

Applicable standards

National Curriculum for England Key Stage 2

KS2 Science		Lessons					
Element of the Science Programme of Study		1	2	3	4	5	6
Properties and changes of materials							
<ul style="list-style-type: none"> Compare and group together everyday materials based on their properties Give reasons, based on evidence for the uses of everyday materials 				✓	✓	✓	
Forces							
<ul style="list-style-type: none"> Explain that unsupported objects fall towards the Earth because of the force of gravity Identify the effects of air resistance, water resistance and friction Recognise some mechanisms including levers, pulleys and gears 			✓				
Living things and their habitats							
<ul style="list-style-type: none"> Identify and name a variety of living things Recognise that environments can change 	✓	✓					
Working scientifically							
<ul style="list-style-type: none"> Ask relevant questions and use different types of scientific enquiry Making systematic and careful observations Plan different types of scientific enquiries Take measurements with increasing accuracy and precision Record data and results Make predictions and plan comparative and fair tests Report and present findings Use results to draw simple conclusions and raise further questions 	✓	✓	✓				
	✓	✓	✓				
			✓	✓	✓		
	✓			✓	✓	✓	✓
	✓	✓					
			✓	✓		✓	✓
			✓	✓	✓	✓	✓
KS2 Geography							
Element of the Geography Programme of Study		Lessons					
		1	2	3	4	5	6
Geography skills and fieldwork							
<ul style="list-style-type: none"> Use maps, atlases and globes to locate and describe features 	✓	✓					

SCHEME OF WORK

Lesson 1: How big and how deep is the ocean?

Overview

This lesson sets the scene for the whole Submarine STEM unit. 71% of our blue planet is covered by the ocean, with an average depth of 2.3 miles. The ocean affects people's food, safety, livelihoods, transport and access to resources, yet we know very little about the deep ocean – we have better maps of the moon! This lesson explores the importance of the ocean and introduces students to some of the strange creatures which inhabit the deep sea.

Learning outcomes

- Discuss prior knowledge of the ocean
- Understand the scale of the ocean
- Describe how the ocean affects our lives
- Compare, observe and ask questions about the features of deep-sea creatures
- Review learning and make suggestions for future learning

Resources



Slideshow 1:
How big and how deep is the ocean?

Student Sheet 1a:
Deep-sea funnies



Student Sheet 1b:
What I would like to know



Gallery:
Deep-sea creatures



Video:
Nekton Mission II:
The Indian Ocean

Lesson 2: What lives in the deep sea?

Overview

This lesson explores the depth of the ocean through creating a scale diagram of the different ocean zones and identifying significant points within these zones. Students will consider why deep sea exploration is so challenging for humans and the different issues scientists have to overcome. This lesson allows students to examine submersibles and identify their main differences.

Learning outcomes

- Identify living things, habitats and environments
- Understand the scale and depth of the ocean
- Make accurate measurements
- Explain why ocean exploration is challenging for humans
- Describe how different submersibles make ocean exploration possible
- Identify significant ocean zones

Resources



Slideshow 2:
What lives in the deep sea?



Activity Overview 2a:
Ocean depths



Student Sheet 2a:
Deep-sea funnies

Student Sheet 2b:
Points of interest

Student Sheet 2c:
Ocean zones



Gallery:
Deep ocean poster



360 Gallery:
Submarine science



Video:
Mission Director



Subject Update:
How to: Quick start to
360 VR in the classroom

Subject Update:
How to: Four ways to use
360 VR in the classroom

SCHEME OF WORK

Lesson 3: What forces affect submarines?

Overview

The context of the lesson is a practical investigation to discover how shape and surface area affect the speed at which a submersible descends. Students develop their understanding of forces, surface area, and fair testing.

Learning outcomes

- Understand gravity as a force
- Consider how forces affect submersibles
- Investigate how shape affects speed
- Predict and test with accuracy
- Describe how forces affect submersibles

Resources



Slideshow 3:
What forces affect submarines?



Activity Overview 3a:
Submersible shape investigation



Student Sheet 3a:
Shape Investigation



360 Gallery:
Diving in a submarine



Subject Update:
How to: Quick start to 360 VR in the classroom

Subject Update:
How to: Four ways to use 360 VR in the classroom

Lesson 4: How do you choose materials for a submarine?

Overview

This lesson discusses the properties of materials and their use in submersible design. Students will compare a variety of materials for their submersible and justify their choices. An investigation into how salt water affects materials allows pupils to make predictions, write conclusions and conduct a fair test.

Learning outcomes

- Discuss the properties of materials
- Compare and group materials based on their properties
- Give reasons for the uses of materials
- Explain the suitability of materials for certain uses
- Make predictions about how salt-water affects materials

Resources



Slideshow 4:
How do you choose materials for a submarine?



Student Sheet 4a:
Materials cards

Student Sheet 4b:
My submersible materials

Student Sheet 4c:
Salt water investigation



360 Video:
Submarine launch



Subject Update:
How to: Quick start to 360 VR in the classroom

Subject Update:
How to: Four ways to use 360 VR in the classroom

SCHEME OF WORK

Lesson 5: How do you launch a submarine with strong structures?

Overview

Part one of this two-part lesson develops students understanding of strong structures and investigates how cranes work. Students work together to design and construct a crane using a variety of materials. They will adapt and evaluate their structure as they go along and make improvements where necessary. They will also construct a model submersible to launch and recover once their crane is complete.

Learning outcomes

- Describe how machines help people
- Describe and apply the features of a stable structure
- Construct a working model of a crane
- Reflect on learning and plan next steps

Resources



Slideshow 5:
How do you launch a submarine with strong structures?



Activity Overview 5a:
Designing a crane

Activity Overview 5b:
Submersible model



Student Sheet 5a:
Designing a crane



360 Video:
Submarine launch



Subject Update:
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Subject Update:
How to: Four ways to use 360 VR in the classroom

Lesson 6: How do you recover a submarine with levers and pulleys?

Overview

Part two sees students develop their understanding of levers and pulleys and relates this to how cranes launch and recover submersibles. Students will continue to develop their crane, this time adding a lever or pulley system which will raise and lower their submarine model. Students will reflect on their build, evaluate the effectiveness of their cranes and make suggestions for improvements. Finally, students will demonstrate their learning by creating a poster which describes and explains how cranes work to launch and recover submersibles, concluding the Submarine STEM unit.

Learning outcomes

- Apply understanding of levers and pulleys
- Construct a working model of a crane using levers and pulleys
- Reflect on learning and suggest improvements
- Explain why cranes are used and how they work

Resources



Slideshow 6:
How do you recover a submarine with levers and pulleys?



Activity 6a:
Levers and pulleys



Student Sheet 6a:
Levers and pulleys

Student Sheet 6b:
Poster



360 Video:
Submarine launch



Subject Update:
How to: Quick start to 360 VR in the classroom

Subject Update:
How to: Four ways to use 360 VR in the classroom