



By A.W. Garrard, H.M. Barnes, R.D. Seale, and T.E. Conners

The Wood Magic Science Fair™ (WMSF) is a new, exciting, and innovative program aimed specifically at elementary school students. It seeks to educate students about the tremendous importance of wood and wood products to each of us individually and to the economy of the nation. The WMSF is an attempt to change some of the common misconceptions concerning the depletion of trees and to improve the visibility of the forest products industries and emphasize their status as environmental conservators. The WMSF originated at the Forest Products Laboratory, Forest and Wildlife Research Center, Mississippi State University and is beginning to spread to other states.

Our program was initiated because of a comment from a local third-grade student on a field trip to the Forest Products Laboratory (Lab). Dr. Dan Seale was conducting a tour of the Laboratory for his daughter's class when

one little girl, whose parents worked at a local furniture plant, spoke up and said, ". . .all you do is cut down trees and destroy the ozone." Consequently, the faculty decided to invite area third- and fourth-grade classes to visit the Lab for a tour and a few demonstrations showing the importance of wood and wood products. We invited 126 classes to visit the Lab, and 89 teachers accepted the invitation. It took the entire Fall semester of 1993 and the Spring semester of 1994 to honor all of the requests. More than 3,000 school children attended these 2- to 3-hour programs. These students were taught that wood is renewable, recyclable, biodegradable, and durable, and that we are currently growing more trees today in the United States than ever before. They participated in hands-on experiments such as making plywood and paper, and testing the strength of wood.



A Photo-op With Smokey The Bear.

Teachers told us that this was an exceptional field trip experience, and requests started coming in for more field trips and demonstrations. There was literally no way to keep up with the demand for Wood Magic demonstrations, and the faculty and staff decided to combine all of the requests and invite students to the Lab at the same time during a 1-week time period, for a huge science fair.

The university and department administration agreed to support the WMSF by allowing faculty and staff to spend the time needed to organize and operate the Fair. The administration recognized that the WMSF falls within the mission of the university by providing education and service to the citizens of the state. With this base financial support in place, the next step was to raise money for other operating expenses. We wanted free admission to the WMSF so that any school could participate. It was estimated that the cost per student for the Fair would be around \$4.00, which provides for various materials, a pizza lunch, and a popcorn snack. Two area plywood plant managers provided initial start-up funds. A letter was sent to

more than 1,200 people in forest and forest-based companies throughout the United States along with a description of the program that outlined what the faculty hoped to accomplish with the WMSF. A few large donations of \$1,000 or more were received, but most were smaller donations from small companies and interested individuals. A list of teachers was obtained from the State Department of Education and letters of invitation were sent to more than 6,000 third- and fourth-grade teachers throughout Mississippi. The available openings were filled within a few days. The Wood Magic Science Fair was transformed into a major annual event!

ORGANIZATION

The WMSF is staffed by faculty, staff, and students at the Forest Products Laboratory, Forest and Wildlife Research Center, Mississippi State University, and by industry and community volunteers, and colleagues from other campus departments and units. Everyone at the Lab is involved with this event, from the students to the department head. It's also helpful to explore other areas for possible volunteers. For example, fraternities and sororities usually require their members to do community service, and these students often staff our food tent to fulfill this requirement.

Flexibility is required in scheduling people to operate the various stations within the Fair. If a professor has a class to teach on a given day, someone will substitute for him at the event at the Fair. The same is true for the MSU students. Either they operate the events during their free time or they may be excused from a class, especially if it's in the forest products curriculum. Enough people are involved so that flexible scheduling is possible.

... many companies are planting trees today with the intent of harvesting them in 15, 20, 30, 40, or 50 years from now. If we don't educate the 8- and 9-year-olds in this country now, we may never be able to harvest the trees we plant today.

— Samuel B. Caldwell, Vice President/General Manager, Sun Machinery Company, Lexington, S.C.

There have now been four annual stationary Fairs, each one held during a 1-week time period in October. The dates are determined primarily by the MSU football schedule because we use the big-top food tent and literally all of the tables and folding chairs that the University Facilities Use Department owns. The Fair events take place

under huge tents, or indoors in the Lab's shop or testing areas. No indoor classrooms are used. Once the football schedule is finalized, soon after the first of each year, the dates for the Fair are set and fundraising becomes more active.

In March, letters with applications for registration are sent to teachers throughout the state. These letters are mailed at the same time on the same day. Within 1 week, more than 600 applications are returned, but, because of space and time constraints, only 300 classes can attend. Registration for the WMSF is primarily based on a first-come-first-served basis depending on when the teacher's application is postmarked. The exception to this rule is when a company or individual makes a donation to the WMSF and requests that a certain class or classes be scheduled to attend. These donors essentially cover the costs for these students to attend to reserve a spot for them. Sponsored classes make up approximately one-third of all classes that attend the Fair. About two-thirds of the classes who attend are accepted because their teachers sent their application form in immediately upon receipt. Teachers have learned that if they don't mail their application back the day they receive it, they probably won't be able to attend because of the overwhelming response.

In early May, the WMSF staff sets up the schedule for the 300 teachers who will be invited to attend. On the application form, teachers are asked to list their first three choices for their preferred day of the week and starting time. Classes are scheduled as close as possible to the teacher's preferences. Local schools usually fill the early time slots; the later time slots work better for the schools that are farther away. After the schedule is made, a formal letter of invitation is sent to the teachers who have been scheduled.

The other teachers' applications are placed on a waiting list and cancellations are filled from this list. A packet of detailed information is sent to the teachers who are invited to attend, including a description of the Fair, a confirmation form that verifies that the teacher plans to attend, an individualized schedule of events for each class, and a form requesting the name of each student who will attend the Fair. A map of the WMSF grounds, a Starkville area map, and a t-shirt order form are also included in this packet. A different WMSF t-shirt is designed each year and sold on an order basis, at cost. The shirts are mailed to the schools before the WMSF so the students can wear them on the field trip. After 4 years, we have noticed that WMSF t-shirts show up all over Mississippi!

DESCRIPTION OF THE WMSF

The stationary WMSF is set up as a scheduled walking tour of events for approximately 60 classes per day. By focusing on lumber, plywood, furniture, and paper, this program emphasizes the importance of the forestry and forest products industry to Mississippi. Math skills, foreign languages, computer skills, scientific methodology, biology, reasons for recycling, and conservation of natural resources are also included. The particular demonstration events change somewhat from year to year. We keep the ones that are working best, and add new ones when someone comes up with a great idea. The classes are scheduled to begin their program at 15-minute intervals from 8:30 to 12:00 noon; a whistle blows to tell each class to move to the next event.

Two third-grade and two fourth-grade classes are invited to the WMSF on the Friday before the first full day on Monday. These classes help us to



Wood Sandwich.



Chem-Is-Tree.



Rock Stars.

debug the Fair, and officially open the Fair with a balloon release.

A TYPICAL DAY AT THE WMSF

Upon arrival, each teacher receives a bag with instructions, another copy of their individualized event schedule, a map of the Laboratory and event locations, a teacher survey, and a classroom banner for use in photographs of their class. From the moment the children step off the bus, they are on a fast-paced, exciting, 3-1/2-hour trip through a world of wood. If the classes arrive early, they are directed to a forestry or wildlife exhibit, and/or forest products industry exhibits. "Smokey the Bear" may be on hand to greet them, or it may be the MSU mascot "Bully" or the MSU Cheerleaders.

The Fair officially begins for each class with the *House*¹ film, a catchy, upbeat 10-minute film (narrated by a tree) that teaches: 1) how all parts of the tree are used in constructing a house; 2) that 25 trees are used in the construction of an average home; and 3) how five trees are planted for every tree harvested.

The Fair continues for an additional 14 time periods of 15 minutes each. The next step is the *Class Photograph* (with their class banner). Each class receives a color photo for their classroom and a B/W photo is sent to their local newspaper.

After the photo session, third-grade classes go to *Wood Pickles* where they are shown wood preservation techniques, while fourth-graders go to the *Sawmill* station where they see a portable sawmill cut eastern redcedar logs into

lumber. Students learn about heartwood and sapwood and are given blocks of the cut-up lumber. Third-graders continue on to the *Wood Sandwich* station where they learn how plywood is made by comparing it to a grilled-cheese sandwich. They get a chance to test how strong they are by breaking a veneer and then trying to break an assembled piece of plywood. Fourth-graders make a *Rice Krispy* treat (particleboard) by combining "cereal" (wood particles) with "marshmallows" (resin). After a *Snack Break* for popcorn and drinks, students continue their trek through the Fair.

Third-grade classes go to *Furniture Testing* where they see computerized stress testing of cushions and frames and simulations of people repetitively sitting on couches. Fourth-grade classes participate in the *Chem-Is-Tree* (chemistry) event where they are shown chemicals made from wood, how charcoal is made, the differences between safety film and old movie film, and other chemical uses of wood.

The third-graders then enjoy an event called *Rock Stars* where they guess how much weight a tensile specimen the size of pencil lead can hold before it breaks. The load is increased by pouring rocks into a bucket supported by the sample. The fourth-grade students participate in *Talking Computers* where the computer talks to the students in several languages and talks to a CNC router to cut programmed designs into wood.

Both third- and fourth-grade classes participate in *Termites* where "trained" termites follow ink of a given color (actually they follow a chem-



Papermaking.



The Mobile Classroom.

ical pheromone trail). This event provides some understanding of basic biology in a fun format.

Following *Lunch* (pizza and soft drinks), the Fair continues with a combined event called the *Sounds of Music*. Musicians among our staff show the students another important use of wood and play various musical instruments made of wood. Both age groups then head to one of three "Big Tents" where the final three events of the day are held.

Daily Wood teaches the students how much wood is consumed by each of us daily and shows the varied uses made of wood. Importantly, students are told the success story of reforestation, and much of the misinformation regarding the history and coverage of our forests is debunked. Students help presenters make paper at the *Papermaking* station. The day is capped off with a demonstration of wood properties, including density, hardness, and permeability at the *Bubbling Bazookas* event where students turn small red oak billets into bubble blowers. A competition crowns the "champion of the tent" for having the longest bubble stream.

On the way back to the buses, teachers pick up their *Teacher Bags* filled with a personalized certificate of attendance for each child, several wood objects for each student (e.g., ruler, pencil), and booklets and brochures for the teachers that can help them reinforce the material covered at the WMSF.

EVALUATION

To gauge how well we were achieving our goals, a pre- and post-Fair paired comparison test was carried out on a sample of student classes who attended the 1995 and 1997 Fairs.

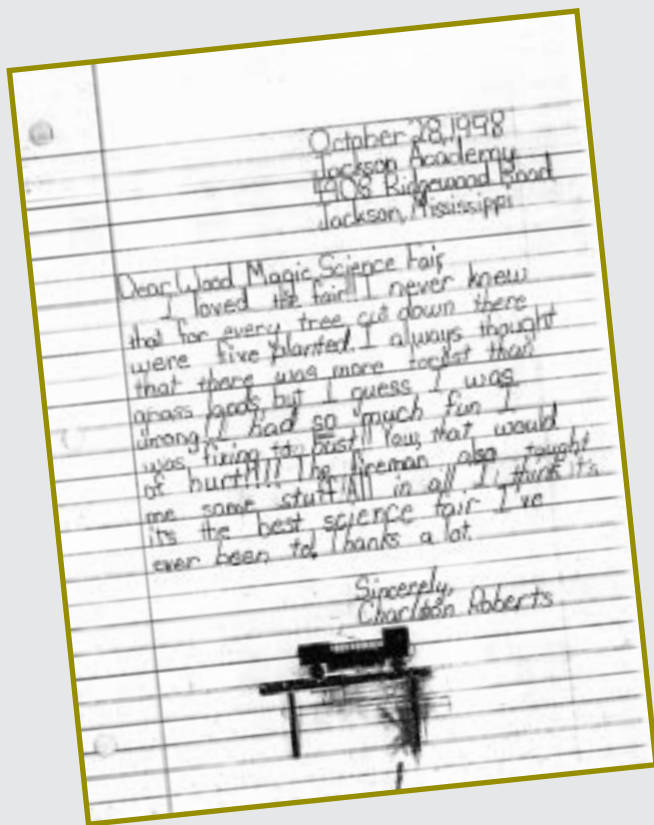
Survey results were used to implement changes to the program. Teachers were given evaluation forms at the 1997 and 1998 Fairs. The WMSF program won the prestigious *Public Education Forum of Mississippi Award for Excellence* in 1996 for the very first October Fair and won this award again in 1997 for the WMSF Mobile Classroom. Hundreds of thank-you letters from students and teachers have been received since the WMSF began. Many teachers have commented that this program is the best field trip they have ever attended with their classes.

The next step will be to develop pre-Fair educational packets to send to the teachers before the students visit the Fair to provide background information and to prepare students (and teachers) for the Fair. Then, after they visit the Fair, we plan to test a representative sample of the students to see how much and, specifically, which facts they retain from what they have learned.

MOBILE CLASSROOM

In 4 years, the stationary WMSF has hosted more than 35,000 students, teachers, and parents and it is now widely recognized as an excellent program in Mississippi. The stationary WMSF, however, can only serve 300 classes per year. This eliminates participation by the many other classes who would like to attend but cannot because of space limitations or because of the travel distance to Mississippi State University. In order to combat this problem, and also reach students in other grades, a WMSF Mobile Classroom program was developed. A 44-foot-long trailer has been outfitted with all of the supplies and equipment to produce a mini-WMSF on-site at schools, forestry field days, and expositions. Industry donated the funds to purchase the trailer and a 30- by 50-foot tent. Companies also provided funds to furnish the Mobile Classroom. Grants and donations were used to outfit the classroom with a professional-quality sound system, large-screen televisions, multiple VCRs, portable stages, a plywood press, wood-strength apparatus, and paper-making equipment. Demonstrations can be held from either side of the trailer or from both sides of the trailer simultaneously.

The Mobile Classroom stays on the road throughout the year. The Classroom makes an average of three trips per month depending on availability of faculty to make the trips and the availability of outside funding to cover the travel expenses. The WMSF Mobile Classroom does



not charge individuals to attend the programs. Often local forest products companies cover or partially cover the travel expenses that are incurred to bring the trailer to a school or expo (e.g., overnight accommodations, meals, diesel fuel). The WMSF Mobile Classroom has traveled to more than 30 towns in Mississippi as well as Kentucky, Arkansas, South Carolina, Virginia, Tennessee, and Georgia. It is estimated that more than 10,000 individuals have participated in Wood Magic programs from the Mobile Classroom.

FUTURE

The Stationary WMSF and the Mobile Classroom have been instrumental in educating the public about the forest industry and they are complementary to other programs such as *Project Learning Tree*² and *Woods Walk - Woods Talk*.³ However, the message must be spread across the country for the effort to have a significant impact on public perceptions. An additional goal of the WMSF is to generate interest and offer assistance to other universities or agencies throughout the United States who would like to begin programs similar to the WMSF. Several states have shown an initial interest in the WMSF concept (Alabama and South Carolina) and others have made further progress (Virginia Tech presented a 2-day Wood Magic Show in

October 1998, and Kentucky has funding to start a similar program).

Both the October WMSF and the Mobile Classroom require year-round fundraising because they are supported almost entirely by outside grants, and donations from forest products industry and individuals. Our future success will be limited only by our ability to continue to fund this program. We would like to reach more students, and to develop classroom teaching literature, experiments, and teaching aids to enhance teacher education and reinforce the facts presented during the WMSF. We plan to continue these worthwhile programs to teach more students and their teachers about the vital role that timber products play in our environment, economy, and personal well-being. Maintaining and expanding the WMSF program will take vision, commitment, and dedication by the WMSF staff, and continued support from the forest products industry. We hope that collaborative efforts between universities, extension services, and industry will, over time, result in changes in the attitudes of individuals toward forestry and forest products industries.

¹*House, a Child's Guide to the Origins of Everyday Stuff*, Odyssey Productions Inc., Portland, Oreg.

²*Project Learning Tree* is an environmental education program that was developed by the American Forest Foundation.

³*Woods Walk - Woods Talk* is a program developed by Allan Houston for the Ames Plantation of the University of Tennessee.

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