

THE JOURNEY INSIDE

The ISTE newsletter of classroom ideas and hardware information.

US\$3.00

Energy Efficient PCs

Dozens of hardware companies—PC companies, and makers of various components and equipment—are rapidly moving in tandem to build and market energy-efficient PCs. Behind these companies is the influence of the federal government as well as growing corporate and public concern about the environment and the way we use our resources. While PCs aren't the biggest culprits when it comes to energy waste (they account for 5% of commercial energy usage), the segment is growing rapidly. It is an area where industry and individuals can make an impact with a minimum sacrifice, perhaps even establishing a model for other industry/government programs.

The Environmental Protection Agency's (EPA) Energy Star Computer Program, which began in June 1992, has gone a long way in encouraging the industry to build and market energy-efficient PCs. On April 21, 1993, President Clinton signed an Executive Order directing all federal agencies to buy only computers, monitors, and printers that meet the EPA's Energy Star Computer Program guidelines. With that action, Clinton effectively put the largest buyer of office equipment in the country behind the movement, sending out a strong signal to the industry.

The goal of the Energy Star program is to encourage, rather than regulate, the development and purchase of energy-efficient PCs. It is a voluntary partnership between the EPA and computer and equipment manufacturers. More than 50 manufacturers currently meet the requirements to display the Energy Star logo.

Energy Star-compliant computers burn less than 30 watts of electricity in the sleep mode (plus 30 watts for the monitor), compared to 50 watts to 200 watts for a conventional PC. Some computer makers have introduced PC models that will use less than 25 watts per hour (idle) and use less energy than a 60-watt light bulb when active. This can add up to significant savings since it's costly to run a PC continuously.

The EPA estimates that if PC owners switched to energy-efficient machines, each one of them would save more than \$120 per year. Some additional benefits are:

- Public utility rebates—some public utilities offer rebates to those who buy these PCs, much like the rebates provided for energy-efficient heating or cooling equipment.
- Lower building operating costs—air conditioning requirements fall with cooler PCs.

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Welcome Letter From Intel

Dear Educators:

When Intel invented the first microprocessor in 1971, we weren't entirely sure how it would end up being used. When IBM introduced the PC in 1981, we expected them to sell maybe 10,000 a year. Now more than 150 million PCs are installed worldwide and nearly 150 thousand more are shipped every day. In fact, more PCs were bought last year than automobiles.

Computer technology has touched nearly every aspect of our lives. The technology is rapidly changing how we work, how we learn, and how we play. Our ability to understand and apply this technology effectively can dramatically affect our success as individuals and as a nation. This is particularly true for today's youth because the fastest-growing jobs will be computer-related and students won't be considered literate unless they are also *technology literate*.

We define technology literacy as not just knowing how to use a computer, but understanding what goes on inside. It means understanding basic scientific principles, being able to apply technology

effectively, and understanding its impact on society.

Intel launched *The Journey Inside* education program to improve technology literacy among students and address the lack of technology-related material available for the classroom. We targeted Grades 5-9 because that seems to be the critical age-range in capturing interest in science and math. We also worked with educators in different fields to make sure we addressed different learning styles.

Your role as educators is crucial. We hope that through our classroom materials and this newsletter, we can give you the tools you need to improve technology literacy among your students. Some of you have already provided feedback on how the program is working for you. We look forward to hearing from the rest of you on your journey.

Best regards,



Craig R. Barrett
Chief Operating Officer
Intel Corporation

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ISTE provides an interactive forum for national and international dialog concerning the appropriate use of technology in education. We support the unique needs of educators by improving access to instructional tools, initiating and endorsing relevant legislative policy issues, and holding special conferences. By joining ISTE and demonstrating your support, you are helping us to achieve the following objectives. **Leadership:** Provide national and international leadership for using technology in education. **Professional Community:** Provide an environment for, and encourage development of a professional community of individuals interested in technology in education. **Information and Materials:** Provide individuals and groups high-quality and timely information and materials that support use of technology to improve learning and teaching. **Research, Development, and Implementation:** Encourage research, development, and implementation of appropriate technologies to improve learning and teaching. **Infrastructure:** Develop and administer an organizational infrastructure which empowers the ISTE community to achieve its mission. **Alliances:** Develop and maintain strategic alliances to enhance the ability of ISTE to accomplish its mission.

— Continued from page 1 —

- Reliability—reducing the number of hours a PC is on full power will lengthen the machine's life span.
- Environmental safety—replacing every PC with an energy-efficient one would reduce CO₂ pollution (by reducing the need for coal-fired electricity) by the equivalent of taking 5 million cars off the road.

What Makes PCs Energy Efficient?

At its most basic level, a computer is energy-efficient when it uses energy wisely, snoozing when it's idle, and using less energy even when it's active. Energy-efficient computers are equipped with a "sleep mode" where improved component and system design and active power management result in saving power even when the system is on.

About seven years ago, Intel began exploring ways to design a chip specifically for mobile computers that would run efficiently off battery power. SL technology is now part of every CPU Intel builds. It allows the CPU to slow down, suspend, or completely shut down various system components to save energy use. These features operate at two levels: at the system level, controlling the way power is used by the entire system, and at the microprocessor level. When the system is left dormant for a predetermined time, the CPU puts power-draining components to sleep. When the PC is being used, SL technology cuts power use by managing devices more wisely, directing electricity only when needed. The power management hardware and software is isolated from system applications and software to prevent system crashes when returning from sleep mode.

The best part for computer buyers is that there is no performance penalty for implementing these power-saving features and no price premium. That's a tough combination to beat. □

Mark Ivey, Intel Corporation

Workshop Schedule

Intel and ISTE are working together to provide teacher training with *The Journey Inside: The Computer* education kit. These workshops include teaching suggestions, tips for integrating the material into curriculum, and discussing options for additional activities and resources.

Dates and locations of upcoming workshops are listed with the name and phone number of the contact person should you require more information. If you wish to organize a workshop for your area, contact ISTE at 503/346-4414.

January 11 & 12, 1995
Arizona Science Center
147 E. Adams
Phoenix, AZ 85004-2394
Tui Conner: 602/257-1049

January 14, 1995
Reuben H. Fleet Space Theater & Science Center
Balboa Park
San Diego, CA 92163
Stephanie Whalen: 619/238-1233 ext. 808

January 16 & 17, 1995
Discovery Museum
3615 Auburn Boulevard
Sacramento, CA 95821
Judy Pischnalnikoff: 916/277-6182

February 10, 1995
TCEA Conference
Austin, TX
Anne Meyn: ameyn@tenet.edu

March 14, 1995
University of Washington
353 Loew Hall
Seattle, WA 98195
Frank Ashby: 206/543-0562

March 16 & 17, 1995
NCCE Conference
Meyden Bauer Center
Bellevue, WA 98004
Tony Jongejan: 206/650-6526

March 25, 1995
NSTA Conference
Philadelphia, PA

Book Review

How Anyone Can Fix and Rev Up PCs

Ron White puts difficult concepts into simple words. The book includes clear explanations of many problems common to IBM-compatible computers. Excellent illustrations by Carrie English accompany and expand on the text material. The book gives the beginner and the advanced computer user a greater understanding of how to solve problems and improve computer performance. Several ideas for regular maintenance are included to help the computer user begin to think in terms of problem prevention.

How Anyone Can Fix and Rev Up PCs covers a wide range of topics. The book starts by helping you identify basic tools needed for working on your computer. The suggestions for becoming familiar with the insides of the computer and being ready for emergencies are helpful and basic. You are given information on memory chips, how to identify bad chips, and how to replace and add memory. You learn to identify expansion slots, install expansion cards, and understand factors that make cards interact correctly. White includes timely information on installing storage devices, sound cards, speakers, and CD-ROM drives. The final chapters include tips on computer maintenance to prevent serious problems from occurring.

How Anyone Can Fix and Rev Up PCs is a book that will be most effective if you sit in front of the computer as you read. Take the time to identify the parts on your own machine and relate each presentation to your situation.

Ron White's *How Anyone Can Fix and Rev Up PCs* (Ziff-Davis, 1994) is currently available from ISTE. Call ISTE's Order Desk today at: 800/336-5191 (US & Canada) or 503/346-4414 (International). □

Questions & Answers

Teaching Binary Numbers

Binary number ideas are important to understanding the way a computer works.

Q: How do I approach the task of teaching the binary number concepts to students?

A: Remind students about their counting system and relate it to their 10 fingers. This makes a simple visual to support the base 10 system. Discuss the way the number system builds by counting ones until there is a total of 10. Remember that instead of holding up all 10 fingers when you reach 10, you put a place holder in the 10s column and use none of your fingers. The counting starts again. Build on this idea until you can develop the 100s column. If you wish, introduce the exponential writing system, but the expanded number form is sufficient.

Help your students understand that a computer doesn't have 10 different digits to use. Instead, it can only use two counting items—electrical current on or off—limiting the computer to only two digits. So, you start with zero on this count, then one. With the next count you have all the counters used, so you move your number to the next higher unit. This is the same step as having changed from units to 10s. Continue building in this way. Again, expanded writing is fine but introduce exponential if you wish.

The lessons include an activity called *The Binary Counter*. Have your students take part in this activity after working through a brief presentation of the previous ideas. Most students now have the idea of how and why the binary system is used. The combination of visual, mental, and kinesthetic information about binary numbers is very powerful in helping students to understand this topic. □

Please Excuse Us... There is a problem in Unit 4 of *The Journey Inside: The Computer* education kit, version 1. The corrected pages will be mailed in January 1995.

Copy Me Worksheet—Word Searches

Find the words we just learned.

B P I E U V J G Y R B T Z D Y B R E R V W M
 R N C A Q G P S X Q Z T S M W T L A S J C K
 K G A P M B E E T U R C I L D O U B U Y P Y
 K E S U M U A R X R R L D R A V K Z C U W N
 Y X F A Q L O U T L A C M U Q Q G S N D P T
 K Z U E D R Z J G S H N L K S A B D W N E J
 D D C B M I Q I T S Z K S O U T P U T P Z M
 G E S F U Z S W P K Y F X F B X F G V X Q K
 C Q J Q S Z O K M T F C I G O L Y Z Z U F B
 T D W E C H O J D A V P G P E R Y U F U Z T
 Z O O C A V O A D R B R R G M C M Q C X E F
 Q L O I N Q J O E Q I G Z T N R Y E X Y X X
 I J R N N I C K Z J K V H A R D W A R E I J
 F X E P E Q R V G M Z Y E B S Z R S M A K A
 R G X U R X G E C O C K E R U O L Q D G R U
 P T H T P O B L C Y L S C H Y C F D W I H M
 O P B A E N K R U P U P A L L R H T R I N T
 R A M I C R O P R O C E S S O R O I W P U D
 C Y Q P V M C N M O U H E K A Z R M P A B N
 I C Z Z R Z Q Z U N E P N Q E P F G E K R W
 M F V T W G B M E C K B I G W S P W L M J E
 W Q T P W U P F G X Z L M Z W P C D M S S I

Find the following words.

- | | | | |
|--------|------------|----------------|-------------|
| CHIP | DISK DRIVE | FUZZY LOGIC | HARDWARE |
| INPUT | MEMORY | MICROPROCESSOR | MOUSE |
| OUTPUT | SCANNER | SOFTWARE | TRANSFORMER |

Use the letters given to make a word that names an internal part of a computer.

- | | | | |
|----------------|-------|----------------------------|-------|
| 1. hipc | _____ | 8. nalepsor ectrpoum | _____ |
| 2. uttpou | _____ | 9. aeormsrfrtn | _____ |
| 3. erswotaf | _____ | 10. mitfoannroi gproceissn | _____ |
| 4. yzuzf igclo | _____ | 11. orrsmpircoocse | _____ |
| 5. mesuo | _____ | 12. ararhwde | _____ |
| 6. ermomy | _____ | 13. ikds dreiv | _____ |
| 7. nutpi | _____ | 14. anncsre | _____ |

Contributed by Dorothy Howard, Harrison Elementary School, Cottage Grove, Oregon. These activities were developed to help her fifth-grade students remember the new technology terms. □

Answer Key

Word Search

						T														
						R														
							A													
			D					N												
			I						S	O	U	T	P	U	T					
				S						F										
			S		K				C	I	G	O	L	Y	Z	Z	U	F		
			C		D							R								
			A			R								M						
		I	N				I								E					
		N	N					V	H	A	R	D	W	A	R	E				
		P	E						E		S									
		U	R						E			O								
		T						S			Y	C	F							
							U					R	H	T						
	M	I	C	R	O	P	R	O	C	E	S	S	O	R	O	I	W			
						M									M	P	A			
															E		R			
																M		E		

Word Scramble

1. chip
2. output
3. software
4. fuzzy logic
5. mouse
6. memory
7. input
8. personal computer
9. transformer
10. information processing
11. microprocessor
12. hardware
13. disk drive
14. scanner

IMAX Film Schedule

Intel's IMAX film, *The Journey Inside: A Learning Adventure in High Technology*, supports the information in the education kit. The film is currently playing at a number of theaters and other bookings will be announced through 1995.

If you have access to CompuServe or America Online, multimedia files about the film are available for you to download from Hollywood Online—found under *Showbiz* on CompuServe and *Games and Entertainment* on AOL.

For availability in your area, contact your local IMAX theater.

Through June 1995
 Science Museum of Virginia
 2500 Broad Street
 Richmond, VA 23220-2054
 804/367-1013

Reuben H. Fleet Space Theater
 Balboa Park
 San Diego, CA 92163-3303
 619/238-1233

Edmonton Space and Science Centre
 11211 142nd Street
 Edmonton, AB T5M 4A1
 Canada
 403/452-9100

Through July 1995
 Detroit Science Center
 5020 John R Street
 Detroit, MI 48202
 313/577-8400

Through January 1996
 Oregon Museum of Science and Industry (OMSI)
 1945 SE Water Avenue
 Portland, OR 97214
 503/797-4000

Through 1996
 Canadian Museum of Civilization
 100 Laurier Street
 Hull, PQ J8X 4H2
 Canada
 819/776-7062

Iowa Enjoys The Journey Inside

The state of Iowa relies on the services of 15 Area Education Agencies (AEA) to help teachers develop the skills to use technology in their classrooms. Members from each AEA staff started the school year by attending Intel and International Society for Technology in Education's (ISTE) first workshop of the year.

Since then, the group has been very busy. There have been over 400 kits sent directly to the group to give to teachers attending their workshops. Other kits have been sent directly to classroom teachers who were unable to attend the help sessions.



Barry Pitsch—opening a chip kit.

Meet Barry Pitsch, the man who started it all in Iowa. Pitsch is an Organization Affiliate member of ISTE. While attending an ISTE meeting in Boston in June, he received a flyer promoting *The Journey Inside: The Computer* education program. He sent members of his team to meet with Sandra Duncan and Barbara Carman—Intel representatives attending the NECC conference—for more information. Since they all felt the idea worthwhile, Barry took the time to organize the event while in Eugene, Oregon, in August.

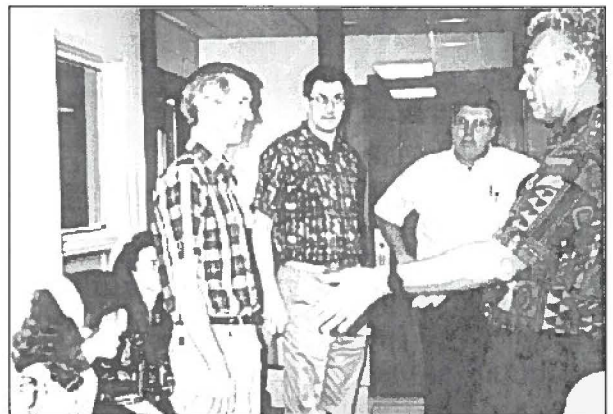
The first workshop was a lot of fun for attendees and presenter—questions and answers were shared and kits were opened

and inspected. Attendees were put into two groups and demonstrated that the binary counter activity in Unit 3 is fun for adult groups as well as school-age students.



The binary counter gets ready for action.

While one group made creative changes to the activity, the other group managed to follow directions more accurately.



Experts can't resist—change the rules.

When the last of the questions were answered, the phone number written, and the magazine and book titles exchanged, the pizza arrived for lunch. Like all good students, no one needed to be told that it was time for the really important task of the day—lunch.

Before the day's activities had ended, several of the Iowa group had already made requests for kits so they could conduct their own workshops. The requests continue to arrive. Thanks to the efforts of this group, many schools in Iowa are well on their way to *The Journey Inside*. □

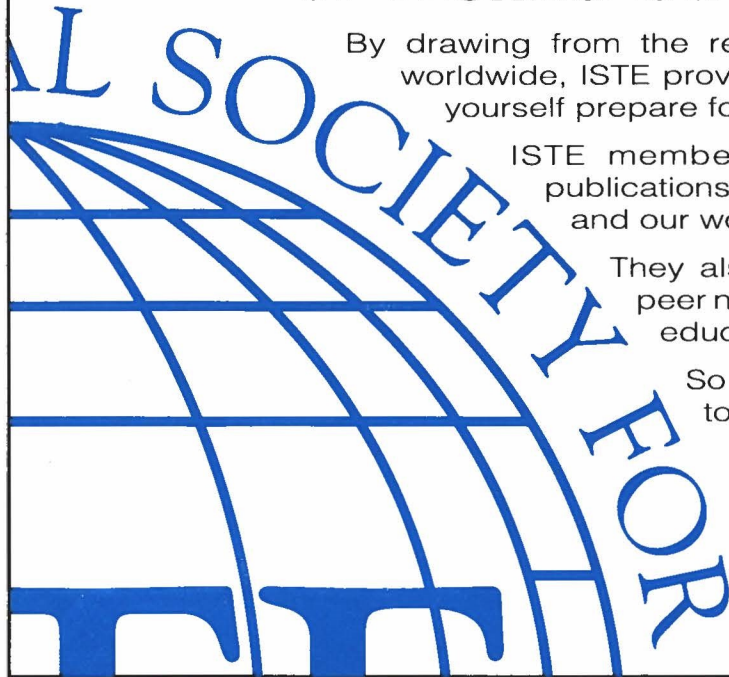
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By drawing from the resources of committed professionals worldwide, ISTE provides support that helps educators like yourself prepare for the future of education.

ISTE members benefit from a wide variety of publications, the activities of our USA National Office, and our work with Teacher Accreditation.

They also enjoy exciting conferences, global peer networking, and graduate-level distance education courses.

So if you're interested in the education of tomorrow, call us today.



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