



For the second year in a row, the children of Fermilab explored what it's like to work at a laboratory and be a scientist. Armed with pencils, paper, their own imaginations and thoughtful questions, the kids left with a deeper understanding about what a career in science entails—and they had some fun too! On the pages of this special edition of *FermiNews*, the children summarize their day at Fermilab.

Fermilab's Children Discover Life at a Science Lab and Explore Careers in Particle Physics

The children conducted their own press conference on the 15th floor of Wilson Hall. Fermilab Director Emeritus and Nobel Laureate Leon Lederman opened the conference with some remarks and addressed the children's questions. The *FermiKids* also interviewed and talked with physicists Herman White, Cat James, Janet Conrad, Hans Jostlein and John Tompkins.

Esther Wu, 14, and O.J. Oshinowo, 14, photographed the event for this special edition of *FermiNews*.

—Ed.

I came here today not expecting to, well, let's just say I was sure I wasn't going to be thrilled. However, today was one of the most interesting days of my life. Today I met some really fascinating people. First, there was Leon Lederman. Being a Nobel Prize winner, I expected him to be speaking that language that only scientists seem to understand. But the moment he started speaking, I knew this wasn't true. Leon was a great person who showed his love for science and had a great sense of humor. Next, we were introduced to Janet Conrad, Katherine James, Hans Jöstlein, John Tompkins, and Herman White. They were really nice and explained and answered questions in a language I could understand.

Seeing and hearing these people talk about their careers was very inspiring. It showed me that if you put your mind to something, you can do whatever you want.

—Jan Brandt, 12, 7th grade,
Thayer J. Hill Middle School

Today my mom dragged me to Fermilab. Surprisingly, it was a lot of fun. I got to meet a Nobel Prize winner, Leon Lederman. Mr. Lederman is a very funny man. Then he told us what protons, electrons, neutrons, molecules, and atoms were. The conference was a lot of fun.

—Patrick O'Boyle, 11, 6th
grade, Batavia Middle School

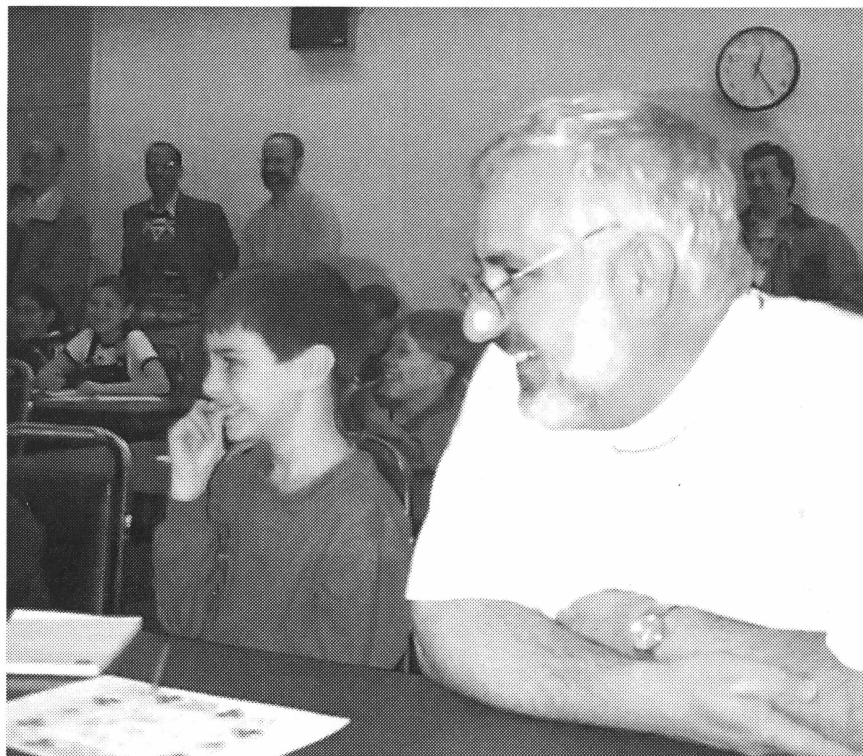


Photo by Esther Wu

Eren Cihangir (left), with his father Selcuk, participating in "Take Your Daughters and Sons To Work Day" at Fermilab.

Young Science Journalists

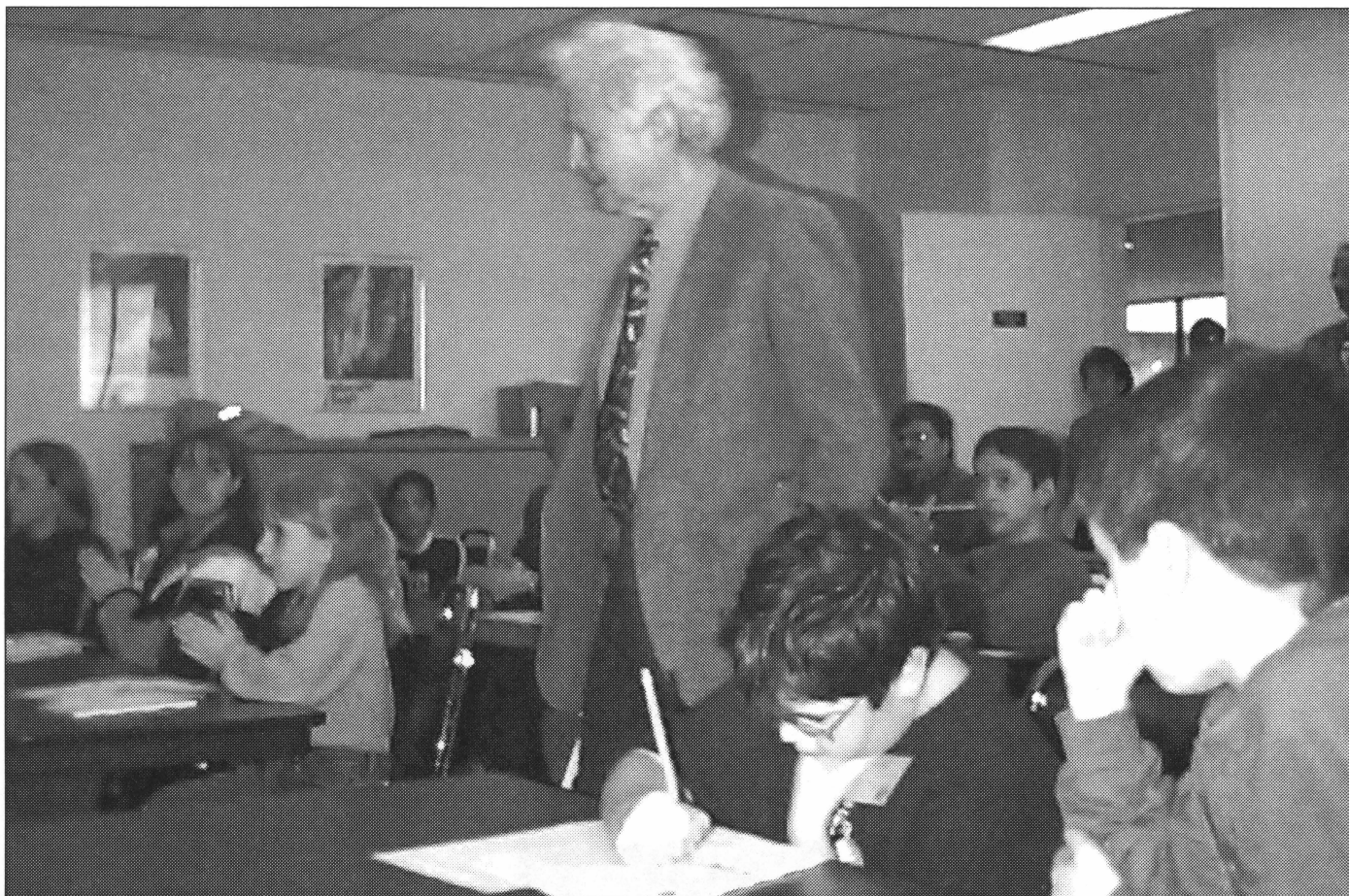


Photo by Esther Wu

Aside from teaching calculus based physics courses at IIT, Leon Lederman had the time and devotion to teach a group of curious children visiting Fermilab on "Kids go to work with Parents Day." As he told us his story humorously, we learned his hobbies, accomplishments, and likings. Leon won the Nobel Prize for Physics, and in his spare time he likes to ride horses, ski, and walk his dog. He had time to teach us about quarks and atoms and answer questions like "What do you do at Fermilab?" To learn more about him you can visit the Leon Lederman Center.

Many other scientists had the time to answer our questions, too. Janet Conrad (from Columbia University) told us about how she wanted to be an astronaut, and then in 6th grade decided to be a physicist. Katherine James is also a scientist at Fermilab and has "explored" here since she was a college student. Hans Jöstlein, from the University of Munich, is an engineer

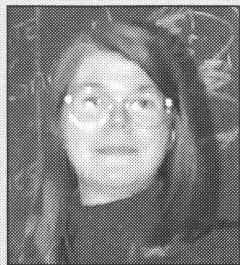
and scientist here. John Tompkins taught us about magnets. All four of them taught us about astrophysics and making a map of a slice of the universe. All in all I learned a lot and after the speeches 3/4 of the kids decided they wanted to be scientists and learn about physics, "the truth of understanding."

—**Reena Sood, 14, 8th grade,
Edison Middle School**

This was a very interesting class with 6 physicists. There were Leon Lederman, Janet Conrad, Katherine James, Hans Jöstlein, Herman White, and John Tompkins. Leon Lederman told us his life story in a cartoon and about how quarks are in protons and neutrons. There are six kinds of quarks, up, down, charm, strange, top, and bottom. Janet Conrad studies neutrinos and teachers at Columbia, Katherine James studies strange quarks, and Herman White studies symmetry. They taught us about physics. There is

Leon Lederman answers questions from young reporters on "Take Your Daughters and Sons to Work Day" at Fermilab.

Kids as Science Journalists



Janet Conrad, a physicist from Columbia University. (Photo by O.J. Oshinowo)

an experiment going on where protons are slammed into a block and antiprotons, quarks, and antiquarks result from it. Physics is interesting because it answers all questions and tells you how rules work. It was a very interesting day at Fermi. I hope to come back someday and maybe be a scientist.

—Denise Ford, 12, 7th grade, St. John the Baptist School

Radiation is protons, atoms, electrons, quarks moving very fast. Sound travels 1,000 feet per second. Fermilab is not the first place in the world to see quarks.

—Brandon, 7, 2nd grade, Anderson

Fermilab has a lot of interesting scientists and they do a lot of interesting experiments. The second director of Fermilab, Dr. Leon Lederman, won the Nobel Prize in Physics for finding and studying neutrinos. Fermilab also found two quarks, the top quark and the bottom quark. There is a total of six quarks that Fermilab confirmed including the two. The quarks come in pairs, also known as cousins. Besides

particle physics, Fermilab also does astrophysics. Astrophysics is the study of the universe. Scientists from Fermilab and other scientists are building a new telescope in Texas. So that is why Fermilab is interesting, but more interesting is what the scientists do.

—Joshua Petersohn, 13, 7th grade, K.D. Waldo Middle School

Have you ever wondered what physicists do? Basically they study how and why things work the way they do, and 5 people explained that to me today. Leon Lederman, a physicist here, was the first scientist. He told us about his life as a scientist. It started when he was little and just started learning physics to now when he is a very famous physicist. He told about winning the Nobel Prize and all about protons, atoms, nuclei, electrons, and more. Also, Janet, Hans, Herman, and Katherine told us what it is like to be a physicist and how they got to be that way. I learned that all scientists start their career when they are young and I want to be like them and start too!

—Julia Geynisman, 10, 5th grade, Ranch View Elementary School

Photo by O.J. Oshinowo



One of the *FermiKids* asking a question at the press conference.

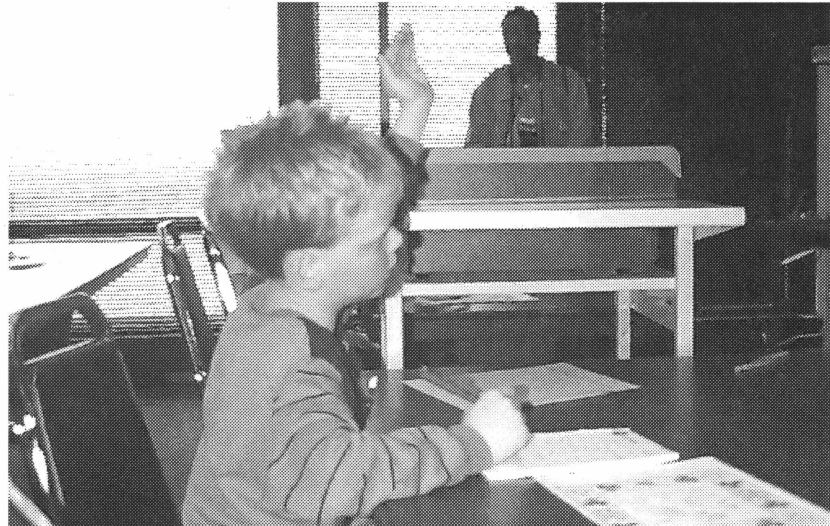
The presentation was really interesting. They told us about quarks. They said there are six different quarks. They have up and down, charm and strange, top and bottom. They told us we all are made of atoms. Atoms are made of nucleus and electrons. Nucleus and electrons are made of protons and neutrons. In them are quarks. They think nothing is inside a quark. Fermilab, I found, discovered the top and bottom quark. I also found out how to make a magnet. Some of the things they said I already knew, but still, most I didn't. It was really fun.

Q: What is a Quark?

A: (Leon Lederman) It is a class of particles. There are six different kinds of Quarks. They come in cousins: Up

Kids as Science Journalists

Photo by O.J. Oshinowo



A young science journalist asks a question of Leon Lederman at Fermilab's "Take Your Sons and Daughters to Work Day."

and Down, Charm and Strange, Top and Bottom Quark. We are also made of atoms. We are also made of Quarks. Atoms are made of nuclei and electrons. An atom looks like a nucleus surrounded by electrons. A nucleus is made of protons and neutrons. In the proton are Quarks. Atoms make molecules and molecules make us. They think there is nothing inside Quarks. Fermilab discovered Top and Bottom Quarks.

Q: How high is the Wilson Hall HiRise?

A: (Janet Conrad) It is about 160 feet high.

Q: How fast does sound travel?

A: (Herman White) Sound travels 1,000 feet per second.

Q: How do you produce antiprotons?

A: (Hans Jostlein) Sling a proton into a target of other protons. You also get Pion and it disintegrates really fast. And you soon get an Antiproton.

Q: How do you build a magnet?

A: (Hans Jostlein) Take a battery and attach it to a nail with a wire wrapped around the nail. Use a steel nail.

Q: Why does the Earth spin while traveling around the Sun?

A: (Katherine James) Asteroids are

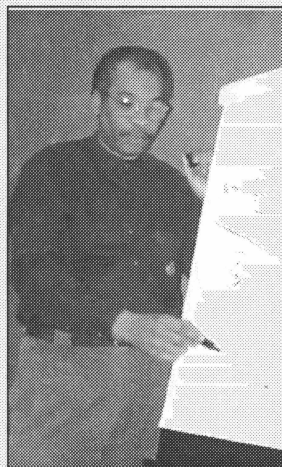
attracted to planets by gravity because of the orbit of a comet. The comet always stays on the same route because of gravitational pull on the comet. Even if the comet crosses over another route or orbit, it will stay on the same place. Protons are sitting mostly still but when they are given a push, they produce radiation.

—Megan Spatafora, 12, 7th grade, Washington Junior High

I interviewed Leon, a scientist who won the Nobel Prize, and works at Fermilab. He told a story called "Story of Leon." As a child Leon learned physics—how to smash things. He was also brought to Little League which he says is tougher. He hit the ball once, but forgot to run. When he went to school he would always dip the hair of the little girl who sat in front of him in his ink well because she had long hair. When he was older he did all his work at once. He became a teacher and in his story he says everyone slept through his classes. Then all his students graduated. He took horseback riding and skiing. And at the end he says he now walks his dog very slowly with a cane.

—Justine Kesich, 10, 5th grade, Somonauk Grade School

I asked different scientists if they would rather have a different job and they said no. They also talked about



Fermilab physicist Herman White talks with the student journalists.. (Photo by Esther Wu)

Kids as Science Journalists



Cat James, a physicist at Fermilab. (Photo by O.J. Oshinowo)

Quarks. There are 6 different kinds of Quarks. They are up Quarks, down Quarks, Charm, Strange, Top and Bottom. The scientists think that Quarks are not made of anything else. I asked them if when you were making antiprotons a proton went too slow when it was going in an object and it got stuck in the middle and another proton came out and it was an energy with no charge? They said that won't happen very often.

—**Emre Cihangir, 9, 4th grade, Good Win South**

Janet Conrad works at Columbia as a professor in physics. She first became interested in physics in 6th grade (inspired by Star Trek). She likes physics because she finds the answers to everyday things that we ignore. For example: Why do we not sink when we swim?

—**Sarah Vela, 11, 5th grade, Gwendolyn Brooks**

I thought it was interesting to listen to physicists and scientists. I learned how a comet stays in its orbit and about protons and neutrons. I found out that I was made of tiny atoms called quarks. I think its neat that

quarks can go through strong steel walls with no trouble. In the end I think it was very educational and fun to talk to teachers and scientists.

—**Jennifer Rubel, 11, 6th Grade, Geneva Middle School**

First the prairie consultant was talking about the grass. He was talking about Indian grass and other kinds of grass. Then we went into the woods. In the woods we saw one kind of flowers. And he was talking about red oak and white oak. But I still don't understand why we didn't see any birds and animals. Actually I did see one bird but I didn't see many of them like in my back yard.

—**Irina Gornouskin, 9, 3rd grade, Harrison Street School**

I like the distance, but I would like to know why you see it that way. I learned that the comet has a bigger orbit then our Earth. I like physics. I think it's interesting.

—**Elizabeth Sharonov, 7, 1st grade, Harrison Street School**

Katherine James first wanted to be an astronaut, but then she got glasses, and astronauts weren't allowed to wear glasses so she grew up to be a physicist. A group of physicists study how things happen, for example why when you look at a mirror your right hand is your left hand in the image.

Comets have lots of mass and have very big orbits. That is why we might not see it for a very, very, very long time. Comets have an orbit because well, they are kind of part of nature, just like the Earth.

Physicists don't know why Earth has life, water and land and air. If there was a planet with water and air would there be life?

—**Katherine Sharonov, 9, 3rd grade, Harrison Street School**

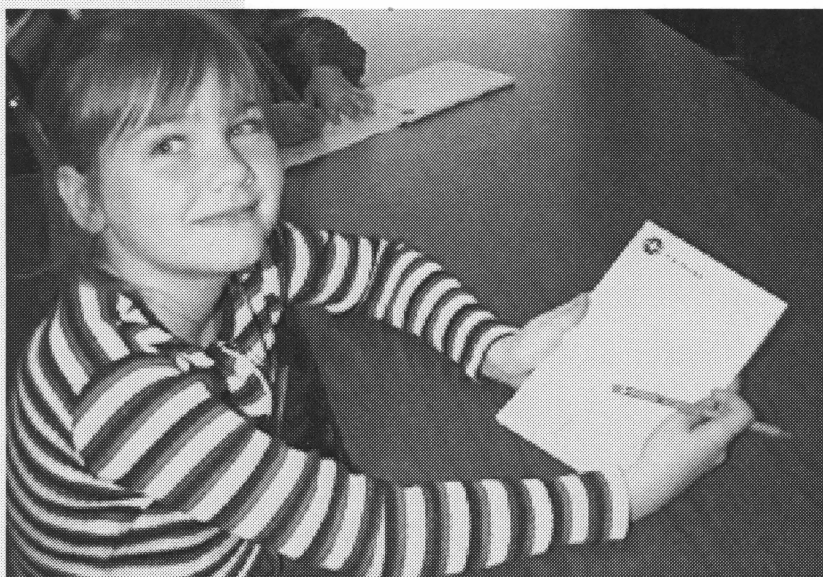


Photo by Esther Wu

Elizabeth Sharonov displays a drawing she did of Fermilab's Wilson Hall.

Kids as Science Journalists



Hans Jostlein addresses the press conference. (Photo by O.J. Oshinowo)

The spring came already, but there are no green plants in the prairie--it is still too early for them. The few ones that we saw, though, are not the original prairie plants. There are 10 major common prairie plants, and nearly five of them are present at Fermilab.

In the wood, some of the flowers are grown already. They need to flower before the leaves appear on the trees, so that they get enough of sun. One of the dangers for the flowers are the deer—they eat a lot of plants. So the fences, that preserve some areas, show how much more flowers there could be. The number of deer cannot be controlled because there are no natural dangers for deer at Fermilab.

—Olga Gornouskin, 16, 10th grade, Geneva High School

I like the Fermilab very much, I want to work like my father in Fermilab.



A look at the newest *FermiNews* photographers: Esther Wu, 14, and O.J. Oshinowo, 14.

I think if I will be big I could come to work in Fermilab.

—Roman Novitski, 7, 1st grade, Currier Elementary

Being a physicist is being a scientist who studies the nature of nature. It requires learning about why things happen in the way that they do and the fundamental particles that make up all things that we know of including living as well as non-living. It requires a lot of dedication to be a physicist. As one physicist puts it; "If I were to rate physics on a scale of 0 to 10, with 10 being the best, I would probably say it's 10, 12, 15 or beyond."

—Esther Wu, 14, 8th grade, Kennedy Jr. High School

There are six kinds of quarks---up, down, top, bottom, strange, and charm. Five physicists talked to us about a variety of subjects including quarks, atoms, story of their lives, and how they became interested in science, comets, gravity, planets, magnets, radiation, etc. It was interesting and helped many people, including myself, learn more about science.

—Christine Kolb, 14, 8th grade, Hubble Middle School

This was different than I expected. It was a good learning experience. Dr. Leon Lederman explained many puzzling things. Janet Conrad's interest in physics because of "Star Trek" is amazing. Hans Jostlein also amazed me. He started working here because he liked the way the CERN looked with all the machines. One amazing but true thing is that physics has to do with about everything. You see, if you ask a question, physics will have the answer.

—Iza de Barbaro, 11, 6th grade, Thayer Hill Middle School

Kids as Science Journalists

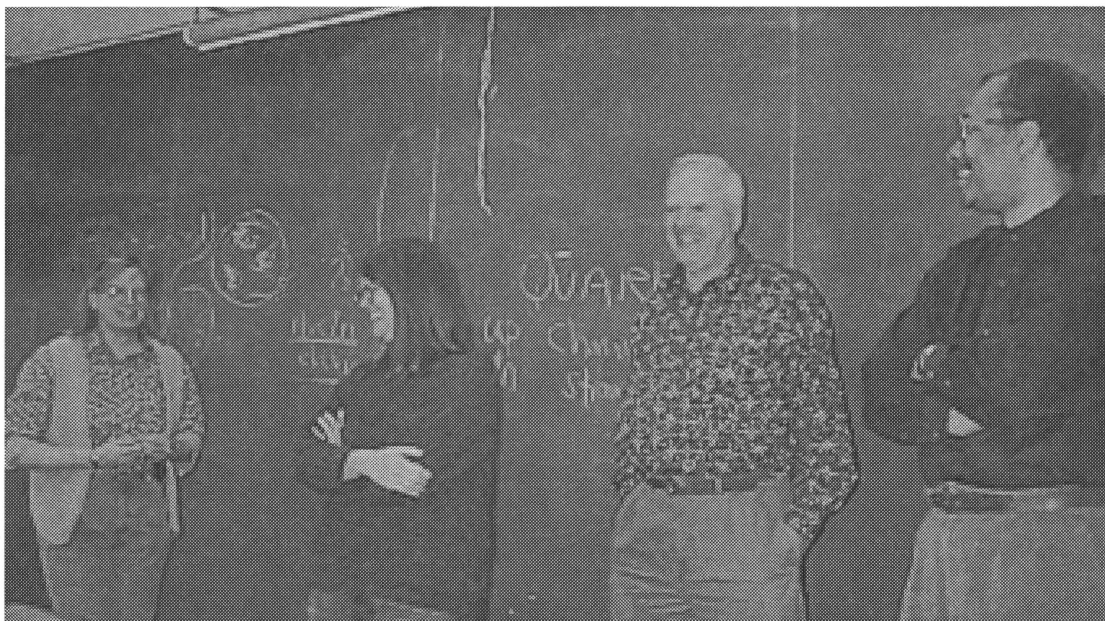


Photo by Esther Wu

Fermilab physicists addressing the "Kids as Science Journalists" press conference.

We met Leon Lederman (named after Lederman Science Center). He taught us about quarks and atoms. He was very kind to us and funny. I'm glad he came.

—Brett Zimmerman, 9, 3rd grade, St. Paul's

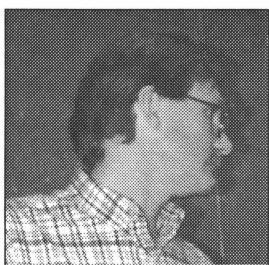
Leon Lederman dipped a girl's hair in ink because he liked her; but the girl never knew Leon liked her. He played ball when he was young for three years. He only hit the ball one time. When he was older, he did an experiment on neutrinos. When he did, he won a Nobel prize. When he was young, there were no ball point pens.

—Andrew Brown, 9, 3rd grade, Long Beach Elementary

—The editors of *FermiNews* would like to thank everyone who contributed to this special edition of Fermilab's newspaper, especially our newest science journalists. The members of Fermilab's Office of Public Affairs would also like to thank those that volunteered their time to help with "Take Your Daughters and Sons to Work Day."

I had a lot of fun at the science journalist activity. Being a photographer made the experience all the more exciting. I enjoyed getting up close and snapping shots. I liked getting to play an important part in the production of the newsletter. I also enjoyed listening to someone who won a Nobel prize.

—O. J. Oshinowo, 14, 8th grade, Gregory Middle School



John Tompkins of Fermilab explains how to build a magnet. (Photo by O.J. Oshinowo)

CHECK OUT THE WEB FOR MORE INFORMATION ABOUT "TAKE YOUR DAUGHTERS AND SONS TO WORK DAY" AT FERMILAB!

A form of this publication also appears on the World Wide Web. The address is:

http://www-ed.fnal.gov/FermiKids/front_page.html