



Teacher Guide: STEM Project

<https://www.tynker.com/hour-of-code/stem>

Time: 40 minutes

Grades: 3-5, 6-8, 9+

Difficulty: Intermediate

Students will use coding to make projects about topics they're learning in school. Code a Solar System simulation, an interactive ecological pyramid, a working analog clock, and more. Step-by-step instructions guide them through creating and animating these fun STEM projects. Choose from six Science, Math, Social Studies, and English activities that are appropriate for grades 3+. Students will use coding and outside research to complete their projects.

Activity Requirements:

Option 1: Laptops, desktops, or Chromebooks with a Web browser and an Internet connection

OR

Option 2: iPads or Android tablets with the free Tynker app from the App Store or Google Play Store

Objectives:

Students will be able to apply these concepts:

- Use visual code blocks to create a program
- Sequence steps in a program
- Use loops for repetition
- Use Actors, sounds, and scenes from the Media Library
- Display information effectively using programming

Standards Mapping

CCSS ELA: L.4.1.G, RI.3.3, W.3.6, RI.4.5, RI.4.3, RI.5.10, RST.6-8.4, RST.6-8.7, RST.9-10.5, RST.11-12.3

CCSS Math: C.3.OA.C.7, MP.3.2, MP.3.8, MD.4.5, NF.4.7

CSTA: L1:6.CT.1, L1:6.CPP.5, L1:6.CPP.6, L2:9.CT.1, L2:9.CT.3, L2:9.CT.5, L2:9.CT.12, L2:9.CPP.3, L2:9.CPP.5

How to Prepare

- **Sign Up for a Teacher Account** - Although an account is not required, creating a free teacher account will allow you to access teacher guides, answer keys, and tons of additional resources. You'll also be able to create free accounts for your students, monitor their progress, and see their projects.
- **Create Student Accounts** - From your teacher account, you can easily create free student accounts for all your students. This will allow them to save their projects and progress, so they can continue coding when they get home! Again, this is not necessary to complete an Hour of Code.
- **Try It Out** - Play around with Tynker before your Hour of Code to familiarize yourself with the activities and the Tynker Workshop.
- **Update Your App** - If you're using the Tynker App for tablets, make sure that you have the most recent version of the app downloaded. Older versions may not have all the necessary content to run this year's Hour of Code.

Lesson Guide

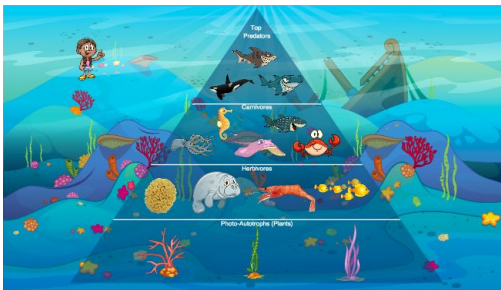


It is important to strike a balance between students learning independently and collaboratively. Students often learn programming well when they work in pairs. They can help each other and catch mistakes that the other student makes. We suggest that you read directions aloud as a class, then allow students time to experiment on their own for each step of the project.

STEM Project

We have six STEM projects. All projects have step-by-step instructions that will help students complete the coding portion of the project. Students can use the Internet to do more research on the topic and add extra information. Each student will produce a unique project.

The answer keys we provide are just for a basic version of the project and will allow you to help students who are struggling with bugs by providing an example of one possible way to implement the app. However, there are unlimited ways to implement these games, and also to customize them. Students' final projects won't look exactly like the sample—and that's awesome!



Ecological Pyramid - Life Science (3-5). Students will create an interactive ecological pyramid to track how energy flows through an ecosystem. This project will guide them through creating an ecological pyramid for any ecosystem, with animals and plants that glide to the proper location in the pyramid when clicked. Students do research on each plant and animal to learn more about the role they play in the ecosystem, and they'll add this information to their project.

[Completed Sample](#)



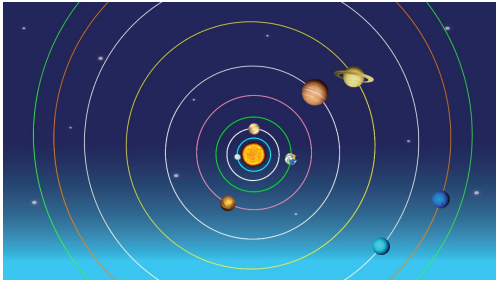
Multiplication Escape - Math (3-5). Students will program a fun game for Math class about a character that needs to escape a cave without getting hit by falling boulders. They'll create a custom character and program that character to only run forward when the player answers a multiplication question correctly! They'll also program the falling boulders and detect whether the player has won or lost the game.

[Completed Sample](#)



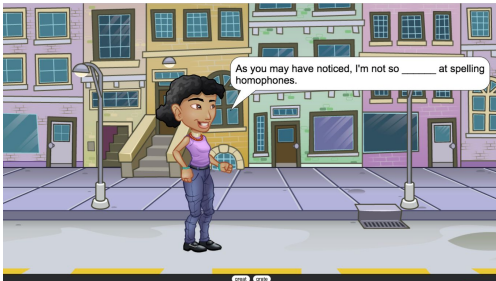
Bill of Rights - Social Studies (3-5). Students will create their own animated Bill of Rights quizzes. They'll choose a scene and animate a scenario based on one or more amendments in the Bill of Rights. The player will need to choose whether what happened was legal or whether it was in violation of the Bill of Rights.

[Completed Sample](#)



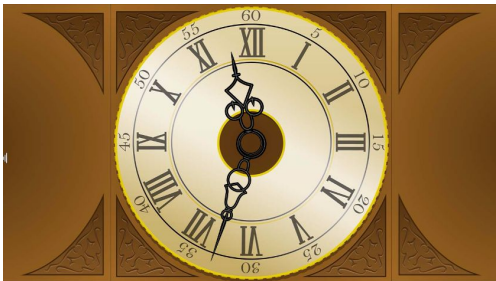
Solar System - Earth Science (6-8). Students will program an interactive model of our Solar System. The instructions will guide students through creating a simulation with planets orbiting the sun. Once they're done with the tricky coding part, they can do additional research to find out facts about each planet that will pop up when the planet is clicked. For an additional coding challenge, ambitious students can even add moons to orbit the planets that have them.

[Completed Sample](#)



Homophones - English (6-8). Students will follow instructions to animate an interactive story with a lot of homophones in it. Each time a character says a word that is a homophone, they'll ask the player which homophone is the correct word given the context. The story can't continue until the player chooses the correct homophone to complete the dialog!

[Completed Sample](#)



Analog Clock - Math (8+). Students use their knowledge of math and geometry to create an analog clock with moving second, minute, and hour hands. They need to calculate the angle that each hand should point based on what time it is. When they're done with the geometry portion of the project, they add reminders about what they need to do throughout the day to make their own alarm clock. This activity is best for high schoolers or advanced middle schoolers.

[Completed Sample](#)

Lesson Wrap-Up

Encourage students to continue working on their programs outside of class. In our experience, kids love the opportunity to create projects and experiment with programming, and will voluntarily continue projects at home.

Tell your students that they can create an account on Tynker for free and use it to save and share their projects, play with coding puzzles, and make many more projects on their own.



Hour of Code Certificate

Be sure to download a personalized certificate for your students when they complete this activity.



Teacher Guide to Tynker Hour of Code

Tynker's activities combine structured and open-ended components to support multiple learning styles. This experience emphasizes that programming requires not only knowledge of how to use a language, but also creativity and critical thinking to figure out how to build projects. Tynker is offering a wide variety of activities appropriate for all grades and experience levels.

What Tynker Provides

- Self-contained, game-based activities that students can complete with minimal support
- A combination of structured and open-ended activities that teach and allow students to create
- Puzzle solutions for all of our puzzles so you can give hints to any students who get stuck
- Common Core alignment for all activities
- A customized Hour of Code certificate for each activity that will show up in the student dashboard when a student completes an hour of programming

Why Children Love Tynker

- Tynker puzzles use game-based learning to teach programming and computational thinking concepts in a fun way
- Tynker tutorials guide students through all the steps to create storytelling projects, games, animations, and much more
- The Tynker Workshop allows students to create anything they can imagine with code
- Tynker's built-in Physics Engine makes it easy to create exciting projects
- Tynker's high quality media assets give students tons of creative options

Recommended Setup and Logistics

- Ideal environment: a computer lab, library, or classroom with your class
- Students can work individually or in pairs
- Students should have headphones if possible, but if not, you can turn the computer volume down
- Set up a free teacher account on tynker.com prior to the activity and add your students so you can track their progress and share a class showcase—and so students can continue working at home! (Note: Creating a teacher account is optional. You can complete your Hour of Code with Tynker without creating an account.)

We hope you take a look at all of our Hour of Code activities to figure out which one is right for your class. Join the global movement and host your Hour of Code with Tynker!