

Forces at the Railway!

STUDENT INTRODUCTION

- ▶ Forces are in action everywhere at the Isle of Wight Steam Railway. The locomotive steam engine, the wheels and rails, the water tower, the signal-box...
- ▶ Can you identify pushing, pulling, friction and traction in action at the Isle of Wight Steam Railway?



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2. Have a look at these train images below. Are the locomotive engines **pushing** or **pulling** the carriages?



Is the engine **pulling** or **pushing**?



Is the engine **pulling** or **pushing**?

Friction & Traction

Let's look at FRICTION. Friction is a force that occurs when two objects are in contact with each other.

- ✓ TRACTION is the force used to generate motion between the train wheels and the rails, through the use of friction and the power of the steam engine.
- ✓ FRICTION can also *slow* objects down when two objects make contact. So when slowing the train, friction is created when braking.

3. What are the two objects that are in contact with each other to create friction in the picture on the right?



- i. _____
ii. _____

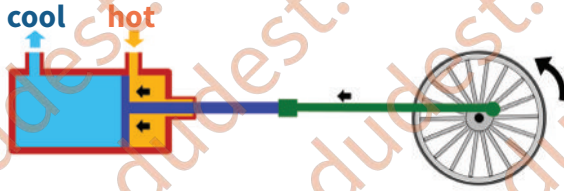
4. Can you complete these sentences below, using the information given above?

- FRICITION acts whenever two objects are in _____.
- FRICITION forces help to _____ moving objects.
- TRACTION is used to generate _____.
- All this is possible due to the _____ generated by the _____ engine.

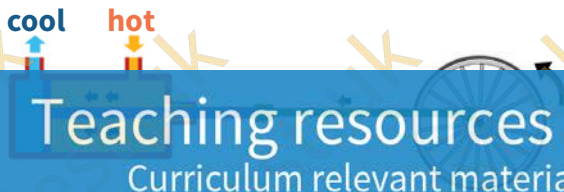
How do the forces move the wheels to create motion and traction?

The diagram below shows how hot steam is used to move the piston backwards and forwards which in turn makes the wheels go round and round.

This process repeats itself over and over. The sound made by the escaping 'exhaust steam' is the 'chuff chuff' sound you hear when the train is moving.



- ▶ Hot steam is let in under pressure.
- ▶ The steam pushes the piston to the left, turning the wheel.
- ▶ The 'cool' steam (in blue) used in the previous cycle is on the left and will be ejected.



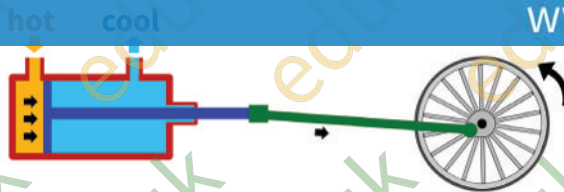
- ▶ The 'cool' steam is being let out of the chimney as exhaust steam.

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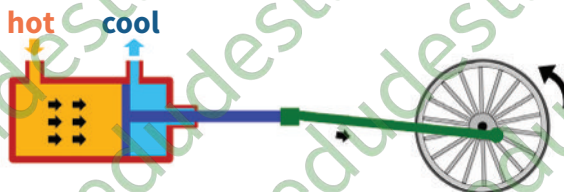
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- ▶ The piston turns the wheel in one direction.
- ▶ The 'cool' steam is being let out up to go up the chimney.



- ▶ The piston moves to the right, pushing and pulling the wheel round.
- ▶ This cycle of pushing and pulling is repeated as long as the driver wants the train to keep moving.
- ▶ Each time the steam leaves the chimney it makes that 'chuffing' sound that we associate with steam trains.

Task - What have you seen today?

Give examples of where, during your visit to the Isle of Wight Steam Railway, you have seen:

1. PUSHING

2. PULLING

3. TRACTION

4. FRICTION

5. MOTION

