



Little Lighthouse



**An exciting first level interdisciplinary
project for Little Engineers,
using lighthouses as a
context for learning**

Introduction

This exciting new resource offers Little Engineers the opportunity to explore various science and technology concepts, using the context of lighthouses. Through a range of practical activities, the project is designed to enthuse and inspire young people about STEM subjects and related careers.

The Teacher Notes provide an introduction to the project including an overview of the activities, and guidance on where the project could support you to deliver experiences and outcomes across several curricular areas in the first level. Little Lighthouse Log sheets can be used to record results of experiments and investigations.

Should you require any support when planning or delivering the project, please don't hesitate to get in touch with the Young Engineers and Science Clubs Scotland team: yesc@scdi.org.uk

Ode to the Little Lighthouse

Lighthouses are a wonderful sight
Lighting the sky for sailors at night
Try to find out if you can
If there is one at Ardnamurchan!
Or choose a lighthouse round our coast
And see who can find out most -
Like how high it is or what's its name?
Are lighthouses nearly all the same?
Does the light shine all through the night
Or does it flash and what colour is the light?

Can you come up with your own design
And build a model which will look fine?
We've explained about each part
So that should help you make a start
When it is really dark at night
Ships will need to see the light
We want yours to light up too -
there's instructions showing what to do.
Building circuits can be fun -
You'll need to put a switch in one
It might surprise you to know
You can make one with play doh!

If the beam is to be intense
You have to use a special Lens
And lighthouse keepers often gather
Information on the weather.
Maybe you could try that too
And see if your forecasts come true!

A foghorn is a sound device
To use when the weather isn't nice
Especially when fog is dense
Making the sailors really tense
If the lighthouse beam does not appear
They'll need a signal they can hear.
You'll need to make your buzzer sound
To stop the ships from running aground!

A lighthouse keeper will most certainly
See wildlife on both land and sea
If animals can't find enough for dinner
They will keep on getting thinner...
A food chain shows us what eats what -
Which are the chasers and which get caught!

Our project looks at little bugs too –
The ones you code to make them do
Little games that you can play
So that you won't get bored all day
Waiting for night time to fall
Which is like a wake-up call
Telling you it is time for the light
To go on and shine so bright
Helping the passing sailors to know
Where it's safe for them to go.

Activity summary

Section 1 – Shedding light	The activities in this section introduce the context of lighthouses; particularly the Scottish connections with the Stevenson engineers.
Section 2 – High height	This section focusses on designing then constructing a model lighthouse, considering its position and the materials. Teachers are encouraged to use materials available in the school and to reuse and recycle where possible.
Section 3 – Lighting Up	The activities here introduce electricity and light, allowing pupils to make a basic circuit to light a bulb, which can be added to their model. Extension activities look at focussing light through a lens and adding a motor to rotate the lens around the light.
Section 4 – Sunlight	This section looks at recording weather, explaining why a lighthouse is needed when visibility is poor.
Section 5 – Sound waves	From the previous activities, pupils will have identified that poor weather such as fog can obscure the light and therefore sound is required to warn passing ships of danger. Activities introduce sound and vibrations.
Section 6 – Light bites	Imagining a lighthouse on a remote island, pupils will look at food chains and how the animals and plants could survive. Then consider how the Lighthouse Keeper could supplement their food supplies by growing their own food, with activities to grow plants.
Section 7 – Light delights	Activities in this section introduce various Technology concepts by thinking about how the Lighthouse Keeper would communicate with the mainland, and what the Lighthouse Keeper would do in their spare time on the island. Digital activities using Scratch and CodeBugs challenge pupils to create their own games.
Section 8 – Lighting the future	Finally the project introduces the automation of lighthouses in the UK and considers future technology.

Curriculum for Excellence and First Level Outcomes

Little Lighthouse is an interdisciplinary project using lighthouses as a context to introduce several STEM concepts while supporting young people to develop valuable skills for learning, life and work.

Little Lighthouse has been designed for learners in the first level, however many of the activities can be adapted for early or second level too. The activities and experiments support the following first level Outcomes in a range of curriculum areas including Technologies, Sciences, Social Studies, Literacy and English, with ample opportunity to embed numeracy throughout.

The activities and experiments can be delivered within an extra-curricular club, or within the curriculum, to suit the school. The activity summary on page 6 will give you an overview of what's included in the resource to help you plan for your club or class. The activities are laid out in a logical order for you to follow over several weeks throughout a term, or you may prefer to pick and choose activities to link with other topics or themes, or to celebrate the Year of History, Heritage & Archaeology 2017!

We'd be delighted to hear from you with examples of how you've delivered the project.

Section 1 – Shedding light	<p>Social studies – People, past events and societies SOC 1-02a SOC 1-06a</p> <p>Numeracy MNU 1-01a</p> <p>Literacy outcomes</p>
Section 2 – High height	<p>Technology – Craft, design, engineering and graphics contexts for developing technological skills and knowledge TCH 0-12a TCH 1-12a TCH 1-13a TCH 0-14a TCH 1-14a</p> <p>Numeracy links – shape, position and movement</p>
Section 3 – Lighting Up	<p>Sciences – Forces, electricity and waves SCN 0-09a SCN 1-09a</p>
Section 4 – Sunlight	<p>Science – Planet Earth SCN 0-05a / SCN 1-05a</p> <p>Social studies – People, past events and societies SOC 1-12a</p>

Section 5 – Sound waves	Sciences – Forces, electricity and waves SCN 0-11a SCN 1-11a
Section 6 – Light bites	Sciences – Planet Earth SCN 0-01a SCN 1-02a SCN 0-03a SCN 1-03a Health and Wellbeing – Food and textiles context for developing technological skills and knowledge HWB 0-30a HWB 1-30b HWB 0-35a HWB 1-35a
Section 7 – Light delights	Technologies – Computing science contexts for developing technological skills and knowledge TCH 0-09a / TCH 1-09a Technology – Craft, design, engineering and graphics contexts for developing technological skills and knowledge TCH 0-12a TCH 1-12a TCH 0-15a TCH 1-15a Science – Planet Earth SCN 0-06a SCN 1-06a Science – Forces, Electricity and waves SCN 0-07a SCN 1-07a SCN 1-08a
Section 8 – Lighting the future	Technologies – Technological developments in society TECH 0-01a TECH 1-01a TECH 1-01b

Kit Contents

This project encourages young people to recycle and reuse materials to develop an awareness of a [circular economy](#). Resources included in the kit are listed below with part numbers for our suppliers. A 'Materials' section at the start of each activity explains what you need.

Item	Quantity	Supplier
USB slap band containing Teacher's Notes	1	YESC
Map of Scottish Lighthouses	1	Northern Lighthouse Board
Serving the Mariner leaflet	1	Northern Lighthouse Board
Casting Light on the NLB leaflet	1	Northern Lighthouse Board
Battery holder (2xAA with switch)	10	Rapid electronics: 18-2906
Battery (AA)	24	Rapid electronics: 18-2107
Play Doh	2 tubs	Argos
Lead with croc clips	30	SciChem: ELA130011
Bulb holder	10	SciChem: ELA060030
Bulb	25	SciChem: ELA010011
LEDs green	10	SciChem: ELA515020
LEDs red	10	SciChem: ELA515010
LEDs yellow	10	SciChem: ELA515030
LED – flashing red	10	SciChem: ELA525010
LED – flashing green	10	SciChem: ELA525020
LED – flashing yellow	10	SciChem: ELA525030
Motor	10	SciChem: ELA260010
Torch	4	SciChem: TOR060020
Fresnel lens	5	Mindsets : PAC FRES
Buzzer	10	SciChem: ELA090010
Switch	10	SciChem: ELA325010
Code bug	2	CodeBug
Battery (Button cells CR2032 lithium)	5	SciChem: BAT050051



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