PLANNING ACTIVITIES ACROSS THE CURRICULUM

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When developing items that are interdisciplinary, care must be taken to ensure that the activities align with the standards of all the disciplines involved.

At Tecumseh Middle School in Indiana the technology education teachers are part of a team consisting of language arts, math, social studies, and science. Teachers work together on items of common interest and student needs. There is a scheduled period each day for instructors to meet to develop plans and activities to help students become more productive.

Science teacher Doug Hauser wanted to develop an activity that would provide the students with hands-on, inquiry-based learning. He studied the Indiana State Science Standards and determined that the area least covered was physical science, specifically forces and motion. He remembered producing a Pinewood Derby Car when he was younger, and really liked its possibilities. He purchased two of the kits and started looking for grants to purchase kits for the students.

A student drills holes for axles.

At this point, Doug contacted technology instructor Ron Yuill, and the planning soon became cross-curricular. What can we do to get this going? What will the students do and learn? How much will it cost? How long will it take? These were some of the questions that needed to be addressed at the outset. There must be communication between teachers if an activity is to produce positive results.

As Doug and Ron viewed the car kit, they shared possible activities—like selection of students working in teams, research of designs, development of working designs, production, items to test, calculations to be made, what to do with the data, and how to share the information with others.

The activity was introduced in the science lab, with a brief overview of what was to happen in the car's development process. There was much excitement exhibited by the students at this time. They were to design, build, and test the performance of a wooden car. They would also share the data with their classmates. To make this job easier and more accurate, they were to keep a journal of each day's summary, which brings language arts into the process.

During science class, the students went to a "build your own racecar" site (www.pbs.org/tal/racecars/index.html) and were introduced to aerodynamics and car design. This site also lists other sites to search for related information. Students interested in racing can really have fun with some of these. The next step was the assignment of students to teams by the science teacher. The team's members were divided during the technology education classes. This could have been a problem, but the students communicated very well and no problems were exhibited.

After two days of research, students committed their best possible design

FEATURE ARTICLE

A student cuts her car to shape.

ideas to paper. These designs were to be used in their technology education classes to develop full-size working drawings. It was during this stage that it was determined that the kit's wooden piece would not lend itself to easily changing wheels and testing different lubricants. A new design was used, with a hole drilled through the wood for a steel rod axle. This would mean the kit could no longer be used, and wood would need to be cut for the cars. It also meant axles and wheels needed to be purchased.

Car wooden bodies were cut out of 2 x 4s and given to each team. When they had their working drawings completed, they copied their shapes on the wooden bodies. After receiving instruction on machines and passing relevant safety quizzes, students were permitted to cut out the shapes. The car bodies were then finish-sanded to a smooth finish.

Wheels were attached, and the students made sure their cars would go down the ramp in a straight path. This was a very good time to watch the students as they reacted. Some cars had problems that needed some problem solving. Teams were first to make corrections. If this could not be done, it was suggested that they work with another team for a solution. The teacher was the last contact for the solution. From a teaching point of view, it was fantastic the way students helped each other. The teacher suggested that students should use the concept of helping others in real life.

Some students, who had completed their projects ahead of schedule, applied paint to their cars. Many had to do some problem solving to see why the wheels would not turn as easily after the painting. It was now time for the cars to go to the science room.

The cars were weighed and the information recorded. Students recorded the car's time for going down the technology education ramp. Students could add weight (washers attached with a stickpin) and test to see if it improved the car's speed. They applied the weight all over the car and had a lot of fun in the process. The data for this was also recorded. When the team arrived at its best time, the students kept their car in that configuration.

The teacher recorded each car's speed before any testing or changes, as a reference point to plot its progress. Students were given a chance to use graphite, lithium grease, or silicon lubricant to make the cars run faster. Again the data was recorded.

When each team had its car running the best, a run was made so that the science teacher could record the best time. Students wanted their team's car to be the fastest. The students had to use the information gained and calculate the speed of their best run.

After all the information was collected, the students went to the computer room and designed a Web page to display their findings. A digital picture was taken of the team and uploaded to the site along with the information gained.

Another interdisciplinary activity used was the designing of a Rube Goldberg device. The students were to make a device at home and display it at school. The students were having problems with making a drawing of the device, so the technology education teacher helped in the process. A math teacher suggested that the technology education department continue to have students learn about measuring, as it helps the students improve that skill. For more activities, go to the "Members Only" area on the ITEA Web site and locate the IdeaGarden Archives.

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The science teacher said, "One of the biggest successes of this project was the level of excitement. I do not remember when I last had students this excited about a project. Students were talking about their cars, comparing results, bragging about how well they did, etc. It was very gratifying to see them so excited. I don't know how much knowledge transfer has taken place but, if nothing else, we excited them about science and technology."

One of the items in the discussion stage was to share our ideas. The result is this article. In the future,

when we do this again, we plan to obtain as much media coverage as we can. We may consider having the language arts teacher work with the students to write an article for the school newspaper. The math teacher can obtain some of the data and develop some story problems for the students to solve. The social studies teacher can search for the history of the Pinewood Derby cars.

We hope this article will provide some ideas or methods to encourage your students to try harder and learn more as they participate in class. This activity was fun for the teachers and students and, as all of you know, when students are having fun they will work harder and learn more.

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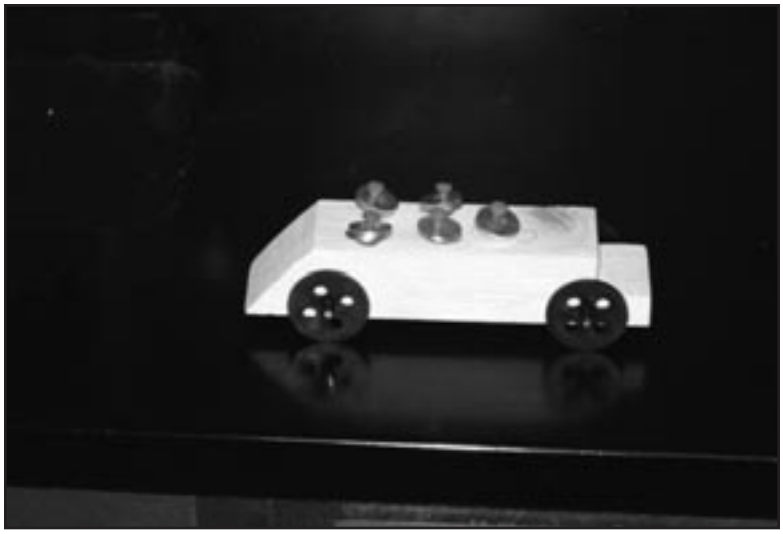
For more information on classroom activities, search the following, located on the ITEA Web site (www.iteawww.org)

IdeaGarden Archives for Activities

ICON (Innovation Curriculum Online Network)

HITS (Humans Innovating Technology Series)

Also check affiliate association Web sites



Washers used as weights were added to increase speed and held in place with push pins.