

Lesson Plan for Project Wavelength delivered by Class Teacher

Workshop Title: How did Isle of Wight inventors use rockets to save lives at sea?	Venue: School	Key Stage: KS2/3 Class Size: 15 - 32
Length of Session: 60 minutes		
Curriculum Links		
History	<ul style="list-style-type: none"> ● Understand how our knowledge of the past is constructed from a range of sources ● They should regularly address and sometimes devise historically valid questions about change, cause, similarity and difference, and significance. ● a study of an aspect of history or a site dating from a period beyond 1066 that is significant in the locality ● Be introduced to technological achievements and inventions from the Island's past. 	
Citizenship	<ul style="list-style-type: none"> ● Developing good relationships and respecting the differences between people. Pupils should be taught to think about the lives of people living in other places and times, and people with different values and customs. 	
English	<ul style="list-style-type: none"> ● Listen and respond appropriately to adults and their peers ● Ask relevant questions to extend understanding and knowledge ● Retrieve and record information from non-fiction (interpretation panels around the site) ● Spoken language: listen and respond appropriately to adults and their peers ● Maintain attention and participate actively in collaborative conversations, staying on topic and initiating and responding to comments ● Use spoken language to develop understanding through speculating, hypothesising, imagining and exploring ideas ● Participate in discussions, presentations, performances, role play / improvisations and debates 	
Science	<ul style="list-style-type: none"> ● Setting up simple practical enquiries, comparative and fair tests ● Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers ● Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables ● Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ● Identify the effects of air resistance, water resistance and friction, that act between moving surfaces 	

Pre-Session	
Prior Learning Required	No prior learning required.
Resources Required for workshop	<ul style="list-style-type: none"> • Mice templates https://learning.sciencemuseumgroup.org.uk/wp-content/uploads/2019/02/SMG-Learning-Activities-Rocket-Mice.pdf • Cardboard cut-outs of Irex • Variety of hats to represent Dennett, Boxer and the main characters from the account of the Irex. • Powerpoint of Wavelength Life saving rocket presentation
Archives, artefacts and images	<p>PowerPoint with following images:</p> <ul style="list-style-type: none"> • Photographs of the IW coast guards practising using a Boxer rocket • Painting of the wreck of the Irex • Photograph of the wreck of the Irex • Photograph of the Bembridge lifeboat • Scan of Instructions for Dennett's Rocket
Vocabulary to be Introduced	Key words: mortar life-saving rocket, rope, ship, shipwreck, rocket, fuel, combustion, air resistance, gravity, thrust, action, reaction, Newtons Third Law
Learning Objectives / Outcomes	
ALL students	<ul style="list-style-type: none"> • Will know how Isle Wight inventors used rockets to save lives at sea.
MOST students	<ul style="list-style-type: none"> • Will be able to describe how life saving rockets were used to save people from the wreck of the Irex.
SOME students	<ul style="list-style-type: none"> • Will be able to explain how rockets were an improvement on Manby's mortars. • Will explain how Boxer's rocket improved on Dennett's. • Explain how rockets work.
Differentiation / Extension Activities	The activities provided in the workshop are sufficiently accessible and open ended to cater for all needs.
Provision for Students with Additional Needs:	<ul style="list-style-type: none"> • Text available in 28+ font • Text supported by images using in In Print • 1:1 Break out activities available for students
Assessment Strategies	Questioning will be used to assess what learning has taken place. Teachers are welcome to take photographs during the workshop for their own assessment purposes.

Learner Activities / Questions & Class Organisation

Starter
5 mins

Activity 1

- Ask children to discuss in pairs what they know about rockets. Ask students to give feedback to the whole class and record feedback.
- Show **slide 1** - Explain that this workshop will help students answer the question: How did Isle Wight inventors use rockets to save lives at sea?
- **Slide 2** - Show **slide 3** – 4000.
- **Slide 4** - Ask student *Over 100 years ago, how could you rescue people from a shipwrecked near the Needles?* Show students where the Needles is on the map (**slide 5**). Ask students to discuss the answer in pairs and share ideas with the rest of the class.
- **Slide 6** - What if the weather is too dangerous for a lifeboat to come to your rescue? Show the image of the Victorian Bembridge lifeboat in slide 7 and discuss why its design (open to the elements with oars) might make it treacherous in extreme weather.
- Show **slide 8** and ask a student to volunteer to be Captain George William Manby. Place a hat on him and explain that:
- On the 18 February 1808, the first recorded rescue using the Manby apparatus took place. It was a mortar that can fire a rope from the land to a ship in difficulties. The crew of seven were safely taken off the *Elizabeth* which was stranded off the shore at Great Yarmouth. It is estimated that by the time of Manby's death in 1854 nearly 1000 people had been rescued from stranded ships using his apparatus.
- Can you see any down sides to firing a mortar with a rope at a ship? Ask students to share ideas such as threat of the mortar causing more damage.
- Show **slide 9** the Photograph of Instructions for John Dennett's rockets. Ask a student to take on the role of Dennett (give him a bowler hat). Explain that in the late 1820s John Dennett, of Carisbrooke, created a similar but more powerful rope-firing device that used a rocket. That his rocket looked like a big firework with an iron weatherproof case and a pole rather than a thin stick and that it also had a greater range than a Manby's mortar. It was also lighter and needed less men to use it. Show **slide 10** illustrating how the coastguards would fire a rocket with a rope attached to a wreck and **slide 11** the crew and passengers can then to be hauled to land.
- Show where Atherfield was on **slide 13** and explain that on the 3 October 1832 at Atherfield a Dennett rocket was launched with the rope reaching the wreck of the *Bainbridge* the first time after four Manby mortars had been launched unsuccessfully. 19 people were rescued and the story made national news resulting a contract for it to be used by coastguards (a map showing where Atherfield is).
- Dress one of the students in the cape and bonnet and explain that this is Princess Victoria in 1833 – soon to be Queen in 1837. Show the painting on **slide 14** and **explain that** on the 26th of August 1833 John Dennett's rocket was

demonstrated to her at St Lawrence as she watched from a yacht anchored in Mill Bay. The reporting of this made John Dennett's rocket even more famous

- Ask for a volunteer to be Captain Edward Mourier Boxer who invented an improved rocket in 1865. Show **slide 15**. Explain that it could travel further than Dennett's and that he put two rockets in one case. The first rocket shot the line to its maximum height. The second rocket carried it forwards. It was used regularly until 1948. Tell the class that he was in the Royal Artillery for 30 years and died in Ryde on the 1st of January 1898.
- Show **Slide 16**, a photograph of a Boxer rocket held in the Carisbrooke Castle Museum Collections. If the rocket is available for loan then the facilitator will show the class the actual rocket.
- Show **slide 17** Even though Boxer created an improved rocket, the Dennett rocket continued to be used for firing rescue lines to ships until at least 1890 when one was used to rescue people from the *Irex*.

Activity 2

- **Slide 18** shows a photograph from the 25th of January 1890 when the *Irex* was grounded at Scratchell's Bay, close to the Needles. Use the **Summary of the Story of the Irex** to get the whole class to enact the story. Use different hats to get students to be some of the key people in the story.
- **Slide 19** Shows the painting showing the wreck of the *Irex* with the line shot from Dennett's rocket.
- **Slide 32** The story on the link shows original artworks and re-tells the story of the *Irex* and can be used in follow-up work afterwards. Note that towards the end of the story the hero Isaac Rose is referred to as a negro as he was in original press releases at the time. This could be used as point of discussion about how it is unacceptable to use this term today or you may wish not to play it.
- **Slide 21 to 25**
- Show photographs showing a coastguards training session with their life saving rocket apparatus near Steephill Castle circa. 1880-1915

Activity 3

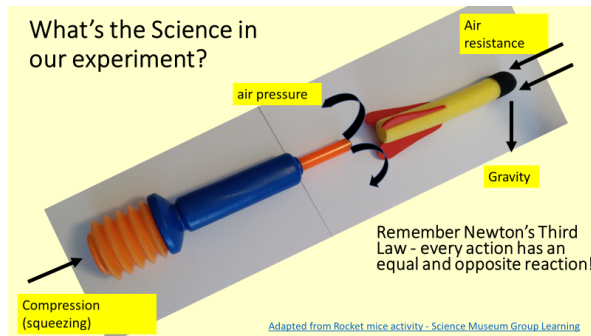
- Explain that we are going to investigate the science behind life-saving rockets. Show **slide 26**. The key points are:
Reaction - The reaction is the movement of the rocket in the opposite direction (thrust)
Action - When the gunpowder ignites, hot gases expand and pushes the rocket downwards
For a rocket to shoot off from the tripod and reach the ship the action, or thrust, from the rocket being ignited must be greater than the mass of the rocket.

Slide 27 Newton's Third Law: Every action has an equal and opposite reaction.

- Ask students to make their own rocket mouse in pairs
<https://learning.sciencemuseumgroup.org.uk/resources/rocket-mice/>
<https://learning.sciencemuseumgroup.org.uk/wp-content/uploads/2019/02/SMG-Learning-Activities-Rocket-Mice.pdf>
- Put the students into pairs and ask them to stand behind a line. Explain that they will be taking it in turns to aim their rocket at the cut out of the Irex 2m away.

Slide 28

- The key facts to gain from the experiment are shown in the diagram on slide 28.



Slide 29

- Rockets were still being used in the 1980s to rescue people on the Isle of Wight.
- They then fell out of use. What do you think replaced them?

Slide 30

- Who to call for help in an emergency? Explain that if you find yourself in an emergency situation or spot someone else in trouble, you should call 999 or 112 and ask for the coastguard.
- If you are inland and see someone in difficulty on the water, be it on a river or a lake, you should ask for Fire and Rescue when you call for help.

<p>Plenary 10 -20 mins</p>	<p>Activity 4</p> <ul style="list-style-type: none"> ● Re-cap by asking the class to discuss in pairs how Wight inventors use rockets to save lives at sea? Share answers as a whole class. ● Have students learnt any new facts today? ● Have they got any further questions they would like to ask?
<p>Session Evaluation</p>	<p>Verbal discussion with group leader about what worked well what could be improved and / or formal evaluation sent via email. "Post-it" note comments from teams about 'three things learnt today'</p>
<p>Suggested Post Visit Activities</p>	<p>Follow on activities:</p> <ul style="list-style-type: none"> ● Create a commemorative plaque or memorial for the wreck of the Irex.

	<ul style="list-style-type: none"> ● Find out more about one of the inventors from the workshop. Turn this into a PowerPoint or fact-file. ● Write a diary entry from the point of view of one of the survivors of the Irex shipwreck. ● Show the Irex’s maiden voyage on a map. ● Re-create the story of the Irex as a cartoon, animation, short film or play. ● Design a modern life-saving device. Label your invention and present your ide to a class. ● Learn more about how to keep safe at sea. RNL water safety education resource: Making Safe Choices activity https://rnl.org/youth-education/education-resources/upper-primary/water-activity-quiz ● Research how people are saved from shipwrecks today. ● Find out about other ships wrecked around the isle of Wight. HMS can be used as a starting point HMS-Pomone The Needles Wreck Discovered IW Heritage Service, HMS Pomone The ship and her sinking- IW Heritage Service ● Complete the Underwater Exploration Activity IW Heritage Service ● Investigate how rockets capable of launching satellites into space were developed on the Isle of Wight. https://wightaviationmuseum.org.uk/black-arrow-history/ UK Space Rocket Project - The Black Arrow BBC One Show - The Rocket Men ● Research how people are saved from shipwrecks today. ● Make your own rocket: https://learning.sciencemuseumgroup.org.uk/resources/rocket-mice/ https://learning.sciencemuseumgroup.org.uk/wp-content/uploads/2019/02/SMG-Learning-Activities-Rocket-Mice.pdf
Suggested Teacher Resources	<ul style="list-style-type: none"> ● irex_wrecked_at_the_needles.pdf (vectisarchaeology.org.uk) ● Wreck of the Sailing Ship “Irex” (annbarrett.co.uk) ● The Wreck of the Irex and its Ghosts - YouTube ● Edward Mourier Boxer 1822-1898 - Isle of Wight Hidden Heroes (iwhiddenheroes.org.uk) ● Jim Roberts on Saving Lives at Sea – Memories of the Sea ● David Butler on Saving Lives at Sea – Memories of the Sea ● Saving Lives at Sea – Memories of the Sea ● How To Call For Help At Sea (rnl.org) ● RNL water safety education resource: Making Safe Choices activity ● rocket_mice.pdf (stem.org.uk) ● https://iwhiddenheroes.org.uk/john-dennett-1780-1852/ ● https://wightaviationmuseum.org.uk/black-arrow-history/

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| | <ul style="list-style-type: none">● UK Space Rocket Project - The Black Arrow BBC One Show - The Rocket Men● Explore fascinating Island shipwrecks (iow.gov.uk)● Underwater Exploration Activity IW Heritage Service● HMS-Pomone The Needles Wreck Discovered IW Heritage Service● HMS Pomone The ship and her sinking- IW Heritage Service |
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