



Digital Technologies @ Home
Unplugged activities for students



Teachers

Parents
and carers

This activity is for: Years 3-6

Marble Run

This activity teaches...

In computing, branching is making a decision that changes the flow, or outcome, of the program. A home computer makes decisions like this all the time, for example, *if a usb is plugged in, then it shows up in the file explorer, or if you click the chrome icon, the browser opens.*

But these decisions don't just exist in computers, they are in the physical world too. Trains switch to a different track *if a lever is pulled*, water flows through a dam *if the floodgate is opened*, electricity flows to your lights *if the switch is turned on*.

We're going to do a branching activity using a marble run, where changing a small element in the run, or flipping a switch, causes the marbles to change track.

This is a creative activity, designed to be made from simple materials lying around the house. It can be as complex, or as simple as you like.

It is targeted towards late primary students and will take a minimum of 30 minutes, maybe longer depending on the complexity of the marble run.

You will need...

Materials to make a marble run!

You could probably make this with just a wall, sticky tape, **marbles** and paper - but it's more fun to get creative with materials.

Some useful materials are:

- Toilet paper rolls
- Sticky tape
- Paper
- Scissors
- Buckets/cups for marbles to fall into
- A wall or door that you can stick things too
- Floor space
- Lego
- A large tilted board to stick things to
- Hot wheels track

Getting started (read this with your child):

We're going to make a marble run!



Marble Run

Make your own marble run!

Step 1: Simple marble run

Make a marble run.

Your marble run should be long enough that the marble travels for at least one second, and lands safely in a bucket at the end!

Don't make it too complicated just yet, we'll add extra stuff to it later.

Some example marble runs:

Lego Marble Run!



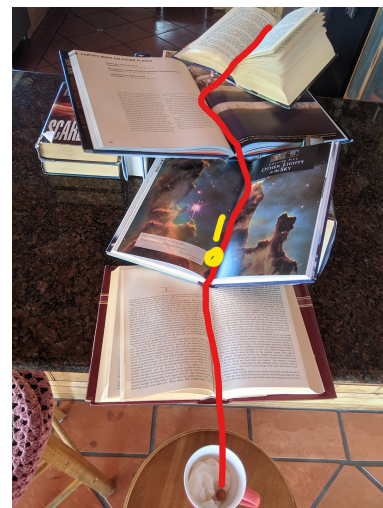
Broken Guitar!



Paper and tape only!



Books!



Step 2: Add a decision

Add a *decision*, or *branch* to your marble run.

It should be something like a switch on a train track, where you can quickly change it back and forth.

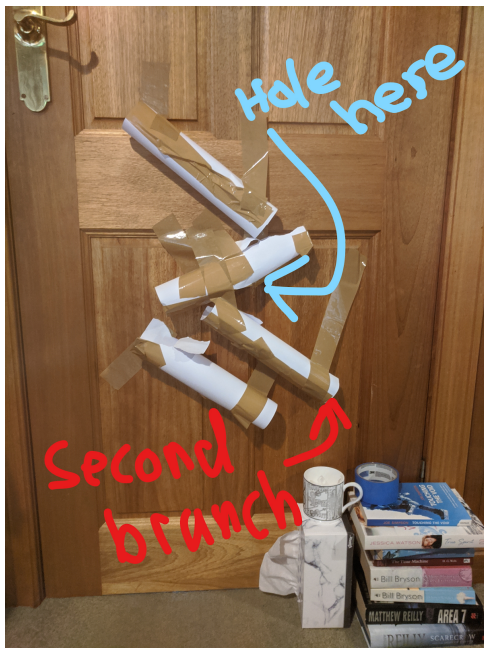
It could be:

- A toilet paper roll with hole cut in it, and paper to easily put on top and seal it back up again
- A lego brick that can be added and removed
- An extra wire that diverts it off the track

Step 3: A bigger marble run!

Make a new track that your marble takes if it branches off, so it ends up in a different bucket!

1. Paper run with two tracks!



There's a hole in one of the paper tubes that can be covered over - switching the marble to the new track.

2. Broken Guitar with an extra branch



A small cable twist tie diverts the marble off to the side.

Step 4: If it's ok with your teacher, parent or carer, take a video of your marble run and ask them to share it on Twitter, Instagram or Facebook, tagging us (@auscompacademy)

See what other people have made!

Want more?

Here are some further activities, online resources, assessment ideas and curriculum references.



Adapting this activity

The basic concept of a marble run with decisions can be extended in a number of ways.

Self sorting

If students have different sized marbles they could make a self sorting run. For example smaller marbles might fall through a hole, while larger marbles don't.

Count the marbles

If you have access to a microcontroller, like a micro:bit or arduino, you could use a sensor to keep track of the number of marbles coming through. Is there an alternative way to do it without a digital system? What's the advantage of each?

Keep the conversation going

- How is the branching decision that we make with marbles like computer branches?
- How is it different?

Keep learning

For year 5/6 students interested in learning more about how computers make decisions, try this course: cmp.ac/garden

For teachers creating a portfolio of learning or considering this task for assessment

Ask students to take a video of their marble run, demonstrating the branching element.

Linking it back to the Australian Curriculum: Digital Technologies



Algorithms

Design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019 - see cmp.ac/algorithms)

Refer to aca.edu.au/curriculum for more curriculum information.