which students prepare for during the year. The competitions follow the format of popular board games, TV shows and athletic games. These challenging and motivational events are well balanced between the various science disciplines of biology, earth science, chemistry, physics, computers and technology.

There is also a balance between events requiring knowledge of science facts, concepts, processes,

ARE UNITS REALLY THAT IMPORTANT?

by Max Shepard, Associate Professor

One of the biggest challenges in teaching science is getting students to use units in all calculations and understand their importance. Students are typically enticed to use units with such threats as, **"NO CREDIT WILL BE GIVEN FOR HOMEWORK UNLESS ALL UNITS ARE SHOWN!"**

This method usually results in a moderate amount of success. However, a more useful approach is to impart the idea that units aren't a necessary evil; rather, they can be a valuable problem-solving tool. In fact, the proper use of units will nearly always tell you whether the problem has been worked incorrectly.

For example, let's say that you are asked to find the flow rate of water in gal/min given a molar flow rate of 370 g-mole/sec. The proper use of units can be used to solve the problem.

$(370 \text{ g-mole/sec}) \cdot (60 \text{ sec/min}) \cdot (18 \text{ g/g-mole}) (1 \text{ lb}/453.6 \text{ g-mole}) \cdot (1 \text{ gal}/8.34 \text{ lb}) = 1.06 \text{ gal/min}$

All units divide out to leave the correct units of gal/min. If you are left with any units other than gal/min, then you know that the problem has been worked incorrectly.

One other question students often ask about units is, "What type of units should I use?" There appears to have been a movement afoot for a number of years to use only metric or SI units. I believe that we are failing our science students if we do not expose them to an equal mix of metric and English units and also how to convert between the different types of units. It has been my experience in ten years of consulting work that English units (pounds, gallons, feet, etc.), no matter how awkward and cumbersome they can be, continue to be used extensively in industry.

As a final note, perhaps one way to drive home the importance of units to students would be to hire them as lab assistants and offer to pay them five/hour. Then after they work for five hours, give them a quarter.



KCT has 2-3 surveying jobs for every graduating student. Mike Anderson, Lawrence, adjusts a prism to measure distances with light beams.

skills and applications. In addition, during the day there are open house activities which consist of science and mathematics demonstrations, and various other science career orientated displays.

A team can have a total of 15 members of which only 7 may be seniors. Past competitions have shown that it is the enthusiasm of the students not the size of the school that makes the difference. Students and coaches both tend to have a very good time at these tournaments, while they are learning. Regional competitions such as this one are excellent places to gain experience before going to the state competition on March 31.

For more information, watch your mailbox, newsletters or call Dr. Loren Riblett, 913-825-0275 or Kent E. Wagner, 913-827-9657 (between 10:30-12:00)