# STEAM MACHINES

# THE MARBLE RUN

## LEVEL

Level 3 – Level 4

## ACTIVITY DESCRIPTION

Puffing Billy weaves its way through the Dandenong Ranges, keeping itself steady as it moves up hills, down valleys, over bridges and through the forest. Students design and create a marble run using different materials. Students investigate how movement can be initiated by combining movement and force. The aim is for a marble to move along the run in the fastest time possible. Ready for some fun!

## THEME

- Force
- Design and Technology
- Properties of Materials

## MATERIALS REQUIRED

- Planks of wood
- Icy pole sticks
- Containers
- Marbles
- Boxes, paper, cardboard
- Lego
- Stop watches / timers
- Sticky notes
- Pens / pencils / rulers
- Sticky tape / masking tape
- Elastic bands

## INSTRUCTIONS

Ignite students learning by asking students if they have ever been to a maze before?

Discuss the materials the maze was made from, the length, the slope, things that affected the speed at which you travelled. Puffing Billy is similar, its moves along tracks but the topography, length, power and change in direction all affect the speed at which it can run.

Introduce the Marble run. The task is to move a marble through a maze that you design and create. Using a stopwatch, we are going to time how long it takes for a marble to get from the start to the finish.

As a whole group discuss what might affect the speed of which a marble can roll. On the white board list the student's ideas using "I think" statements.

I think:

- The materials used effects the speed
- The slope of the marble run effects the speed
- The length of the marble run effects the speed

Then introduce the students to the different materials. Encourage students to discuss and share their ideas with other students around them.

Hand out the "The Marble run Investigation" worksheet to each student. Students list the materials they need for their investigation and draw a design. Students label and describe their design process and materials. Once their design is complete, they commence their investigation by making their marble run.

Remind students they need to continually refer to their design and if they change things throughout the process, they need to record the changes. Allow each student to test and share their marble run with the class.

Why and what did they change to make it work?

Display the marble runs in the classroom. Refer back to the "I think" statements to draw some conclusions about what affects the speed of the marble. Remind students they are going to experience the properties of material, slope, length and speed when they ride Puffing Billy Railway.

## SUGGESTIONS FOR ASSESSMENT

Contribution to whole class discussions. Completion of the Marble Run Investigation worksheet. Successful marble run model.

## CURRICULUM LINKS

### DESIGN AND TECHNOLOGIES

Investigate how forces and the properties of materials affect the behaviour of a designed solution (VCDSTC024)

Investigate the suitability of materials, systems, components, tools and equipment for a range of purposes (VCDSTC027)

Select and use materials, components, tools and equipment using safe work practices to produce designed solutions (VCDSCD030)

## BACKGROUND INFORMATION

Puffing Billy railway line is 24kms long. The railway line is narrow gauge, only 762mm or 76.2 cm wide.

Puffing Billy travels at an average speed of 16 km/h.

# THE MARBLE RUN INVESTIGATION WORKSHEET

| Title: | Name: |
|---|---|
| "I think" statement | |
| Materials Used | |
| Procedure | |
| Design | |
| Marble Run Times | |
| Conclusion | |