Introduction to Programming

What is programming?

Programming, in the simplest of terms, is telling a computer what you want it to do, which involves step-by-step commands for the computer to follow. Computers are not clever; however, they are very obedient. They will do exactly what you want them to do, so long as you tell them how to do it correctly.

Learning programming code has been compared to learning a foreign language, or perhaps more specifically a family of foreign languages. There are many different programming languages, each one designed with certain things in mind. Examples include C, a low level but fast programming language that is good for anything graphically intensive like games; JavaScript, which was specifically designed for dealing with web content; and Perl, a multi-functional language that is often referred to as the 'Swiss army knife' of programming.

Why is programming important?

Code powers our digital world. Every website, smartphone app, computer program, calculator, and even microwave relies on code in order to operate. This makes programmers who can code, the architects and builders of the digital age.

Over the next 10 years, there will be an estimated 1.4 million jobs in computer science related fields and only around 400,000 graduates qualified to do them. Jobs not directly linked to computer science - such as banking, medicine and journalism - will also be affected by the need for at least a basic understanding of programming.

Choose an option to learn a little more about programming

Visit the Code.org website to work through some of their tutorials or resources.

- Choose to work through a course at https://studio.code.org/ (We suggest starting with course 2).
- Or choose a specific tutorial from the Hour of Code site. Here you can narrow down the choices by grade level, subject area, or technology tool. https://code.org/learn

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Additional Resources

Art

Binary Bracelets- https://studio.code.org/s/course2/stage/14/puzzle/1 and https://code.org/curriculum/course2/14/Teacher (could use beads to make a real bracelet)

Dance/Movement

Getting Loopy- Dances that loop and repeat themselves. - https://code.org/curriculum/course1/12/Teacher

Move it, Move it- giving directions based on movements- https://code.org/curriculum/course1/2/Teacher refer to Happy Maps lesson if need be for some easier tasks- https://code.org/curriculum/course1/1/Teacher

PE/Health

Relay Programming- https://studio.code.org/s/course2/stage/9/puzzle/1 (Graph paper programming lesson- might be helpful to do beforehand- https://code.org/curriculum/course2/1/Teacher

Foreign Languages

Graph paper programming- have students use directions in Spanish/French to complete the diagrams - https://code.org/curriculum/course2/1/Teacher

Science

Ecological Pyramid- https://www.tynker.com/hour-of-code/tynker-stem-teacher-guide.pdf and https://www.tynker.com/hour-of-code/ecological-pyramid

Solar System- https://www.tynker.com/ide/?p=54f4d2b284aafaae36000012

(Note- have students complete these in pairs. One should open the tutorial and the other complete the programming)

Math

Code with Anna and Elsa- https://studio.code.org/s/frozen/stage/1/puzzle/1 Teacher directions- https://code.org/hourofcode/frozen

Create an Analog Clock with moving hands- this looks pretty advanced as students will need to know degrees and a circle and create angle measurements to move the hands around the clock - https://www.tynker.com/hour-of-code/analog-clock

Create shapes and then add color to them in this example- good for beginning students- starts easy and then gets harder https://studio.code.org/s/artist/stage/1/puzzle/1

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Social Studies

Draw a Flag- https://groklearning.com/hoc-2016/activity/flags/ Teacher notes- https://groklearning.com/hoc/flags/ (this also requires math skills)

English Language Arts

Programming with the Foos- use as a way for students to sequence stories (see teacher guide) or use so that students can write their predictions for how they will need to move the Foos to complete the tasks. Then determine if they were correct and go back and problem solve and rewrite if need to.

http://thefoos.com/hour-of-code/ Teacher guide- http://thefoos.com/wp-content/uploads/2016/11/Hour-of-Code-Curriculum-2016-Puzzles.pdf

Code.org

Any of the activities here are great as they walk students through the process of programming- https://studio.code.org/s/course2

If you start at stage 3- the students can make an angry birds game.

These are the next steps and a little bit harder- https://studio.code.org/s/course3

The following are various programming apps for different age levels and skills.

Hopscotch – In this app, students are able to design, code, and create their own mini-games, art projects, space adventures, or amazing patterns. This is a free-create space where creations made are based on students' talent and imagination. Suitable for children ages 12+. Available on the iTunes App Store https://itunes.apple.com/us/app/hopscotch-learn-to-code-creatively/id617098629?mt=8

Kodable – Students use simple commands to move their fuzz creature through various mazes. The further students get, the more challenging the mazes become. Suitable for children ages 5-9. Available on the iTunes App Store https://itunes.apple.com/us/app/kodable-k-5-programming-curriculum/id577673067?mt=8

Lightbot – Students control Lightbot using code and maneuver him through differing levels. The Lightbot is controlled using progressively more complex programs. Suitable for children ages 9-13. Available on the iTunes App Store https://itunes.apple.com/us/app/lightbot-code-hour/id873943739?mt=8

Tynker – With a mission of empowering students to become makers, Tynker allows students to code robots, dragons, and other creatures as they work through different puzzles and games. Suitable for children ages 5+. Available on the iTunes App Store https://itunes.apple.com/us/app/tynker-learn-to-code.-games/id805869467?mt=8