ALL ABOARD PROGRAM

THE "PUFF" IN PUFFING BILLY

LEVEL

The Early Years, Level A-D (towards foundation), Foundation – Level 2

ACTIVITY DESCRIPTION

Students explore how Puffing Billy gets its "Puff". They learn how steam energy is generated and used to power the train. They observe everyday objects that create steam and further develop their understanding by completing a steam energy experiment.

THEME

- Energy
- Force/Motion

MATERIALS REQUIRED

- The "Puff in Puffing Billy" worksheet.
- Coloured pencils
- Kettle
- Water

MATERIALS REQUIRED FOR EXTENSION ACTIVITY

"How to make a steam engine, out of a soft-drink can" experiment. - https://www.youtube.com/watch?v=ni9zhuOvtf8

- Tealights
- Unused soft drink can
- Cup
- Nail or Needle
- String
- Cable Tie
- Matches

INSTRUCTIONS

As a whole group define and discuss steam energy and how it powers the trains at Puffing Billy. Make a connection to everyday objects at home that also create steam such as an iron, boiling water and a kettle. Demonstrate the amount of steam that is created by filling up and turning on a kettle in the classroom. As the classroom fills with steam, the students can see the steam coming out of the kettle. Discuss converting the steam into motion.

Hand out the "Puff in Puffing Billy" worksheets for individual students to complete.

EXTENSION ACTIVITY

As a whole group activity, undertake the "How to make a steam engine, out of a soft-drink can" experiment (Link under Materials). Ask individual students to assist with each of the different stages of the experiment. Encourage students to draw their own diagram of the experiment's components, labelling the parts as they go.

Get students to use procedural text to outline the steps in the equipment.

SUGGESTIONS FOR ASSESSMENT

Ability to listen and observe in whole group experiment. Completion of worksheet. Ability to retain information from the excursion to engage in classroom discussions.

BACKGROUND INFORMATION

WHAT IS STEAM ENERGY?

Steam energy is water heated into steam. Steam is usually converted to motive power by a reciprocating engine or turbine. The pistons are driven by the steam power.

HOW IS STEAM ENERGY USED AT PUFFING BILLY?

When you look at Puffing Billy the first thing you might notice is the locomotive at the front of the train. The locomotive is the first car that powers the train and pulls the connecting carriages along the track. Without the locomotive, the train could not move.

On top of the locomotive is a chimney, which releases large amounts of smoke. Where is the smoke coming from?

The steam engine inside the locomotive relies on the burning of coal in order to work. The most important parts of the engine are fire, coal and water.

The fireman at Puffing Billy gets the woodfire burning in the engine room. The woodfire burns until its turns into hot coal, which can burn for long periods of time. The coal heats up the connected boiler, which is full of water, creating steam.

The steam is then squeezed into a very small space and forced into a metal rod called a piston. The steam is so powerful it moves the pistons, which are connected to the wheels of the train. The wheels start moving, and the pistons keep pumping.

As Puffing Billy moves along the track you will notice the steam from the boilers and smoke from the chimney.

CURRICULUM LINKS

DESIGN AND TECHNOLOGY

Explore how technologies use forces to create movement in designed solutions (VCDSTC014)

SCIENCE

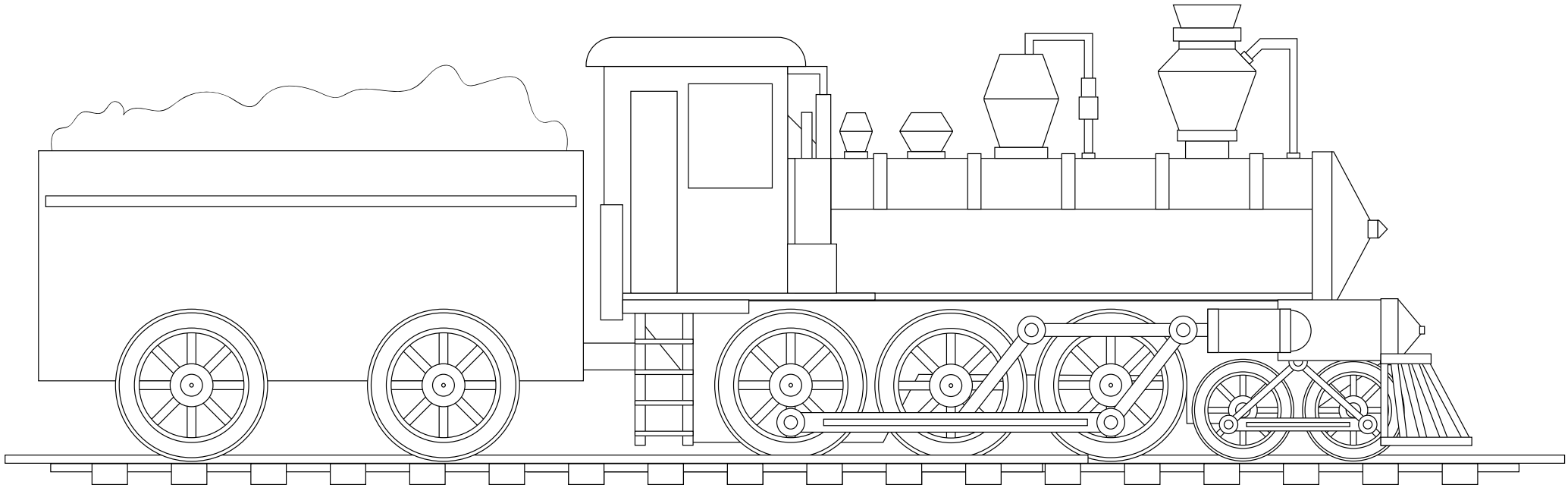
Everyday materials can be physically changed or combined with other materials in a variety of ways for particular purposes (VCSSU045)

Respond to and pose questions, and make predictions about familiar objects and events (VCSIS050)

Participate in guided investigations, including making observations using the senses, to explore and answer questions (VCSIS051)

THE PUFF IN PUFFING BILLY WORKSHEET

Using the words below, label the diagram to demonstrate the "Puff" in Puffing Billy.



COAL, BOILER, WATER, STREAM, CRANKSHAFT, PISTONS, WHEELS, SMOKE, FIREBOX

DON'T FORGET TO COLOUR IT IN!