The purpose of this publication is to: (1) offer an overview of the Internet and its educational applications; (2) provide teachers and students with a guide for a hands-on experience with the Internet; (3) show how educational resources from around the world can be brought into the classroom; and (4) show how some educators have used the Internet. Dedicated to improving mathematics and science education for students everywhere, teacher Juanetta Jones stands for educational equity, making learning available to all. This document tells her story in comic book form—a journey of discovering educational resources on the Information Superhighway. Also included is a description of the Internet; getting connected to the Internet; Internet operations and applications, including e-mail and news, Telnet, information retrieval applications, and the World Wide Web; and online sources for further information. Addresses are provided for the National Network of Eisenhower Mathematics and Science Regional Consortia and National Clearinghouse. (AEF)
AN EDUCATOR’S GUIDE TO TRAVELING ON THE INFORMATION SUPERHIGHWAY!
The purpose of this publication is to:

- Offer an overview of the Internet and its educational applications.
- Provide teachers and students with a guide for a hands-on experience with the Internet.
- Show how educational resources from around the world can be brought into the classroom.
- Show how some educators have used the Internet.

The Story of Internet Jones

Teacher Juanetta Jones embodies the goals and vision of the Mid-Atlantic Eisenhower Consortium for Mathematics and Science Education. Dedicated to improving mathematics and science education for students everywhere, she stands for educational equity, making learning available to all. This is her story—a journey of discovery, finding treasure troves of educational resources on the "Information Superhighway."

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The information provided by this guide is as up-to-date as possible. Check online resources for breaking information (see pages 18 and 19 for additional resources).
As our story opens, Juanetta Jones graduates from college with a degree in education and a desire to help others.

Juanetta makes a vow on this day: I will find a way somehow to make learning available to all no matter their race, color, creed or financial standing!

I stand for educational equity!

Your mother and I are very proud of you, Juanetta! We know that you will accomplish great things!

Well, it took some time but it was worthwhile. Now let's see if I can land a job with my own classroom!

Juanetta enjoys teaching: bringing her students lots of wonderful things...

And stimulating their imaginations and natural curiosity.

Ok kids, it's story time!

Ok! Yeah! Allright!
Juanetta finds new ways to stimulate her students' natural curiosity.

Today is such a nice day, I thought it would be good to take a walk. I want you to make a list of all the living things you see out here today. We'll write about our walk in a class journal article later.

How do birds stay up in the air?

Ms. Jones, why is the sky blue?

This, children, is a snail - he carries his home on his back and is a member of the mollusc family.

Neat! What does he eat?

Juanetta wants to offer her students the world.

But in spite of her success as a teacher, she feels that there is still more to learn.

After a time, she returns to the university.

Not sure what she is looking for...

But searching, none the less.
IN THE UNIVERSITY LIBRARY JUANETTA FINDS OUT ABOUT SOME NEW INFORMATION SERVICES.

I NEED SOME UP-TO-DATE INFORMATION ON AGRICULTURE FOR A SCIENCE EXPERIMENT MY STUDENTS ARE GETTING INVOLVED IN. DO YOU HAVE ANYTHING THAT REFLECTS THE LATEST NATIONAL EDUCATION STANDARDS?

WE PROBABLY DON'T HAVE MUCH ON THAT HERE. WHY DON'T YOU TRY ANOTHER LIBRARY ON THE INTERNET?

WHAT'S THE INTERNET?

THE INTERNET IS A WORLD WIDE COMPUTER NETWORK WHICH ALLOWS COMMUNICATION WITH MILLIONS OF OTHER INTERNET USERS AND USE OF COMPUTER RESOURCES THROUGHOUT THE WORLD. NO MATTER HOW BASIC YOUR OWN COMPUTER MIGHT BE, IF IT IS CONNECTED TO THE INTERNET, YOU HAVE A VIRTUALLY UNLIMITED WEALTH OF SOURCES AVAILABLE FOR YOUR EVERY-DAY USE.

IF YOU ARE INTERESTED, I CAN GET YOU A COURTESY ACCOUNT FROM THE COLLEGE.

BOY, I'M GLAD MARY LET ME USE THIS THING. SHE SEEMS PRETTY SUPPORTIVE OF NEW IDEAS MOST OF THE TIME.

WOW! WHAT A GREAT OPPORTUNITY! I REMEMBER SEEING SOME DUSTY OLD COMPUTERS IN THE SCHOOL BASEMENT. I WONDER IF MY PRINCIPAL WILL LET ME USE ONE FOR A WHILE?

YOUR LOGIN IS "PILOT." YOUR PASSWORD IS "INET." GOT IT?

AND THAT MODEM I FOUND WAS A GREAT BUY. I'LL TRY TO PUT IT TO GOOD USE. NOW ALL I NEED IS THAT ACCOUNT!
WITH ACCESS TO INTERNET MILD-MANNERED TEACHER JUANETTA JONES BECOMES...

INTERNET JONES!

BRINGING THE ELECTRONIC WORLD OF VIRTUAL REALITY TO HER STUDENTS!

JUANETTA IS AMAZED BY THE WEALTH OF RESOURCES AND INFORMATION SHE FINDS ON THE INTERNET.
These are a few of the possibilities she sees...

Communicating with other people:
- Join network of teachers engaged in ongoing professional development and educational improvement efforts.
- Conduct science experiments globally investigating topics such as the environment with students at sea level or at 10,000 ft. in Mexico or Alaska.
- Consult with experts in math, science, or other content areas.
- Create opportunities for critical thinking and collaborative problem solving with students internationally.

Accessing the resources of other internet computers:
- Electric library catalogs worldwide.
- Curriculum ideas from educational archives.
- Free electronic books and computer software.
- On-line training opportunities.

Copy available...
What is the Internet?

The Internet is a global computer network allowing communication with millions of computer users and access to resources from around the world. No matter what type of computer is used for connection to the Internet, a virtually limitless wealth of resources is available for everyday use.

Teachers and students gain access to the world's largest archives, the NASA Space Center, the Dow-Jones Report, satellite weather stations, and thousands of other educational and research sources.

Use of the Internet can provide opportunities for inquiry-based learning. Students and teachers can network, study, and collaborate with others around the world. Teaching strategies can be shared through communication with other educators and may be integrated across the curriculum. Instructional materials can be downloaded (copied) to classroom computers almost anywhere.

There are also opportunities for professional development through ongoing online dialog and support. Members of the educational community may become connected to enriched resources and increased communication.

Getting Connected to the Internet

■ Basic Equipment

Generally, you'll need a computer, a modem (a device which connects your computer to other computers using the public telephone system), and some communication software (a program that allows your computer to access the modem and dial other computers). For more information, ask someone who is already using the Internet, your local computer store, or an Internet Service Provider (ISP). You can also look for additional resources at your local book store.

■ What Does It Mean To Connect?

Connecting to the Internet means that you are ready to use the tools mentioned in the last section to dial a special telephone number. When you dial that number, a modem attached to specialized networking equipment will answer, establishing a dialogue with your modem. The networking equipment (often the combination of a "terminal server" and a "router") is responsible for transferring data to and from your computer to the Internet. To access the Internet in this way, you need the aforementioned telephone "dialup" number and an "account" (the networking...
equipment identifies you by a name and password — information which is set up ahead of time; see next section).

How to Connect

There is no central address or entity such as "Internet Inc." from which you can purchase an account. Although the "InterNIC" (Internet Network Information Center) does manage all Internet addresses, it does not provide connections. Rather, accounts are available to individuals and organizations through Internet Service Providers. The most popular ways of connecting to the Internet are through:

- **Dial-up Service Providers**— Accounts start as low as $15-$20/month. This is often a flat fee and may include a place to put up your own "Web" page (see page 15).

- **Dedicated Service**— This service (e.g., 56K, T1) is often used by organizations and costs approximately $200/month and up. Recipients get faster connection to the Internet for multiple users on a local area network (LAN).

- **Online Service Providers**— You’ve probably heard of America Online and CompuServe. These services often start at $10 per month for a limited number of hours per month and offer proprietary information, with access to the Internet as an option. Typically, Internet access is slower and the service, in general, more expensive.

Places to look for initial connectivity include local colleges/universities that sometimes offer courtesy accounts to enrolled students, alumni, or school districts in their area; state education computer networks; regional service providers; and community organizations.

It’s a good idea for new users to form relationships with helpful sources: school district technology people, Internet service providers, other experienced users, and the Mid-Atlantic Telecommunications Alliance (MATA) (see back page for contact information).

Internet Operations & Applications

E-mail & News

Short for electronic mail, this application is probably the most widely used of all Internet operations. E-mail can include the sending of personal messages, as well as journals, reports, entire books, graphics, and sound files. Discussion groups based on shared interests are formed using e-mail and an Internet service called a "list server." Similarly, Internet "news groups" allow users with a "newsreader" software program to read and/or post news on large, topic-oriented electronic bulletin boards.
Telnet

Telnet allows a user to access a computer system at a different location, however distant, as if he or she were sitting right in front of that machine. Information can be made available in a matter of seconds from databanks, libraries, and research centers the world over. Students can gain access to the latest information on space shuttle launches or satellite deployment from NASA, and moments later, log into the "Weather Underground" at the University of Michigan for detailed information about the weather in cities throughout the United States.

Information Retrieval Applications

Although learning how to glean information from the Internet can be rewarding and fun, it still takes time. A number of applications have been made available to make the process of searching for information on or about the Internet less of a chore. These include:

- **Archie** (from "archive" search) is a tool that allows specific searches through millions of files from over a thousand anonymous (open to the public) File Transfer Protocol (FTP) sites and notes their location. If you can telnet or ftp, you can use Archie.

- **FTP** allows Internet users to transfer large files from one computer to another. Files can include text documents, sounds, and images, as well as computer programs. FTP servers are computers set up on the Internet which host archives of files which one can download using FTP.

- **Gopher** (to "go for") is a way of finding information in menu form almost anywhere on the Internet. It also offers some search capability.

World Wide Web

WWW or World Wide Web is an information browse and search system that can link related documents (many incorporating graphics, video, and sound) at sites across the world. WWW browsing software incorporates not only the WWW method of retrieving information, but also "speaks" the FTP, Gopher, and e-mail languages, turning it into the "Swiss Army knife" of the Internet. Browser software is usually available through Internet service providers, online (for free), and in local software stores.
Juanetta uses e-mail to communicate on the Internet

Writing a personal message:
To: VicePresident@Whitehouse.Gov
Dear Vice President Gore,
I understand that you want to get teachers involved in using the Internet. Just wanted to let you know that I'm online!
Sincerely, Juanetta (Internet) Jones

Receiving mail:
Dear Ms. Jones,
Welcome to the Information Highway! I'm glad to hear that you are able to access this excellent resource. Please keep me updated about how you are able to use the network in your classroom. Thanks for the interest in the welfare of our nation's children and your efforts in the area of educational technology.
Regards, Al Gore

Networking with a "users group"
There are teachers I know with computers who might be willing to share their classroom experiences. I'll get their e-mail addresses and see if I can start a "users group" among my peers.

To: JJones@RBS.org,
Dear Juanetta,
I had a challenging day today--tried working with the students in groups--was chaotic, but some good things happened. Cooperative learning takes lots of energy right now but I'm hoping that it will pay off for the kids down the line. You've been using this method in your classroom for years, Juanetta. Do you have any ideas on how I can better organize class and curriculum this way?
Sincerely, Pat.
AFTER REPLYING TO PAT, JUANETTA USES E-MAIL TO GET NEWS UPDATES...

EDUPAGE
EDUCATIONAL EQUITY GETS A HEARING TODAY IN CONGRESS, WITH A NEW BILL DESIGNED TO FUND TELECOMMUNICATIONS AND TECHNOLOGY EFFORTS IN SCHOOLS...

EDUPAGE
A TWICE-WEEKLY SUMMARY OF NEWS ITEMS ON INFORMATION TECHNOLOGY PROVIDED AS A SERVICE BY EDUCOM, A CONSORTIUM OF LEADING COLLEGES AND UNIVERSITIES, SEEKING TO TRANSFORM EDUCATION THROUGH THE USE OF EDUCATION TECHNOLOGY.

I'VE BEEN THINKING ABOUT THIS ISSUE FOR SUCH A LONG TIME! IT'S GOOD TO KNOW OTHERS ARE CONCERNED!

INTERNIC
INTERNET HAPPENINGS DISCUSSION GROUP

NOW I KNOW WHERE TO FIND GOOD INFORMATION ON WHAT THIS INTERNET IS ALL ABOUT!

100'S OF USERS & LISTS PARTICIPANTS

LISTSERV DISCUSSION GROUPS

LISTSERV IS A MEANS OF COMMUNICATING WITH A LARGE NUMBER OF PEOPLE ON THE INTERNET.

TO SUBSCRIBE TO EDUPAGE, SEND E-MAIL TO: LIST.PROC@EDUCOM.EDU, CONTAINING THE FOLLOWING TEXT: SUB EDUPAGE YOUR FIRST NAME, YOUR LAST NAME. TO UNSUBSCRIBE, SEND E-MAIL CONTAINING THE TEXT: UNSUB: EDUPAGE. BACK ISSUES OF EDUPAGE ARE AVAILABLE BY WAIS, Gopher, AND ANONYMOUS FTP FROM EDUCOM.EDU.

OBTAINING CLASSROOM MATERIALS VIA E-MAIL TAKES ONLY SECONDS. JUANETTA SENDS AN E-MAIL MESSAGE TO PROJECT GUTENBERG AND RECEIVES THE TEXT FROM AN IMPORTANT DOCUMENT!

HOW CAN I GIVE MY STUDENTS THE FREEDOM TO LEARN WHenever AND HOWEVER THEY CHOOSE?

LET'S GO TO...

WethePeople

How Can I Give My Students the Freedom to Learn Whenever and However They Choose?
TELNET ALLOWS DIRECT ACCESS TO OTHER COMPUTERS AND DATABASES WORLDWIDE...

CREATING A CONNECTION FROM ALMOST ANYWHERE!

NEWTON IS AN ELECTRONIC BULLETIN BOARD SYSTEM SPONSORED BY THE ARGONNE NATIONAL LABORATORY TO PROMOTE MATHEMATICS, COMPUTER AND SCIENCE EDUCATION IMPROVEMENT THROUGH TEACHER NETWORKS.

TEACHERS CAN ASK A SCIENTIST A QUESTION, WHICH WILL BE ANSWERED BY A SCIENTIST, OR RESEARCH A SPECIFIC TOPIC!

YOU CAN LOG ON BY TYPING:

```
TELNET NEWTON.DEPT.ANL.GOV
LOGIN: BBS
```

WOW! ANOTHER GREAT RESOURCE FOR MY KIDS! AND IT'S CALLED NEWTON!

ST COPY AVAILABLE
Internet Gopher Information Client
v2.0.16

Home Gopher server: gopher.rbs.org

1. About RBS
2. Mid-Atlantic Eisenhower Consortium for Math/Sci Education
3. Mid-Atlantic Telecommunications Alliance (MATA)

MID-ATLANTIC EISENHOWER CONSORTIUM FOR MATH/SCI EDUCATION

1. About this gopher/
2. The Mid-Atlantic Eisenhower Consortium for Math & Science Ed/
3. Nat'l Network of Eisenhower Regional Consortia & Clearinghouse/
4. Math/Science Education Newsletters Online/

CONSORTIUM INFORMATION

Join the Consortium to find out about:
- what works in math and science ed.
- professional development opportunities
- new and effective uses of technology

COPY AVAILABLE
The World Wide Web is the name for the multimedia service on the Internet. The "Web" allows access to documents combining sound, graphics, and video with text. Documents can also include "links" (also known as "hypertext") which, when clicked on, connect users to other documents on the Internet—anywhere in the world!
LETS SEARCH FOR SOME SCIENCE RESOURCES!

HTTP://WWW.RBS.ORG

THE FRANKLIN INSTITUTE SCIENCE MUSEUM

WELCOME TO THE FRANKLIN INSTITUTE SCIENCE MUSEUM! WE BRING THE EXHIBITS, RESOURCES, AND FUN OF A MUSEUM VISIT TO YOUR DESKTOP.

THE FRANKLIN INSTITUTE IS A MEMBER OF THE SCIENCE LEARNING NETWORK

Diving Into The Gene Pool

The Exploratorium, San Francisco, CA

Diving Into The Gene Pool

Pointers To Genetics On the Net

- What's New in Genetics?
- Access Excellence
- GenotypeTech
- Latino, Female, and Social Issues in Science
- Biology in Action
- Genetics in Aboriginal
- Quantitative Genetics Resources

This looks like a good resource for my sixth grade class...

COPY AVAILABLE
Juanetta takes the kids on an electronic journey to NASA. You can, too!

Telnet Spacelink, MSFC.NASA.GOV
Login: Guest

FTP stands for file transfer protocol. A means of transporting large clusters of information quickly, the entire encyclopedia Britanica can now be transferred in less than one second!

How many pounds of thrust does it take to move an object the size of the space shuttle? How many to move a gallon of milk?

We can use FTP to transfer more information from NASA!

Our ability to access information influences the way we think and helps define how we live our lives.

The internet can give us the freedom offered by the information superhighway so that we can travel virtually anywhere!

I'm so proud of you, Juanetta!

Thanks, mom!

ST COPY AVAILABLE
More Places to Go

■ E-mail (Listservs)

- **List of Lists** (about 30 pages of more than 3000 lists)
  E-mail: listserv@bitnic.educom.edu
  Type: list global

- **Gutenberg Project**
  E-mail: hart@vmd.cso.uiuc.edu
  Type: "send info" in the body of the message

- **K-12 Kidsphere**
  networking students K-12
  E-mail: joinkids@vms.cis.pitt.edu
  Type: subscribe kidsphere "your full name"

- **Network Resource Mailing List**
  Merit Network's list of "Latest finds on the Internet"
  E-mail: nris-request@merit.edu
  Type: subscribe nris "your name"

- **Big Computer Pals**
  College students who communicate as Big Brothers or Big Sisters
  E-mail: drz@sjuvm.stjohns.edu

- **Yanoff List**
  List of "Special Internet Connections"
  E-mail: yanoff@csd4.csd.uwm.edu

■ Gopher

- **ENC**- Eisenhowær National Clearinghouse for Mathematics and Science Education
  gopher.enc.org

- **KidLINK**
  K-12 telecomputing projects
  gopher.kids.duq.edu

- **ERIC**
  Education Research and Information Clearinghouse
  ericir.syr.edu

- **OERI**
  Office of Educational Research and Improvement
  (U.S. Department of Education)
  gopher.inet.ed.gov
Telnet

- **ERIC**
  Education Research and Information Clearinghouse
  telnet ericir.syr.edu
  login: gopher

- **Academy One**
  telnet yfn2.ysu.edu
  login: visitor

- **Library of Congress**
  telnet dra.com

- **NASA**
  telnet spacelink.msfc.nasa.gov

World Wide Web

- **Internet Jones' top picks!**
  (sites to visit and Internet news)
  http://www.rbs.org/ijones

- **U.S. Department of Education**
  http://www.ed.gov

- **The Science Learning Network**
  http://sln.fi.edu/tfi/sln/sln.html

- **National Council of Teachers of Mathematics Standards**
  http://www.enc.org/online/NCTM/280dtocl.html

- **National Science Teachers Assoc.**
  http://www.nsta.org

- **Mid-Atlantic Telecommunications Alliance**
  http://www.rbs.org/mata

- **ENC- Eisenhower National Clearinghouse for Mathematics and Science Education**
  http://www.enc.org/

- **Classroom Connect**
  (Internet ideas for educators)
  http://www.classroom.net

- **The Math Forum**
  http://forum.swarthmore.edu/index.html

- **Pathways to School Improvement**
  (research-based school improvement information)
  http://www.ncrel.org/ncrel/

- **Athena**
  (lessons, supplementary materials)
  http://athena.wednet.edu/index.html
The Mid-Atlantic Eisenhower Consortium for Mathematics and Science Education is a partnership which brings together Research for Better Schools (RBS), a non-profit educational research laboratory, with other key agencies in the region to reform mathematics and science education. The consortium is an integral part of a larger national effort to improve mathematics and science education: the Eisenhower Federal Activities Program, administered by the Office of Educational Research and Improvement (OERI) of the U.S. Department of Education.

Join MATA to learn about cost-effective ways to connect to the Internet.

For more information: Mid-Atlantic Eisenhower Consortium for Mathematics and Science Education and Mid-Atlantic Telecommunications Alliance (MATA), Research for Better Schools, 444 North Third St., Philadelphia, PA 19123; or call 215-574-9300 ext. 280. You may also e-mail: mathsci@rbs.org.
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