*ELA= Standards found in English Language Arts (SL= Speaking and Listening, RI=Reading Informational text, L = Language)

** LM= Standards found in Library Media (LM=Media Literacy)

***CS, NI= Computer Science Standards

Materials Needed: An account for your child at Scratch - Imagine, Program, Share (mit.edu)**, Scratch Coding Cards (**here**), and Coding for Kids: Scratch (**here**), an account at canva.com, and a software that allows you to make charts and graphs (i.e. Microsoft Word)**

Computer Science Lesson 1

Standards Taught: Review		
Materials: Scratch App and account for your child	**Preparation:**	**Implementing the Lesson:** Give your child time to review the concepts they've already covered in Scratch, explore different games made by others, and review the programs they've already done. This should be a fun time to review and become familiar with the controls of the app once again, not a time for starting a new project.

Computer Science Lesson 2

Standards Taught: 5.CS.1, 5.CS.1.a		
Materials:	**Preparation:**	**Implementing the Lesson:**
Each of the electronic devices you have in your home (e.g. computer, tablet, phone, MP3 player, speaker, etc.)		Lay out the devices you have in your home where your child can see each one. Ask them to review the definitions of hardware (items you can see and touch) and software (programs and apps that run the tasks on these devices). Ask them to discuss some problems they've had with each device's hardware and/or software. Discuss low batteries, devices not turning on or off, software freezing or not opening, no internet connection, broken screens, things not printing, games not working right, videos not playing, pop-ups interrupting, etc. Next, ask your child how they fixed each of these problems. Review how to charge or connect each device to a power source, how to check and fix physical or wireless internet connections, how to protect screens and other hardware, how to restart the device, how to close and restart software, how to connect to the printer, how to reload a website, and what to do in case of a pop-up. As your child works and plays on devices this year, encourage them to use these skills to troubleshoot basic issues. Remind them that it is always a good idea to ask an adult for help if they are unsure.

Computer Science Lesson 3

Standards Taught: 5.NI.1, 5.NI.1.a		

Materials:	Preparation:	Implementing the Lesson:
An internet connection A poster board or large paper Markers/Crayons		Begin the lesson by asking your child what they know about the internet. How does it work? What does it allow us to do? How has it improved communication, business, finances, education, and other aspects of daily life? How has it changed society? Discuss the fact that the internet allows for faster communication by allowing people around the world to connect instantly and in real-time, rather than waiting on snail mail or fax machines. It allows us to send photos, videos, text, and documents quickly and efficiently. It also allows a searchable method for learning about any topic and a vast amount of information that we can access anywhere. Point out that the internet has changed how people talk to each other, how we learn, how we record our history, and how we complete a task as simple as cooking dinner. Next, discuss how the internet works. Ask your child how an email they've written on the computer at home reaches someone far away. Point out that this only takes a few seconds. Remind your child that computers use hardware and software. Point out that the keyboard, the computer screen, the mouse, and the wires connected to it are examples of hardware. Smartphones and tablets are also examples of hardware. Computers with internet are connected to routers and servers, which are also hardware. Point out the router in your home and explain that it creates a network within your home. All of the devices in your home are connected to this router. The router sees everything done on every device and sends it to the proper place. An email sent to a friend, for example, will go through the router in your home. The router will then send it to the network in your friend's home, allowing them to see it on their device. What if you want to see a webpage your friend built for their business? On your computer, you type in the URL, or address, of the page you want to visit on the internet, your friend's business. Your network then sends a request to the server that holds the information for the website. A server is like a storage area for all the information found online. There are several servers, each with a different purpose. The URL helps your network request information from the correct server. The server sends the requested page back to your network, allowing you to see it on your own device. Ask your child to repeat the processes of accessing a website and sending or receiving an email to ensure they understand the basics. Then, ask your child if they know how networks and servers communicate with each other. Explain that networks and servers are connected to each other through nodes. Nodes can be physical things such as cables, or wireless signals from phone towers, radios, or satellites. Point out that your cell phone can likely connect to the internet in most of the places you visit, though you are far from your home network. Explain that your phone is connected through signals to cell towers that are places around the area. Next time you drive, point out any cell towers you see and ask your child to review what they've learned about them. Sending information across cables or wireless signals, however, takes time and space. A node can only handle a certain amount of information before it slows down or crashes altogether. Like traffic on a freeway, too many cars can result in slow speeds and accidents. Many times, information being sent is too big for the "road" is needs to travel on. In most cases, it is sent in packets, or smaller parts, to allow quicker transmission and fewer problems. A website, for example, may come to your computer in a series of several different packets. Your network and computer use the protocols and

directions from each packet to piece them all back together, like a puzzle. Once the puzzle is put together, the website loads onto your device for you to use. Emails, videos, photos, and even phone calls can be broken down into packets.

Ask your child to use the poster board and markers/crayons to illustrate the connections and processes that are taken to transmit information over the internet. Ask them to include labels for basic hardware, routers, networks, servers, packets, and nodes in their illustration. Then, ask your child to use their illustration to explain the process to someone else.

Sources: Strickland, J. (2010, May 7). *How does the internet work?*. HowStuffWorks.
https://computer.howstuffworks.com/internet/basics/internet.htm

Computer Science Lesson 4

Standards Taught: 5.NI.1, 5.NI.1.a, 5.DA.1, 5.DA.1.a		

Materials:	Preparation:	Implementing the Lesson:
Blank paper Pen/Pencil		Use your child's illustration from the previous lesson to review the process of sending information through the internet. Ask your child to discuss some different types of information that may be sent. Examples may include: emails, documents, photos, games, videos, or audio recordings. Point out that each of these types of information, or data, work differently on your device and contain different types of coding. An email will display text, a video will allow you to play it and include movement and/or sound, and a game is coded to react to input from a player. Point out that each of these types of coding help the network and hardware understand the protocols, or rules, for each bit of information and put the packets back together so that they work correctly. Next, explain that different types of data take up different amounts of space on nodes, networks, servers, and your own device. Each of these aspects of the internet can only hold so much in storage at a time. Additionally, each can only run a certain amount of coding at a time. This is why opening a text message on your phone is much faster than downloading an entire movie. The text takes little space and can be sent and opened quickly while the movie includes more packets of information that must be moved, analyzed, and organized. Photos take longer than text, but less time than movies. Codes are the instructions to hardware on how to send, build, and operate each type of data. Codes are how computers talk to each other. Codes can be numerical, which uses a series of numbers (e.g. your zip code is a numerical code which tells people what area you live in) or alphanumerical, which uses both letters and numbers (e.g. a license plate on a car uses letters and numbers to tell who that car belongs to). These types of codes can help send different types of information between devices. A simple numerical code, for example, can be used for smaller items, such as a text, while an alphanumerical code allows for additional combinations of "words" or instructions and may be used for more complicated data. On the blank paper, ask your child to illustrate the following types of data: text, audio, video, game, and photo in order of smallest to largest amount of data. Underneath each, ask them to explain what a hardware device would do with each type of data (e.g. audio would play sound, video would show a moving picture and sound, photo would show a picture).

Computer Science Lesson 5

Standards Taught: 5.DA.2, 5.DA.2.a		
Materials:	**Preparation:**	**Implementing the Lesson:**
Paper and pen		Briefly review the previous lesson with your child about types of data. Point out that data, or pieces of information, allows computers to communicate with each other in different ways, allowing the user of each device to access text, photos, games, photos, videos, and/or audio. However, computers are not the only things that use data. Data can also help people organize and analyze information. Doctors use data to learn about the progress of different illnesses, the effectiveness of different medications and treatments, and the safety of different practices. Scientists use data to predict earthquakes, analyze how well a certain species is doing, and predict weather. Businesses use data to see what is selling and making the most money and what items they need to order more or less of. Point out that data simply means information that is organized in a way that helps us understand something better. Ask your child to discuss some data they may use in their daily lives (e.g. how much milk they drink between shopping trips, how much money is spent on toys, how much gas your car needs each week, or how often they buy their favorite snack.) Discuss how this data helps make life easier (e.g. you always have enough milk/snacks and know when to buy more, you don't run out of gas, you can create a budget). Give your child the paper and pen and explain that today, they are going to collect data. Explain that they must contact 15-20 people as part of their study group. They will be asking about shirt size and recording answers on their paper. Ask them to think of a way to organize their questions to include information about the gender of each person asked and their respective shirt size. If needed, point out that they can draw columns on their paper to organize this information. Then, ask your child to contact 15-20 people they know and record the shirt size of each person. Keep their data for the next lesson.

Computer Science Lesson 6

Standards Taught: 5.DA.2, 5.DA.2.a		

Materials:	Preparation:	Implementing the Lesson:
Data collected from the previous lesson Software with the ability to create charts (e.g. Microsoft Word)		Ask your child to review the data they collected on shirt sizes in the previous lesson. At the bottom of the page, ask them to create a final count that includes the total number for each shirt size from their data group. Next, help your child use the software available to create a pie chart, a line plot, and a column chart using this data. Print each chart after your child adds their data to it and labels it correctly. Finally, ask your child what claims they can make based on the data they collected and organized into charts (e.g. most people wear which shirt size, if you wanted to make shirts for this group how many of each size would you need, who is the smallest person they interviewed, etc.)

Computer Science Lesson 7

Standards Taught: 5.DA.3, 5.DA.3.a		

Materials:	**Preparation:**	**Implementing the Lesson:**
This website Blank paper Pen/Pencil Software with the ability to create charts (e.g. Microsoft Word)	Go to the website and put in your zip code. Click on the tab labeled Natural Disasters and then the link for More Details under earthquakes. Scroll down to the List of Earthquake Incidents	Ask your child to review ways in which humans can use data they collect through research, interviews, or observations. Remind them that this data can help make life easier, safer, or more efficient and help us to see patterns. Give your child the device you used to access the website and ask them to use the information found there to collect data on how many earthquakes have occurred in your area each year for the previous 20 years. Remind them that they can create a table to record this information, which may include a column for the year and a column for the number of earthquakes that occurred that year. Next, ask your child to create a line plot with the data they gathered using the same software they learned about in the previous lesson. When the plot is correctly labeled and data is entered, print the chart. Then, ask your child what information they can learn from this chart. Finally, ask them how likely it is that your area will get an earthquake this year based on the patterns and information in this chart. Keep their chart and save it in the program for the next lesson.

Computer Science Lesson 8

Standards Taught: 5.AP.5, 5.AP.5.a		

Materials:	Preparation:	Implementing the Lesson:
The paper and saved copies of the line chart from the previous lesson The website from the previous lesson Information about correctly citing sources (e.g. CitationMachine.net)		Ask your child to review the previous three lessons on collecting, organizing, and analyzing data. Point out that, for the first assignment about shirt size, your child collected the data themselves. However, the data collected on earthquakes in your area was not collected by them. They simply went to a website to obtain the information, rather than tracking earthquakes themselves. Explain that one of the benefits of the internet is the fact that information can easily be shared and found. However, when they use information, text, data, charts, pictures, art, videos, or games that they did not create, credit should be given to the person or company that did create it. In this case, that would mean including a *Sources* section on their chart. Ask your child to open their chart on the computer once again and add a Sources section at the bottom of the page. Then, help your child learn how to accurately cite the website used in ALA style and add it to this section. A correct citation should include: Author last name, Author first initial. (Date). Page title. Retrieved from URL. Next, point out that some items online, in books, music, articles, magazines, or videos are protected. Some are copy written, meaning they cannot be used without permission from the original creator. Others are classified as creative commons, which means they are free for anyone to use. Some items are appropriate for personal use, but cannot be sold. Others can be used for commercial (making money) uses after the payment of a fee. Explain that anytime we use something, or part of something, we did not create, we should check for the rules that the original creator has set up for them. If we are allowed to use them, we should always give credit to the creator. This includes using code, video, images, art, information for research papers, and quotes.

Computer Science Lesson 9

Standards Taught: 5.AP.2, 5.AP.2.a		

Materials:	Preparation:	Implementing the Lesson:
A messy room Blank paper Pencil		Show your child the messy room and explain that, today, they will be cleaning that room. Point out that cleaning a room is a big job and has several different steps. If you were teaching a toddler how to clean the room, you couldn't just tell them to clean the room. You would have to tell them to do each step. For example, pick up the toys, make the bed, dust the flat surfaces, sweep, mop, put away laundry, etc. Many tasks are like this. They are big jobs that need to be broken down into smaller pieces so that our brains can accomplish each piece. Point out that this applies to coding, too. Computers need small instructions that can be done in a certain order to accomplish a task. Ask your child to write down each step to cleaning the room before they begin. Then, ask them to clean the room exactly as their instructions say. Time their work. Point out that they shouldn't do anything more or less than what is on the instructions. If more needs to be explained about a certain task, ask your child to add it to their instructions. If something needs to be done in a different order, ask them to rearrange the order of the steps they've written. At the end of the task, ask your child how well their steps were laid out. What had to change? What went right? How long did it take to finish the cleaning? Were the steps in the correct order? Point out that each step built a "program" or algorithm to finish a whole task. Record the amount of time it took to clean on the bottom of their paper. Keep this information for the next lesson.

Computer Science Lesson 10

Standards Taught: 5.AP.1, 5.AP.1.a		

Materials:	Preparation:	Implementing the Lesson:
The paper with steps to clean a room from the previous lesson The same messy room		Review the previous lesson with your child. Remind them of things about their "program" that needed to be improved upon or changed. Point out that certain things had to be done in order (e.g. you can't vacuum before picking up). Tell your child that they will clean the room again. However, this time, they should complete the steps in a more efficient manner. Explain that changing the order the steps are done in can help cut down the amount of time it takes to complete the whole task. Point out that picking up laundry before putting away toys may make the toys more visible and easier to pick up, picking up all of a certain type of toy and putting them away at once may cut down on how many times they need to walk across the room, or making the bed after cleaning toys off of it may help reduce how much they have to pick up off the floor. Allow your child to analyze their steps and make changes they think will help make the task more efficient. Then, time them once again as they work through each of their steps. When they are finished, discuss what went better, what they would change, and whether or not they accomplished the goal of working faster. Discuss ways to make the process more efficient. Point out that both "algorithms" resulted in a clean room, though one was likely faster and/or easier.

Computer Science Lesson 11

Standards Taught: Review		
Materials:	**Preparation:**	**Implementing the Lesson:**
Scratch app and account for your child Scratch Coding Cars: Catch Game Cards		Remind your child of the previous lessons about breaking a big task into smaller steps. Then, explain that today they will be programing a game. Point out that, while this is a big task, the instructions have broken the task down into smaller steps. Ask your child to follow each of the steps, in order, to create their game. Allow your child time to play through, troubleshoot, and make changes to their game as needed.

Computer Science Lesson 12

Standards Taught: Review, 5.CT.1		
Materials: Scratch app and account for your child Scratch Coding Cars: Jumping Game Cards	**Materials:**	**Materials:** Remind your child of the previous lessons about breaking a big task into smaller steps. Then, explain that today they will be programing a game. Point out that, while this is a big task, the instructions have broken the task down into smaller steps. Ask your child to follow each of the steps, in order, to create their game. Allow your child time to play through, troubleshoot, and make changes to their game as needed. Next, ask your child to build their own game and allow them time to play through, troubleshoot. Encourage them to make it efficient for players and include aspects that might interest others.

Computer Science Lesson 13

Standards Taught: 5.AP.3, 5.AP.3.a, 5.CT.1		
Materials: Scratch app and account for your child	**Preparation:**	**Implementing the Lesson:** Ask your child to visit the *Explore* tab in Scratch and play games other people have made. When your child finds a game they like, ask them to push the *Remix* button and add or change the game's programming to something they like even more. They may add characters, challenges, or change the ending. Encourage your child to try different things until the game works smoothly and is different than the original.

Computer Science Lesson 14

Standards Taught: 5.IC.1, 5.IC.1.a		

Materials:	Preparation:	Implementing the Lesson:
Scratch App and account for your child Local government or school website of your choice		Remind your child what they've learned about different cultures (e.g. history lessons). Point out that culture can affect what language we speak, what clothing we wear, what religion we believe in, what foods we eat, how we decorate our homes, and even what we do for fun. Ask your child to give you a few examples of aspects of different cultures and discuss how these different from each other. Point out commonalities, too. For example, Christians celebrate Christmas as the birth of Jesus Christ with lights, trees, and gifts. Jews celebrate Hanukkah, which celebrates the dedication of a temple in Jerusalem, their freedom to practice their religion, and the miracle of an oil lamp burning longer than it was supposed to be able to. Though these holidays celebrate different things, both are in December, both include lights, and both have special foods and gifts associated with them. Next, ask your child to visit the website you have chosen and search for ideas on the culture of the people who may access it. What language is it in? What holidays does it mention? Can it be translated? What types of services are offered? What specific issues are discussed? Point out things you see which can hint at culture. Ask your child what the people using this website might need when they visit it. Are those things easy to find? Is it in their language? Is it easy to get help? What if I were new to the area and from another country? How difficult would it be for me to do what I needed to do? What if I couldn't see? What if I were deaf? Discuss what types of changes may make the website easier to use for people of different cultures, abilities, and backgrounds. Finally, ask your child to revisit one of the programs that they've created this year and modify it in some way to make it more accessible to someone with a different culture, different abilities, or of a different background.

Computer Science Lesson 15

Standards Taught: 5.AP.4, 5.AP.4.a, 5.CT.1

Materials:	Preparation:	Implementing the Lesson:
		Remind your child of the lessons with the messy room. Discuss how there was a large task, which was broken into smaller steps, and how they tried different ways to make the steps easier and more efficient. Explain that they are going to use the same skills today to help someone else complete a task that is difficult for them (e.g. homework assignment, cleaning task, exercise routine, organization, etc.)
		Ask your child to find someone who is having a hard time with a certain task. This may be a sibling, parent, grandparent, or friend. Ask your child to discuss the task with the person and ask why they find it so difficult. What is scary about the task? What is hard to start? What part is the worst? What part is the easiest? What might motivate this person to finish the task? What types of things help them complete other tasks?
		Then, ask your child to break the task into steps. If they were going to complete this task, how would they "program" it? Would they add rewards after each step? Make steps even smaller to be less intimidating? What order would they put the steps in to make the task more efficient?
		Ask your child to work through their steps, troubleshooting as they go and making changes to their instructions until they are happy with the way the task can be completed. Encourage them to add steps that would help the person in particular. For example, a small child may need a reward at the end of each step. A teen may work better with music on. They made need a break or a timer. Maybe they need to count as they go or do only a certain number of steps before they do something different.
		Next, ask your child to work through the steps with the person they are helping. Encourage them to ask questions as they go about how it is working for that person. What made the task easier? What made it harder? What changes do you think may help? Ask your child to make changes to the steps based on feedback from the person they are helping. Then, ask your child to type up the steps and present their person with a "code" to help them in the future.

Computer Science Lesson 16

Standards Taught: 5.AP.6, 5.AP.6.a		

Materials:	Preparation:	Implementing the Lesson:
Scratch App and account for your child		Ask your child to build a new game on their Scratch app account. Encourage them to create a game for someone else in the family. This should include characters, actions, and other aspects that would appeal to that family member rather than their own interests. Allow them time to code, troubleshoot, and streamline the game experience until they are happy with it.

Next, ask your child to allow the family member they designed the game for to play it. Encourage constructive criticism and discuss what they really enjoy about the game. Allow your child to make changes as needed.

Finally, ask your child to describe the process of building the game to the family member and you. Discuss why they chose certain aspects and how those aspects reflect the desires and needs of that family member. For examples, a little sister may enjoy a unicorn character, a toddler may need a simple and quick game, a teen may enjoy a longer and more difficult game. Praise your child for their thoughtfulness and hard work. |

Computer Science Lesson 17

Standards Taught: Review		
Materials: Scratch App and account for your child	**Preparation:**	**Implementing the Lesson:** Repeat the previous lesson, allowing your child to create a game for another family member or friend. Encourage them to use the things they learned about different preferences to create something just for this person. Remind them to consider difficulty level, time needed to play the game, and personal interests.

Computer Science Lessons 18-19

Materials:	Preparation:	Implementing the Lesson:
		Take time during these lessons to review any concepts your child may be struggling with. Alternatively, allow your child to explore the Scratch app and build, play, remix, troubleshoot, or create new programs and games.

Standards Taught: Review