Teacher Guide: Build an App

https://www.tynker.com/hour-of-code/build-app-activities

Time: 30 minutes
Grades: K-2, 3-5, 6-8
Difficulty: Beginner

Students will use coding to make their own versions of their favorite games, animate captivating stories, and program mathematical art! Each project includes step-by-step instructions that help students figure out the steps to create the game or app. At each step along the way, there are opportunities for your students to personalize the project, create custom assets, and express themselves creatively.

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

Note: Most *but not all* of these activities are available on the Tynker app.

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
- Add Actors, sounds, and scenes from the Media Library
- Keep track of score using variables
- Move Actors using various different methods
- Tell stories using code
- Detect and respond to user input, mouse events, and keyboard events
- Animate characters using frame-based animation and character rigs

Standards Mapping
CCSS ELA: RI.2.3, RI.3.3, W.3.6, RI.4.3, RI.4.5, RI.5.10, RST.6-8.3, RST.6-8.4, RST.6-8.7, RST.9-10.5, RST.11-12.3
CCSS Math: MP.3.8
CSTA: L1:6.CT.1, L1:6.CPP.5, L1:6.CPP.6, L2:9.CT.1, L2:9.CT.3, L2:9.CT.4, 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.

Build an App Kits

We have nine "Build an App" kits. All kits have step-by-step instructions that will help students complete the coding portion of the project. Students can customize their games by uploading their own assets, drawing custom graphics, changing the rules of the game, or anything else they can imagine! 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!
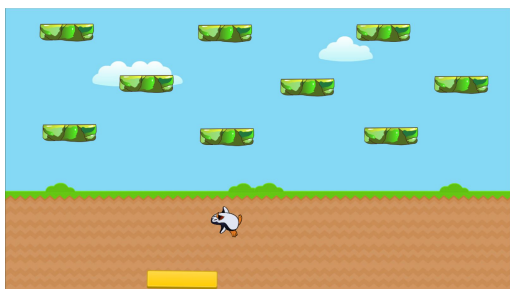
Brick Breaker Game Kit - Beginner (3+). Students will use Tynker's Physics Engine to make their own personalized version of this classic arcade game. They'll start by programming the paddle to move when the arrow keys are pressed, then add a ball and some bricks. They'll personalize the game by drawing or uploading custom assets for the ball, bricks, and paddle. Ambitious coders can even add multiple levels to their game by going to the Level Editor!
Also available on the Tynker app for iPads and Android tablets (Workshop → Hour of Code).
Completed Sample

Undersea Arcade Game Kit - Intermediate (5+). Students will make their own top-down arcade game. They'll start by programming the fish to move up and down when the arrow keys are pressed, then code the sharks to swim across the screen. They'll personalize the game by adding custom assets for the hero, the villain, and the background. Their game could be set at the beach, in the forest, or even in outer space! Ambitious coders can add a variable to keep track of score and create win and lose conditions.
Also available on the Tynker app for iPads and Android tablets (Workshop → Hour of Code).
Completed Sample
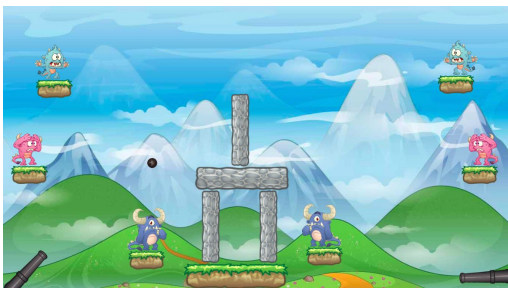
Physics Cannon 2-Player Game Kit - Advanced (5+). Students will start with a partially programmed 2-player cannon game. Currently, only the right cannon works. They'll need to program the left cannon by setting up physics, making the cannon stationary, making it point toward the mouse, and firing a cannonball. Once they've got both cannons working, they'll set up platforms and other items to knock over. They'll have to make some platforms stationary and some not stationary. Ambitious coders can create a variable to detect which player won (knocked over the final item) by keeping track of whose turn it is currently and how many items are still standing. Also available on the Tynker app for iPads and Android tablets (Workshop → Hour of Code).
Completed Sample

Tell a Joke Storytelling Kit - Beginner (1+). Students will choose two characters, then program those characters to tell each other a joke. The instructions give a suggested joke, but encourage students to brainstorm their favorite jokes or even come up with their own jokes! Ambitious coders can add sound effects and make the characters react to the punch-line by animating their characters laughing. Students can also use Tynker's drawing tools to create their own characters and even create multiple costumes for each character. For example, they could create one version of the character as they're waiting for the punchline, then a laughing version of the character for after the punchline.
This activity has audio instructions on web.
Also available on the Tynker app for iPads and Android tablets (Workshop → Storytelling).
Completed Sample
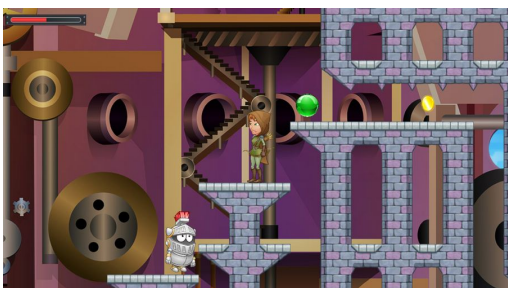
Platformer Starter Kit - Intermediate (1+). Students will build their own platformer game using Tynker's platformer libraries and the Level Editor. They'll use tiles to design the platforms, then program custom power-ups, add sinister villains, and create a hero. Ambitious coders can add an end condition that, when reached, takes the hero to the next level of the game!
This activity has audio instructions on web.
Completed Sample
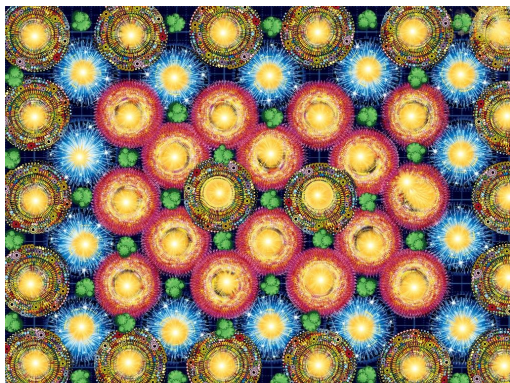
Spin Draw Animation Kit - Beginner (1+). Students will create a customizable drawing tool that paints with a rotating image. They'll program their pen to constantly rotate, go to the mouse, and create a stamp when the mouse is pressed. Students can personalize their pen by drawing or uploading their own image or by changing how the pen works. Ambitious coders can add a button that causes the pen to change to a different image.
This activity has audio instructions on web.
Also available on the Tynker app for iPads and Android tablets (Workshop → Hour of Code).
Completed Sample
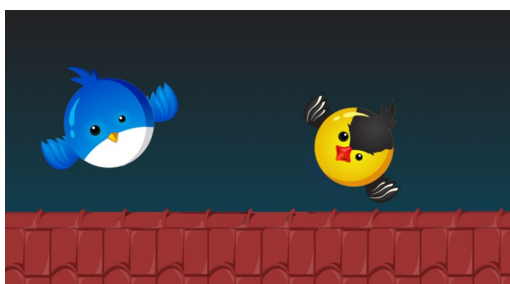
Bird Mayhem Game Kit - Intermediate (5+). Students will learn how to use Tynker's Physics Engine to fill the screen with bouncing birds that clone when you click them. They'll apply physics to their project, then they'll set up gravity. They'll use Tynker's cloning abilities to program the birds to clone (create a temporary copy of an actor) when they are clicked. Having too many clones will significantly slow down or even crash your game, so students will need to delete clones after a certain period of time.
Also available on the Tynker app for iPads and Android tablets (Workshop → More Hacks).
Completed Sample

Pattern Maker Animation Kit - Intermediate (5+). Your students will make awesome math art using code. The first part of this activity is a short tutorial that teaches them the basics they'll need to start making math art like simple shapes and stars. In the second part of this activity, students will apply this knowledge and expand upon it. Through experimentation with angles, distances, and loops, they'll create their own unique math art and patterns.
Completed Sample

Monster High Music Video Animation Kit - Beginner (3+). Students will program a music video animation scene with the characters from the popular Monster High show. They'll use coding to add a background, choose music, and add special effects. Then they'll use special dance animation code blocks to choreograph the characters. Each student will come up with a unique music video with all their favorite characters.
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!