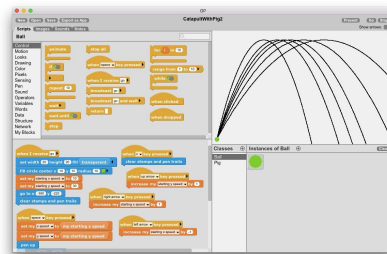
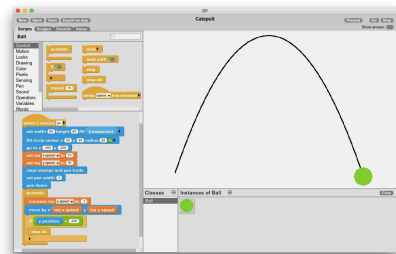




Lesson Plan | Build a Catapult

WHAT IS GP?

GP is a free, general-purpose blocks programming language (similar to MIT's Scratch) that is powerful yet easy to learn. This lesson plan is designed to provide educators with the resources and information they need to teach the GP's Build a Catapult [Hour of Code](#) Tutorial.



WHO IS GP FOR?

Grades 6+ | This tutorial is designed for experienced CS students and/or students studying similar concepts in math or physics courses.

GP is an excellent vehicle for learning and teaching computer science and there is something for beginners and experts alike. GP is a natural next step for those who have used Scratch. It can be used to teach computer science in grades 6-12 or at the college level. GP is also intended for anyone who wants to make their own app but is not fluent with the complex languages and tools designed for professional software developers.

LEARNING OBJECTIVES

Participants will:

- build a catapult that will launch a ball from one side of the stage to the other
- trace the path of the ball by adding a pen trail
- create two variables to control the x and y speed of the ball using the arrow keys
- *Math teachers may want to point out that the arcs drawn are parabolas*
- *Physics teachers may want to point out that the ball moves at constant horizontal speed but its vertical speed increases downward each step, simulating acceleration due to gravity*

MATERIALS & RESOURCES

- One minute [video overview](#) of GP
- Introduction to GP and [User Interface Guide](#)
- Build a Catapult [2-Page Tutorial](#)
- [Student Resource](#) available on the GP Website (includes a link to the tutorial)
- [Certificates](#) for students from Hour of Code
- Completed project is available in the GP download. Choose Open > Project Starters > Catapult.gpp

*Please note that all videos are also available on the [GP website](#).

TECHNICAL RECOMMENDATIONS

- GP runs in the browser on Windows, Mac, Linux, and Chromebooks. Here is the browser URL: gpblocks.org/run/gp.html
- *NOTE: For ease of setup for the hour of code tutorial, we recommend running GP in your web browser. Please note that GP is slower in the browser than in its native environment. If you wish to download GP, [please visit our website](#). The GP download is a ZIP-ed folder containing executables for all supported platforms (Windows, Macintosh, and Linux).*



Procedure

INTRODUCE THE HOUR OF CODE & GP (5-8 mins)

- For resources on introducing the Hour of Code, visit <https://hourofcode.com/us>
- Explain: you will build a catapult using GP, a blocks-based programming language. Show the [GP Overview Video](#) to introduce the activity.
- Ask students: what did you notice? Responses may include:
 - You can change the way pictures look (manipulate the pixels of an image)
 - You can draw, construct simulations, make music, and create art
- Explain: GP is a blocks-based programming language and a natural next step for those who have used Scratch. GP can generate high-quality graphics computationally, manipulate images and sounds, analyze text files or CSV data sets, simulate physical, biological, or economic systems, access the web and use cloud data, connect to hardware via the serial port, and deploy projects on the web or as stand-alone apps.
- Direct students to gpblocks.org/run/gp.html and provided printed or digital copies of this [pdf](#).

ACTIVITY (20-40 mins)

- Students work using the instructions in the tutorial to build a catapult. They will create variables to control the *x and y speed* of a ball as it is launched across the stage. The project will manipulate the initial speed of the ball based on which arrow key is pressed.
- After students complete the instructions in the tutorial, challenge them to turn their catapults into a game using the remixes on the project page.
- Students can explore other projects by using the additional resources available on the [GP Resources](#) page.

REFLECTION (5-10 mins)

- Ask students to share what remixes and elements they added to their projects.
- Ask students to share a red, yellow, and green for the activity:
 - Green: what went well?
 - Yellow: what are you curious/confused/neutral about?
 - Red: what could be improved?
- [Green/Red/Yellow](#) worksheet

OTHER IDEAS FOR REFLECTION

- Gallery walk: students move around to look at peer work
- Rose/Thorn or Plus/Delta: ask students to reflect individually, in partners, or as a group as to a highlight and a frustration of the tutorial
- [Exit Ticket](#) from the Hour of Code team

BEYOND ONE HOUR

See additional resources including more project tutorials and videos at gpblocks.org

We want to hear from you and your students:
Please email us at goteam@gpblocks.org to share your Hour of Code experience!