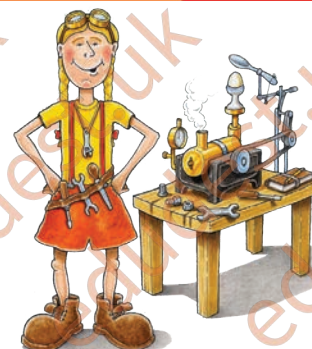


## States of Matter at the railway

### STUDENT INTRODUCTION

- ▶ At the Isle of Wight Steam Railway, you can see particle kinetics and energy changes in action
- ▶ This resource allows you to apply what you've learned in the classroom to the real-life railway environment!



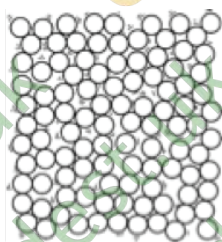
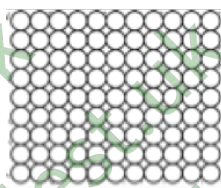
### The particulate nature of matter

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- ▶ The particle diagrams below show atoms as **solid**, **liquid** and **gas**:



### Task

Label which of the particle diagrams above show the state of matter for the:

1. Steam
2. Railway line
3. Water in the engine

### Complete the following to show your understanding:

The particles in \_\_\_\_\_ are very close together and in a \_\_\_\_\_ pattern.

They can \_\_\_\_\_ about a fixed point.

Particles in \_\_\_\_\_ are still close together but are arranged \_\_\_\_\_.

They can move by \_\_\_\_\_ over each other.

Particles in a \_\_\_\_\_ are spaced far apart. They can move \_\_\_\_\_ in any direction.

**Word Bank** quickly solids liquids gas randomly regular vibrate sliding

Complete the following table as you move around the railway:

Railway material encountered?	Solid, liquid or gas?	Compound or element?

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The three states of matter can be changed to one another:



### Questions

1. Explain what happens to the arrangement of iron particles when the railway track gets hotter and colder.
2. Is the boiling of water to power the engine an example of a chemical reaction or a physical change?
3. Is the burning of coal to heat the water an example of a chemical reaction or a physical change?
4. Which of these, if any, is a reversible change?  
(You could explain your answer using particle diagrams on a separate sheet)