TEACHER NOTES

States of Matter

Particle kinetics and energy changes in action at the railway

Contextual Summary

This resource is for key stage 3 students who are covering 'States of Matter' as part of the compulsory science element of the National Curriculum.

It allows students who visit Isle of Wight Steam Railway to engage with the scientific concepts within the railway environment and to identify how materials change due to various processes, including combustion.

Students can explore the steam elements of the locomotive and how the water changes into steam, identifying the basic elements of the process. They can see the water being added at the station, witness the coal fire being stoked, and the resultant expansion of the steam being harnessed to provide traction.

SUBJECT

Science

UNIT

States of Matter

OPPORTUNITIES FOR USE

- ✗ Pre-Visit
- ✓ On-Site Activity
- ✗ Post-Visit
- ✗ Peripheral Task

45 - 60 Mins

APPLICABILITY

KS3

S1 - S3

CURRICULUM / SYLLABUS

- ✓ National Curriculum 2014
- ✓ Curriculum for Excellence

Applies to Resources numbered:

10159**1**

10159**2**

Task Implementation

This task can be introduced to students before their visit to Isle of Wight Steam Railway. The resource assumes that students have covered atoms and molecules as particles, changes with temperature in respect of motion and spacing of particles, the particulate nature of matter; the properties of the different states of matter in terms of particle kinetics, and the changes of state in terms of particle kinetics and energy changes.

This resource helps consolidate the learning above and show particle kinetics and energy changes in real life situations. When on site at the railway, students can then complete the questions on the sheet as they move around the venue. This will focus students' attention on the key areas for learning.

Ability Levels

There are 2 versions of this resource intended for lower and higher ability at upper key stage 3.

Teachers can adapt these resources further if required.

Key skills practised in this unit:

- Understanding the properties of the different states of matter and how they change
- Understanding the particulate nature of matter
- How energy is created and how it changes through various processes

Relationship to Curriculum

The above skills are required to be taught and practised as per the National Curriculum 2014, for key stage 3 SCIENCE, and the Scottish Curriculum for Excellence.

Learning Opportunities

Pre-Visit

Students need to have covered work on atoms and molecules as particles, motion and spacing of particles, the particulate nature of matter, the properties of the different states of matter in terms of particle kinetics.

During the Visit

Completion of Science KS3 resource linked to this document:

States of Matter at the railway

Resource ID: 101591 (higher ability), 101592 (lower ability)

Post Visit

Follow-up tasks could include:

- Class discussion, Q&A etc. of what they discovered, answers to the questions, etc.
- Completion of labelled diagrams, PowerPoint slides, or animations showing these examples
- Finding other examples of particle kinetics and energy changes in action around us
- Class discussion about the scientific processes /techniques used by the railway team
- Work on forces and motion

Enrichment Opportunities

This resource allows students to see the processes in action, in situ, and enables them to ask questions to enhance their understanding. It is hoped that they will be able to gain a fuller, more hands-on experience.

Learning Outcomes

Students will be able to demonstrate an understanding of how particle kinetics and energy changes function in real life situations.

See Also...

Other resources at Isle of Wight Steam Railway relevant to this age group include:

101011	English	10 questions to ask at the railway
101112	English	Review and comment
101171	English	Understanding railway texts
101381	English	Comprehension of information
101294	History	Changes on the railway over time: Train Story
101133	History	Placing events in chronological order
101583	History	Restoring the railway
101061	Science	Motion, Distance, Time & Force

For further details visit **www.edudest.info** and click:

- *Resource Finder* - to locate specific resources identified above
- *Venue Finder* - to learn more about education at this venue
- *Subject Finder* - to find other relevant Isle of Wight venues

101591

Our ref: SCI-CHEM-PCMT-10159-TN