Coding Resources for Children

ScopeIT Education understands the pressure on parents right now as they school their children from home. In order to assist parents with tools that their children can access, below is a list of free online tools and some information on each of them.

If your children are enjoying more 'screen time' than usual, why not have them learning some new skills? Children will really enjoy the activities and puzzles that these tools involve and they may just realise they are more creative than they know!

Code.org

Age Appropriateness: 5+

Difficulty: ★☆☆☆☆

Code.org can be seen as a first step into the world of computer programming (coding). It introduces students to a number of puzzles that can improve computational thinking, logical thought processes and also begins to target a number of foundational coding concepts that are consistent across other programming languages - should your children be ready to make that jump.

Pros:
Code.org is a free resource and was specifically designed with a child user base in mind. This simplistic design has also made it useful for adults who wish to learn basic programming skills. It utilises focused and engaging activities that allow students to work at their own pace yet remain challenged.

Limitations:
Without explicit teaching of the coding fundamentals, students will naturally zip through the puzzles and believe that they have "done" Code.org. If this tool is used in isolation (which is usually the case) then the students may miss the real meaning behind some important concepts being taught through some of the puzzles. Another limitation of this resource is that it provides very little opportunity for free creation so moving on to another resource eventually is a must.

Access this resource now: https://code.org/

- Ages: 5 - 8: https://studio.code.org/s/course1?section_id=1471115
- Ages 8 - 12: https://studio.code.org/s/course2?section_id=1471115
- Ages 12 - 14: https://studio.code.org/s/course3?section_id=1471115
- Ages 14+: https://studio.code.org/s/course4?section_id=1471115

Scratch

Age Appropriateness: 8+

Difficulty: ★★☆☆☆

Scratch is a free visual programming resource and can be seen as a stepping stone in the world of computer programming. Scratch was created to help young people learn to think creatively, reason systematically, work collaboratively and uses blocks to teach people how to program without the possibility of syntax errors. The benefit of block-based programming is that you are unable to make typos, which would prevent code from running and therefore discourage or intimidate beginners. Scratch teaches you a number of critical programming concepts that you will be able to later rely on should you decide to make the jump to other more traditional and industrial-strength programming languages and is an excellent place for newcomers to start.

Some of the programming concepts that you can learn from Scratch include:

- **Sequential Processing -** the processing of code in order (read top to bottom) by a computer, and how important careful sequencing is when constructing programs

- **Conditional Programming Logic -** adding choice and therefore user-interaction to our projects based on logical 'if' statements

- **Use of Variables -** the storage, retrieval, and modification of data during application execution

- **Iterative Processing -** the looping/repetition of code blocks to process large amounts of information in an efficient way

- **Boolean Logic -** the application of programming logic that executes based on the analysis of true/false data

- **Interface Design** - the development of user-friendly and intuitive application stage layout, making it easy for users to interact with applications

- **Program Synchronization** - the passage and receipt of messages between application scripts for the purpose of coordinating the execution of different parts of an application

- **Event Handling** - the initiation of script execution based on the occurrence of predefined events, such as the pressing of keyboard keys, the pressing of the green flag key, or the receipt of a synchronisation message

- **Application and Game Development -** the creation of different types of computer application projects

- **Debugging** - the identification, location, and elimination of programming errors, or bugs, that prevent projects from running as they are supposed to

Pros:
Scratch is a free resource and was specifically designed with a child user-base in mind. As such, the design is simple to use and child-friendly. The simplistic design has also made it useful for adults who wish to learn basic programming skills. While Scratch is missing some key concepts, as a first-time programmer, these concepts can be challenging to learn. By omitting them, the developers of Scratch have produced a streamlined yet powerful learning environment, which will prepare you to later make the jump to programming languages that support these advanced programming concepts.

Limitations:
The visual interface of Scratch is unlike how computer programs and the majority of websites are designed, these are usually created using a text-based system. Although Scratch teaches how algorithms work and function logically, it does not specifically teach coding languages. Another drawback to Scratch is that there is not an official version of the app available on mobile devices such as tablet computers.

Access this resource now: https://scratch.mit.edu/

Khan Academy

Age Appropriateness: 11+

Difficulty: ★★★☆☆

This tool is for newbies who know what they want to build and want an engaging, straightforward way to learn skills. Additionally, Khan Academy will make the most sense for those who want to focus on graphics and gaming-type applications. There's also a focus on programming drawings and animations.

Languages offered:
- JavaScript
- HTML
- CSS
- SQL

Pros:
Everything is free, making Khan Academy one of the great resources for learning to code online without having to hand over credit card information. Lessons are reasonably sized (not hours-long) and engaging. The way new skills are presented and taught is also well-organised; you can jump to animation basics within the JavaScript materials, for instance.

Limitations:
Relatively few languages offered, and you won't enjoy the same thriving forum community as available with other resources. That may or may not make a difference depending on your learning style and preferences — it's just something to keep in mind.

Access this resource now: https://www.khanacademy.org/

Digital Technologies Resources

WIX

Age Appropriateness: 10+

Difficulty: ★☆☆☆☆

Wix offers an excellent drag-and-drop site builder to create small websites. There are 100s of free templates available and Wix provides its own web hosting as well as domain names (free and paid). The App Market makes it easy to add extra functionality such as photo galleries or ecommerce. Their visually impressive layouts are designed for small businesses, restaurants, online stores and artists such as musicians and photographers. They are optimized for mobile devices and can be spiced up with one of the numerous apps available from the Wix App Market.

In a way you can compare Wix to a prefabricated house: the fundamental structure already exists and can't be changed. You can, however, paint the walls whichever colour you want (choose a theme) and add the furniture you love (photo galleries and other apps).

A great tool for children to perhaps create a 'family website' they can share with family and friends filled with photos of the things they are doing in isolation.

Access this resource now: https://www.wix.com/

Tinkercad

Age Appropriateness: 8+

Difficulty: ★☆☆☆☆

Tinkercad is one of the most popular classroom tools for creating simple designs from scratch, quickly modifying existing designs. It's a free online 3D design program that you can use in your web browser without downloading any software. Tinkercad is extremely intuitive, easy to use and basic models such as name tags, furniture, houses, snowmen, vases, keychains and cups are easy to create quickly with Tinkercad. Design by selecting, dragging and placing basic shapes, then combining and manipulating them to create 3D models of whatever you like. Tinkercad excels at cutting things into parts, adding simple features, making holes, combining, aligning and arranging objects. It's easy to bring existing designs into Tinkercad to make quick modifications or additions, so advanced designers can also benefit by including Tinkercad in their design toolbox. You can import 3D STL models into Tinkercad for modifying or incorporating into other models, or import 2D SVG images that can be used to make extruded patterns, lettering and designs. When you're done designing you can export to STL for 3D printing or even directly to Thingiverse, Shapeways or Minecraft.

Access this resource now: https://www.tinkercad.com/