FAIRFAX FUTURES

Investing in School Readiness

Tapping Into Technology

Connecting Children, Teachers, and Families in the Digital Age

INTRODUCTION

In this digital age, technology is all around us. Children may be exposed to computers, tablets, television, video games, smart phones, apps (application software), and other technology in many environments including at home, in early care and education programs, schools and in other community settings.

According to a 2014 Rand Policy Brief, digital literacy, the ability to "analyze, learn and explore" with technology, may soon be considered an aspect of school readiness.

Educators and families often receive mixed messages about the use of media and its impact on children. It can sometimes be confusing to determine when and how best to introduce and support children's use of technology and digital media.

A growing body of research is beginning to identify best practices and useful strategies to help educators and families tap into media and technology that can support children's development. In her book *"Screen Time: How Electronic Media Affects Your Young Child,"* author Lisa Guernsey highlights the importance of the three Cs – Content, Context, and the Child – when making decisions about using technology with children.

- **Content –** the media is appropriate and engaging
- **Context –** the child is exploring media with, or near, a caring adult who can help the child make the best use of the specific technology experience
- **Child –** adults will want to consider the social maturity and temperament of the individual child

This approach helps educators and families make informed decisions about screen time and digital media with young children.

This booklet is designed to help you use digital technology with children ages two through eight in an educational, engaging and enjoyable way. We have compiled an array of useful tips and will periodically update the online version of this resource so that it reflects the most current findings.

KEY CONSIDERATIONS FOR FAMILIES AND EDUCATORS

- Adults can be excellent facilitators of children's learning by interacting with children using technology and also overseeing the way technology is used. Technology can enrich educational experiences and strengthen children's relationships with both peers and adults when used intentionally and selectively.
- While technology is a wonderful resource when used appropriately, it is not intended to be a substitute for adult-child interaction nor should technology replace meaningful interaction with children's peers.
- Parents, caregivers, and teachers have the important role of choosing what is best for children and what, if any, technology is appropriate. Considerations may include the age, nature, and inclinations of the children and the way that digital media can be used to enhance learning opportunities and meaningful interactions. No solution fits every child, family, or classroom.

This booklet, developed in partnership with Fairfax County Office for Children, was made possible through a generous grant from the PNC Foundation. It includes ideas to meld technology and digital media into educational opportunities and successful learning experiences.

At the back of this booklet, there is a Glossary to help define current technology terms as well as a Resource List that can be used to tap additional helpful information. If you do not have direct access to technology at home or in your early care and education program or classroom, the resource list includes other places where you can access technology in your community.

Working in partnership with families, as well as early care and education professionals, we are laying the foundation for children's success and creating possibilities for many bright futures.

An Important Note About Internet Safety

Being an active participant in your child's use of technology is not only best practice from a developmental viewpoint but it provides an excellent opportunity to filter content and to engage in discussions about Internet safety. Be mindful that many websites, software programs, and applications will have advertisements and/or external links you may find to be inappropriate for your child.

It is always a good idea to test new websites or software to check for the possibility of inappropriate content before using them with children. However, there may be situations when you are unable to prevent exposure to unsuitable content. For example, if you are using the Internet to help your child find information through a search engine, you can't always anticipate what results may be displayed. The good news is that there is software available that can help filter and block inappropriate content from websites; however, this software isn't always 100% effective. This type of software is often referred to as "parental monitoring software" and is a good place to start when engaging Internet safety protocols. Even when taking necessary precautions, engaging in discussions about Internet safety is a great way to prepare children to use the Internet responsibly to support educational goals.

It is also important for all Internet users to consider what information is posted over the Internet through e-mail, social media, blogging, and other websites. Information shared online has the potential to be accessed by anyone and used for unintended purposes. It is important to pause before posting pictures of children, sharing details about where they go to school or engage in after-school activities. Think critically about who can view the information and what type of information is being provided to others. Consider having conversations with your family and friends to express your concerns about sharing your child's information online, so they can support your efforts to protect your child's safety. The Internet is a powerful communication tool, but it is important to understand the risks and make smart decisions about Internet use.

LEARNING WITH TECHNOLOGY

Children learn best through meaningful interactions with caring adults and peers. When used appropriately, technology can enhance these interactions and open new dynamic learning opportunities for children. Integrating technology into everyday situations helps children recognize the potential of technology as another tool for learning. When using technology with a child, there are several things to keep in mind to maximize the experience.

Use technology in a variety of educational ways

Using technology in a variety of ways helps children understand that technology is more than a device to play games. Taking pictures during a nature walk, reading eBooks, and using the Internet to find information reinforces the concept that technology is diverse and a powerful educational tool. It also empowers children to become active participants, instead of passive observers, in the use of technology.

Vocalize what you are doing

As you interact with technology, verbalize each step of the process and invite your child to participate when possible. For example, saying "I am going to click the link in the middle of the smartphone screen to open the website" exposes children to language and vocabulary associated with technology and introduces them to basic functions of devices.

Ask open-ended questions

During your interaction with technology, help your child think critically about cause-and-effect. For example, asking "What happened when you pushed that button?" helps your child become curious about how and why things happen. It also helps develop problem-solving skills.

Model appropriate use of technology

Screen time is a large concern for many parents and educators. Current research indicates that the quality of screen time is more important than the quantity of screen time. The content of the program or game, whether the child is playing in isolation, without the benefit of an actively engaged adult, and whether the child's engagement is replacing interest in other activities such as outdoor play, are more critical than imposing a standardized time limit for every child.

However, if limiting screen time is a concern, it is important that, as adults,

we exercise limits on our own use of technology to model an appropriate balance for children. For example, you may wish to create "screen-free" zones or times of the day that apply to all members of the family.

Limit interactions with screens before bedtime

Research has shown that the noise and light emitted from electronic devices stimulate the brain and disrupt natural sleep patterns in both children and adults. It is recommended that children not interact with screens in the two hours before their regular bedtime. It is also recommended that children not have televisions in their bedrooms.

SOCIAL AND EMOTIONAL DEVELOPMENT

Beginning at birth, children's social and emotional development progress as they learn to interact with others, understand their feelings, and express their perspectives. Assisted by caring and nurturing adults, children learn to cooperate and balance their needs and goals with the needs and goals of others. This helps children develop attitudes and skills that promote confidence, competence, and success.

There are several ways that technology can be used to help children develop social and emotional awareness.

Recognize Familiar Faces and Places

- Take photos of family, friends, and other important adults in a child's life, such as caregivers, and teachers. Look at these pictures together and talk about the people in the photos.
- As you go through a typical day, have your child help you take pictures of the places you go together. Reflect on the pictures and talk about what you did and who you saw at the different locations.

Identify Feelings and Emotions

- After watching a video with your child, talk about the characters in the show. Identify how characters felt and how they behaved in response to specific events to help children label and recognize emotions.
- Relate character experiences and emotions in a video back to your child's everyday life. For example, you might ask your child "Did you ever feel sad, happy or scared like the character in the video?"

Create Awareness and Acceptance of Change

Photos can help children process change that has happened or change that will happen in the near future.

The first day of school is a great example of a major transition in a child's life.

- You can help your child prepare for this transition by visiting the school with your child well before the first day. Help your child take pictures of the school, the classroom, and the new teacher.
- As you look through photos together, you can discuss how your child feels about the change and encourage acceptance, understanding and confidence in managing the transition.
- Review the photos a few months later and reflect on the child's past versus current feelings.

LANGUAGE AND LITERACY

Children enter the world communicating by using sounds, facial expressions, and movement to tell us what they are feeling or what they need. As they grow and develop, children learn to respond to our words and begin to say words of their own. Children's abilities to listen, think, speak, read, and write are all connected, regardless of the language they are learning. When we talk to children, we expose them to new content and vocabulary. The more relationships children have with caring adults, the more exposure to language they will have.

There are several ways that technology can be helpful as a tool to enhance language development.

Video chat with family and friends

Geographic distance is no longer a barrier due to advances in communication technology. Video chatting allows children to engage in conversations with family members and friends regardless of geographic distance.

- Use video chatting services to talk to family and friends in other cities, states, or countries.
- Use video chatting services to connect with your child when you are away from home, such as for work or on a trip, as this can help ease feelings of separation and provide opportunities to connect by sharing experiences.

Play games that encourage children to talk and record their voices

Interactive games engage children in the creative process, exercise language production, and empower children to create their own media.

- Download drawing applications that record your child's voice and every brush stroke as they create a picture. The process of creating the drawing plays back in a video that you can watch with your child or share with family and friends.
- Find collaborative storytelling applications that allow your child to select characters and work with a friend to create and tell a story. Stories are saved in a video format that can be watched and talked about later.
- Engage in eBook programs that allow your child to record his/her voice as narration or funny character voices. The new voices and narration can be saved and the story can be read with the child's recordings.

Read Electronic Books (eBooks)

Incorporating the use of eBooks into regular reading times and alongside traditional print books exposes children to various forms of literacy.

- eBooks instantly expand the size of your home library. With the click of a button or the tap of a screen, you can access hundreds of titles, including many children's favorites, often at no cost.
- eBooks often offer interactive features that build literacy skills. Read-to-me narration highlights the words on the page as they are read. Sound-it-out words allow children to highlight specific words and listen to them one syllable at a time. If you find that these features are distracting for your child, you may be able to turn them off.
- Many eBooks offer language features that give readers the ability to hear and read a story in a different language. This supports multilingual families and introduces children to new languages.

NUMBER SENSE AND MATHEMATICS

At very young ages, children begin to develop number sense, including an awareness of quantity and curiosity about mathematical concepts. You can help children learn about numbers and counting, shapes and sizes, patterns, one-to-one correspondence, and many other emerging skills through the use of interactive technology.

Help children become comfortable using numbers

Use digital photography to capture objects in your child's environment that can be counted and, therefore, associated with a number.

- Take various photos of singular objects such as a flower, a car, a house, a favorite toy, a book, a hat, a friend, or similar objects that your child can easily identify.
- Allow your child to develop his/her sense of how numbers work and how objects can be grouped to create larger quantities and then counted using higher cardinal numbers (1, 2, 3, 4, and more).
- Count the number of objects in the photos you have taken. How many items are in each photo? Compare them to each other. Is there the same number of items in each photo?

Create concept photos of the child's environment

Digital photography can be used to capture pictures of things around your home, neighborhood, or school that can represent mathematical concepts.

- Explore shapes by asking your child to help find things in your home that have a circle shape, a square shape, a rectangle shape, or a triangle shape.
- Explore size by asking your child to help find things that are big/large, medium/average, or small/little. Find ways to compare the size of objects by using vocabulary such as, "Which one is larger?" and related questions.
- Sort the photos into categories. Ask your child to identify different kinds of groups (categories) that could be made using the photos. Are there objects of the same color? Objects that have similar characteristics such as shape or size?

Explore educational software and applications

Games provide natural opportunities for children to practice mathematical skills and concepts.

- There are many applications that allow children to practice fundamental math skills like counting and sorting through interactive gaming experiences.
- Engage children by introducing concepts such as recognizing and building patterns. Search for apps that encourage these skills and allow children to build their own code.
- Explore apps that compare objects and evaluate size using unconventional measurements like coins, paperclips, and blocks.

EXPLORATION AND DISCOVERY

Children are naturally interested in observing the world around them, asking questions about what they see, investigating objects, predicting what might happen if they try a particular step or activity. You can help your child develop a passion for exploration and discovery by encouraging natural scientific curiosity about the way things work in the world.

There are many ways that technology can be helpful as an investigative tool to enhance and empower the development of curiosity about the world.

Record experiments with photos and video

When you engage in hands-on science activities, such as simple sink or float experiments or experiments that are more involved, help your child record the experience through photos and video.

- Watch the footage during the experiment to talk about why you are getting a certain result or what you might try next.
- View the footage after the experiment and discuss the results. This reflection period allows children to think critically and improves comprehension.
- Share the footage with family and friends and give your child the opportunity to explain the activity; this enhances your child's memory and later recall of this experiment.

Use the time lapse feature on digital devices

Many digital cameras have a built-in time lapse features that allow the camera to take a picture at given intervals throughout the day. Photos can be played back in quick succession to observe growth or movement. This gives your child an opportunity to observe something in a few minutes that would normally take hours, days, or weeks.

When a digital camera with the time lapse feature is set-up in a stationary place, it can capture numerous scenarios such as:

- The progress of a shadow across the ground.
- The growth of a plant.
- A butterfly hatching from a chrysalis.

Engage in virtual field trip opportunities

Many national and educational institutions offer virtual field trip experiences. You can view tours of historic sites, national parks, science labs, museums, NASA's exploration of Mars, and much more.

- Base your virtual field trip experiences on the questions and interests of your child.
- Take a "real" field trip to a special place and then follow-up with virtual field trip opportunities that reinforce and extend the learning.
- Help your child create a recorded virtual field trip by planning and photographing (or making a video) of a special trip that you take together.

CREATIVE ARTS

Children use rhythm, music, art, movement, dance, drawing, singing, and imaginative play as ways to express what they see, think, and feel. Encouraging children to explore creative art concepts allows them to discover new interests, abilities, and ways to communicate while gaining a sense of personal identity and confidence.

There are several ways that technology can support the creative arts as well as the development of personal expression.

Explore different types of music

With the tap of a screen, you can access songs recorded by thousands of musicians reflecting cultures around the world. Listening to a wide variety of music at a moderate volume exposes children to different instruments, arrangements, rhythm, tempo, and vocal expressions.

- Using your electronic device, listen to music from different parts of the world where you may have family or friends. Listen for familiar words or learn new words in other languages.
- Search for videos of traditional dances to accompany cultural music and try to imitate the movements or have your child create unique movements to the rhythm and mood of the music.
- Softly play music from different genres while your child colors or paints. Talk about the pictures that were created while listening to different types of music.

Record video or audio clips of sounds

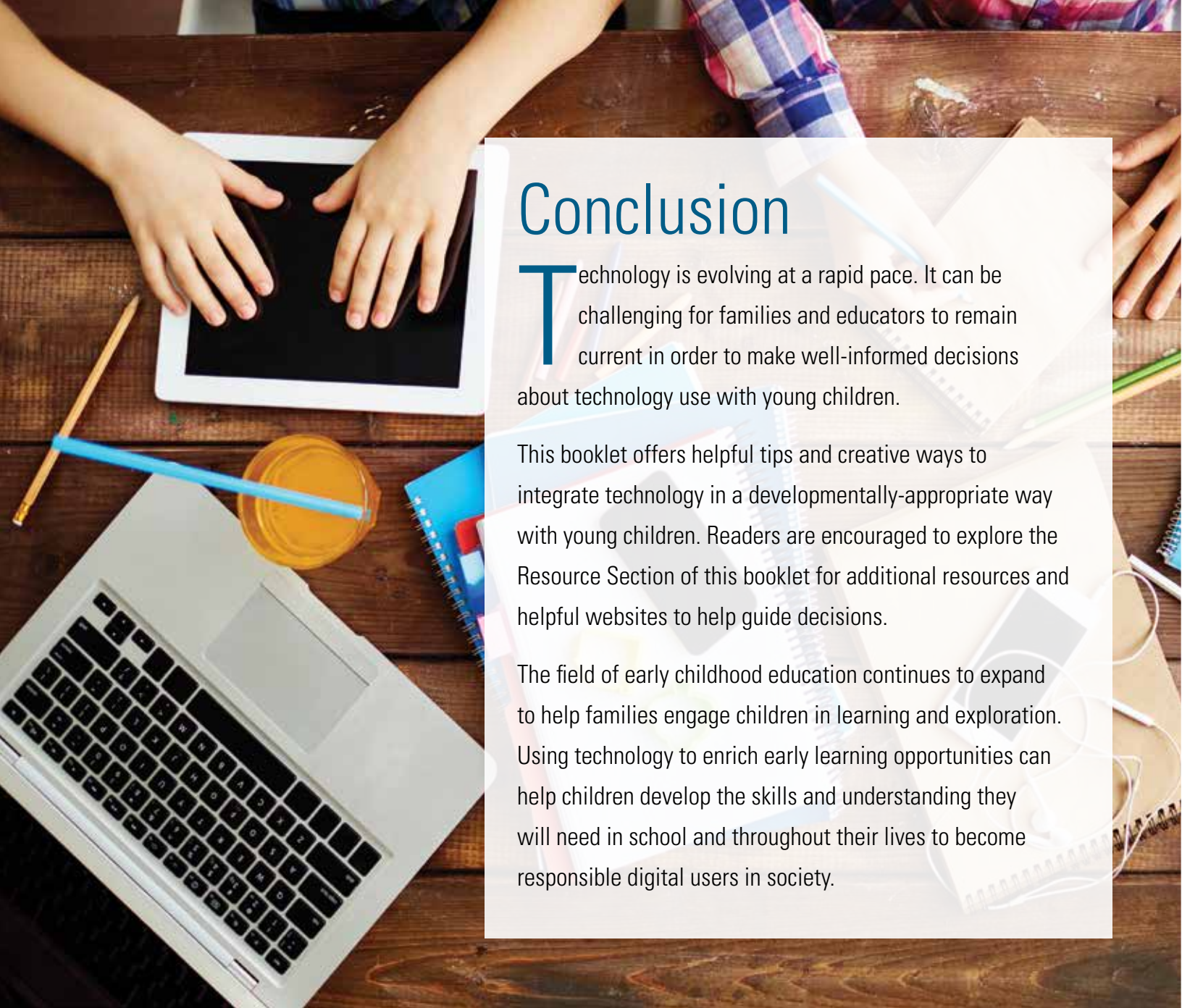
Explore your home, neighborhood, or school by recording video clips of things that make sounds.

- Take a nature walk focusing on what your child hears, e.g. a bird chirping or water running through a stream. Capture the sounds in a short audio or video clip. Listen to the sounds later and try to guess what made the noise.
- Create a kitchen band using pots, pans, bowls, and kitchen utensils. Record video clips of the different types of music your child can make.
- After collecting sounds, explore different programs that allow you to easily edit sound clips together and create your own tracks or songs.

Make an electronic book

There are many applications that allow you to build your own book by inserting pictures, videos, text, and even voice recordings. With the guidance of an adult, your child can create a book using various types of media. This experience provides opportunities to practice developing story structure – a beginning, middle, and end to the book – as well as practicing sequential order.

- Take pictures and videos when you go to a new place. Work with your child to put these pictures and videos together to tell a story.
- Once the book has been created, encourage your child to tell you about the adventures that were documented.



Conclusion

Technology is evolving at a rapid pace. It can be challenging for families and educators to remain current in order to make well-informed decisions about technology use with young children.

This booklet offers helpful tips and creative ways to integrate technology in a developmentally-appropriate way with young children. Readers are encouraged to explore the Resource Section of this booklet for additional resources and helpful websites to help guide decisions.

The field of early childhood education continues to expand to help families engage children in learning and exploration. Using technology to enrich early learning opportunities can help children develop the skills and understanding they will need in school and throughout their lives to become responsible digital users in society.

FAIRFAX COUNTY RESOURCES

Fairfax County Office for Children
http://www.fairfaxcounty.gov/ofc

The Fairfax County Office for Children's Institute for Early Learning offers professional development classes for early care and education professionals related to the effective use of technology with young children.

Fairfax County Public Schools (FCPS)
www.fcps.edu

Fairfax County Public Schools offers many technical resources available to children and families in the school system. In addition, all FCPS students are given access to a wide variety of free online resources that promote literacy and language development.

- Community Internet Access Maps are available through the FCPS website. These maps show community Internet access and computer access sites by neighborhood.
- Technology@Home enables FCPS students and staff to purchase technology products for home use directly from vendors at discount rates.
- Microsoft Office 365 ProPlus is free to all currently enrolled FCPS students.
- Access4All is an FCPS team that works to ensure every student in FCPS has adequate access to reliable technology and the Internet. The team works to provide discounted access to technology hardware and Internet access to qualifying families.

Fairfax County Public Library
http://www.fairfaxcounty.gov/library

Fairfax County Public Library has an extensive collection of print and electronic resources, many of which are geared specifically toward early learning. With your library card, you can reserve traditional print books online and have them transferred to a branch location near you for easy and convenient pickup. The library also offers eBook services that can be accessed through your computer or mobile device.

- **OverDrive** – provides eBooks, eAudiobooks, and eVideos through your computer or mobile device. Resources are for both adults and children. This service allows you to carry a digital library with you wherever you go.
- **TumbleBooks** – offers electronic books specifically for children. eBooks include animation, music, narration, and highlighted text to help engage children in the story and build emerging literacy skills.

ADDITIONAL RESEARCH AND RESOURCES

For additional research, media reviews, and best practices, here are some resources you can use.

Skype in the Classroom
https://education.skype.com

Fred Rogers Center for Early Learning and Children's Media
http://www.fredrogerscenter.org

Common Sense Media
http://www.commonsensemedia.org

Joan Ganz Cooney Center
http://www.joanganzcooneycenter.org

Children's Technology Review
http://childrenstech.com

TEC Center at Erikson Institute
http://teccenter.erikson.edu

Virtual Field Trips
http://www.scholastic.com/teachers/article/virtual-field-trips

Education World
http://www.educationworld.com/

Discovery Education
http://www.discoveryeducation.com/

National Association for the Education of Young Children
http://www.naeyc.org

GLOSSARY

TERMS RELATED TO COMPUTERS

Chromebook – A specific type of laptop that runs on the Google Chrome operating system which allows access to custom applications and cloud-based programs. There are many different brands of chromebooks including (but not limited to) HP, Dell, Samsung, Acer, and Toshiba.

Computer – an electronic device used for storing, processing, and sharing data.

Cursor – the movable indicator on a computer screen that identifies the point that will be affected by input from the user (often recognized as the blinking point on a computer screen).

CPU – stands for central processing unit. It can be thought of as the "brains" of the computer that carries out major operations.

Desktop – a type of computer intended for regular use at a single location. Also refers to the main screen of the computer from which you access programs and folders.

Digital Media – digital content including text, graphics, audio, and video that can be transmitted over Internet or computer networks.

Drives – the device on or related to a computer that reads or stores data. Drives may be embedded in the computer system (such as the hard drive, often referred to as the "C" drive), portable (such as a flash drive or external drive), or shared via an Internet or intranet storage system/server.

Hardware – physical pieces of equipment related to a computer. Computer hardware includes items like the monitor, CPU, keyboard, and mouse.

Laptop – a type of computer designed to be portable.

Macintosh – also referred to as "Mac" or "Apple" is a brand of computer that has several major differences from PCs, including a unique operating system that only runs on Macintosh products.

Monitor – the screen component of a computer.

Mouse – the movable hand-held (hand-operated) device that is moved around on a flat surface and controls the cursor to be directed and scrolled across a computer or laptop screen.

Operating System – sometimes abbreviated as OS. An operating system manages and runs all the programs on a computer. It is important to note that different types of computers run different types of operating systems. The type of operating system a device has determines what kinds of programs or applications you can use.

PC – stands for personal computer but is often used to distinguish between Macintosh or Apple brand computers which have a different type of operating system than PCs. There are many different brands of PCs including (but not limited to) Dell, HP, Toshiba, Microsoft, Intel, Acer, and Lenovo.

Platform – an underlying computer system on which applications and programs operate.

Server – a storage system and computer program used to organize and save data for multiple computers/users. Users on networked servers can store and access files on a managed network system, often referred to as an intranet connection.

Software – programs that can be loaded onto a computer to perform different functions. A well-known example is the Microsoft Office suite.

USB Flash Drive – often referred to as a thumb drive, a USB flash drive is a lightweight, removable, and portable data storage device. USB stands for Universal Serial Bus which refers to the type of connection to the computer.

Windows – a popular operating system designed by Microsoft and largely used on PC computers. Current products include Windows 10, Windows 8, Windows 7, Windows XP, and Windows Vista.

TERMS RELATED TO MOBILE DEVICES

Android – refers to an open-source operating system used for many smartphones and tablets.

Application – a type of software designed for mobile devices, often referred to as an "app."

Cloud-Based – generally refers to online storage as opposed to storage on a user's local computer. Online storage means that users can access their information from any computer with Internet access.

iPhone/iPad – smartphones and tablets created by the Macintosh/Apple brand. These devices use an operating system exclusively available for Apple hardware and that is not open-source. These devices do not use the Android operating system.

Mobile Device – refers to a computing device that is typically small enough to be handheld. Common examples include smartphones and tablets. Mobile devices often have different operating systems than traditional desktop and laptop computers.

Open-Source – software for which the code is made freely available and may be redistributed and modified.

Operating System – sometimes abbreviated as OS. Both computers and mobile devices have operating systems that manage and run all programs and applications. However, computers and mobile devices have different types of operating systems. This is why some programs only work on mobile devices and some programs only work on computers. It is also important to note that different types of mobile devices run different types of operating systems. The type of operating system a device has determines what kinds of programs or applications you can use.

Smartphone – a cellular phone that is able to perform many of the functions of a computer.

Tablet – a mobile computer with a touchscreen display equipped with sensors including a camera and microphone.

TERMS RELATED TO INTERNET ACCESS

Bandwidth – refers to the rate of data transfer that an Internet connection has the ability to provide.

Broadband – refers to a common type of Internet connection that includes DSL, cable, fiber optic, and satellite.

Flash – usually refers to Adobe Flash, a multimedia technology that allows web developers to incorporate animation and interactive content into websites. Not all systems support Adobe Flash; depending on the device or web browser you are using, some websites might not load properly.

Internet – also known as the World Wide Web, is a global system of connected computers that host and share information. The World Wide Web is often abbreviated "www" at the beginning of many website URLs.

Internet Browser – a program used to access, search for, and display information from the Internet. Well-known examples include Internet Explorer, FireFox, Safari, and Google Chrome.

Intranet – refers to a private network accessible only to the members of a group or organization. This is different from the Internet which is public and accessible to everyone.

ISP – stands for Internet service provider, refers to a company that provides Internet access to individuals and businesses.

Link – also referred to as a hyperlink describes a word, phrase, or image that appears in a webpage and, when clicked, will take you to a different webpage or website.

Mbps – stands for millions of bits per second, describes a measurement of bandwidth or data transfer.

Modem – hardware associated with establishing an Internet connection to a computer. The modem takes the signal from the Internet service provider and translates it into a language that the computer can understand and use.

Router – hardware associated with establishing an Internet connection to a computer. The router forwards the Internet signal to other computers and devices that may share the same Internet connection.

URL – stands for Uniform Resource Locator and is often referred to as the web address. URLs often begin with http://www. and allow your computer to locate where to find specific websites across the Internet.

Webpage – a single web document that can display any combination of text, audio, video, and more.

Website – a collection of connected web pages that display any combination of text, audio, video and more.

Wireless – sending and receiving electronic signals by using radio waves instead of wires (i.e. wireless Internet access).

For More Information:

- Fairfax County Office for Children
  www.fairfaxcounty.gov/ofc
- Fairfax County Public Schools
  www.fcps.edu
- Fairfax Futures
  www.fairfax-futures.org

FAIRFAX FUTURES

Investing in School Readiness

Tapping into Technology: Connecting Children, Teachers, and Families in the Digital Age is made possible through the generous support of the PNC Foundation.

PNC