

# STEM Nation Award

## Evidence

### Applicant details

- Bowmore Primary School
- Argyll and Bute
- SEED number 8130922
- Rachael MacCaskill
- 29.11.19

### Setting profile

A state school for boys and girls aged from 3 to 12.

It hosts a Gaelic Medium Unit and a pre-school unit for both mainstream and Gaelic pupils alongside the mainstream school.

Pupils: 69



# Leadership in STEM



Staff participated in hand on science activities and were provided with the resources required to implement these activities in class.

*“Very practical ideas which were well explained and easy to transfer into the class.”*

*“Really enjoyed training- looking forward to trying different learning approach in class”*

A member of Bowmore’s teaching staff has been trained as a SSERC mentor. The Islay SSERC Mentors were trained in 2017 and have since ran a number of CPD sessions for all schools within the cluster. They have secured funding over the years and handed out resources to support each CPD session.

2017-2018

The Mentors ran CPD sessions for first and second level teachers. These sessions included hydraulics, forces, sound, light and forensics.

2018-2019

The Mentors focused primarily on early level, holding sessions on creating an enquiries classroom, science through stories and sound.

Scan the QR code for access to the full SSERC mentor report.



We have a trained SSERC mentor within our school who support teachers with all aspects of science.



## SSERC Presentations

The SSERC mentors presented their work at the SSERC conference to share their achievements in raising staff confidence in teaching STEM. They also led an Engineering at Early level training session at an Argyll and Bute SSERC training.



# Leadership in STEM

## School Improvement Plan

STEM is fully integrated into our school improvement plan.



**OCTF - KEY OBJECTIVE 1 - Raise Educational Attainment and Achievement for all**

**NIP Priority:** Closing the attainment gap between the most and least disadvantaged children. **Quality Indicator:** HGDS 3.2

**Achieve STEM Quality Mark – Continue the collegiate approach to STEM across the Islay and Jura Cluster, within individual schools and continue partnerships with businesses and parents.**

Maggie Harrison (PEPS) and Rachel MacCaskill (BPS) worked together to develop a series of STEM Homelink bags for all the cluster schools. A total of 71 bags were put together from Early to Second level, trying to cover all curriculum organisers. (See Phase 1 Bags in both S&Q Reports)

Presented Homelink bags at CPD event for staff. Feedback from staff was all positive. We have a baseline and will measure impact over next year.- See Baseline data in S&Q.

Science Day organised and held for parents during National Science and Engineering Week. Launch of STEM Homelink bags. Positive response to the Open afternoon and the STEM Homelink Bags. [See screenshot of feedback in S&Q]

Bowmore has participated in the Primary Science Education Conference, Edinburgh in June 2019. Presenting learning on marine plastics. This project incorporated topical science, maths and technologies (STEM) and was used to moderate learning in these subject areas in PEPS and BPS.

**OCTF - KOD - Strengthen Leadership at all levels**

**MP Priority:** Improvement in accessibility with an increased quality school-leaver destinations for all. **Quality Indicator:** 3.3 implementing improvement and change across schools.

**Action 1 – Develop the Islay and Jura Digital Strategy**

Primary schools across the cluster have identified that there are deficiencies in staff digital skills across the cluster. Most staff indicated they were between 1 and 3 on a 5 point confidence scale in the following areas:

- Integrating digital technology into the curriculum (64%)
- Teaching digital literacy (77%)
- Teaching computer science outcomes (84%) and
- Internet safety (95%)

After identification of this need, an Oak had delivered a series of digital CPD highlights this written for primary staff who are now more confident in several areas. All said they would like to continue with the training, but that modelling and team teaching would be a more effective methodology. There has currently been no training aimed at early years staff. Across the five primaries there are totally different levels of skills among practitioners and professional support really needs to be tailored; these differences in levels of capability and confidence among practitioners are reflected in the levels of confidence and expertise seen in students going to High School from the different primaries at transition.

**Specific Focused Targets are:**

- TIME WITH PT TEACHERS TO TEACH TEAMS
- APPLICATION FOR DIGITAL XTRA FUNDING
- RUN AN IFLR SCHOOL CLUB
- ORGANISE TRIP
- ORGANISE DIGITAL TRANSITION DAY (TO INCLUDE INTERNET SAFETY?)
- PT PUPILS RECORD OVER YEAR IN THEIR PROFILE ON TEAMS
- CREATE DIGITAL PASSPORT
- TO IMPLEMENT THE USE OF SEESAW FOR PUPIL PROFILING ACROSS BPS/PEPS

Curricular Area	Year to View 2019-2020			
	Term 1	Term 2	Term 3	Term 4
IDL	Ceeflest	Nativity	Space	Robotics
Skills	Successful learner	Effective Contributor	Responsible Citizen	Confident Individual
Social Studies	Ceeflest	Weather Linked in with time in maths		Our Local Shops + services (link with future me)
Science	I am unique Inheritance	Science through Enquiry	Space	Science through Stories
Health	I am unique Valuing myself and others	EMOTION WORKS	Internet Safety PATHS	Future Me
Enterprise		Build your own puppet theatre		Spring Fair
PE	Balance + Control Movement	Dance	Astronaut Training	Stamina, determination and sportsmanship
Technology	Gaeffest Seesaw	Puppets Forces	Internet Safety	Programming and Computational thinking

### Planning for STEM throughout the year

All teachers plan for a breadth of STEM learning experiences throughout the year.

### Increasing STEM Resources



We are committed to increasing the number of resources available to support teaching STEM.

### Increasing Technology Equipment

Increasing the number of ipads available in the school has been a school priority. Our parent council agreed to purchase additional ipads for our school, they fully support our digital agenda.





# Leadership in STEM

## Numeracy

ELC staff attended training to supported them in using Stages of Early Arithmetical Learning (SEAL) in the ELC setting. This resource was implemented in Early and First level to ensure the children had the best start in securing a strong understanding of number.

- The ELC staff held a twilight to support colleagues in using this resources in an ELC setting.
- The Primary 1 teachers attended numerous training session on SEAL and supported ELC staff in the implementation of this resource.

## Science

Two members of our ELC staff attended SSERC training and returned enthusiastic to share their ideas with schools within our cluster. They lead a science enquiry twilight session, delivering a range of workshops for all ELC staff and P1 teachers.





# Leadership in STEM

## Digital Action Plan

In Bowmore Primary School, we are currently working to achieve a Digital School Award. We evaluated our progress using the Digital Schools audit and we have created an action plan that clearly states our next steps.

## School Leadership

Within the school there is a digital mentor who's role is to support staff development with digital skills and digital literacy.

Each member of staff has evaluated their use of digital technology and has created a target. The digital mentor will support them with this target through cpd and team teaching opportunities.

## Cluster Leadership

Our digital mentor supports the development of digital skills within our cluster, with a focus on early and first level. The main focus is to increase staff confidence and to support staff in exploring digital technology and it's uses across the curriculum. The mentor's role is to introduce a variety of digital technology to staff and to demonstrate how this can be used in different settings.





# Leadership in STEM

## Plastic Warriors

After conducting a number of beach cleans and recording their findings, it was clear that plastic pollution on Islay was a problem.

The children in P1-4 discouraged the use of single use plastic in our school, they encouraged all staff and pupils to use re-useable water bottles. They also planned their 'Keep Islay Beautiful' campaign. The children marched through the village spreading the word on plastic pollution and sold re-useable bags that they had designed themselves.

The P5-7 collated the data collected from our each cleans and presented it in a clear way. This was shared with parents and carers to spread the concern about plastic pollution.

Finally, three children attended the Primary Science Teaching Training Conference in Edinburgh where they presented their findings to teachers, MSPs and science leaders.



## Change Makers

Through our Change Makers groups, the children lead different areas of development throughout the school. These include the Eco Group who are responsible for ensuring our school is as eco-friendly as possible. We also have a Digital group

## Leading Change in the Community

Following our plastics topic, a group of children independently designed and displayed posters to inform people about global warming and plastic pollution.





# STEM family learning

## Family and community: Science Homelink Bags



**Bowmore Primary** @BowmorePrimary · 14 Jun 2018

Islay's STEM mentors are preparing STEM homelink bags to promote science enquiry & scientific discussions at home. Applying & developing problem solving & observational skills in addition to promoting talking & listening at home will be fun! @SSERCprimary @ilovemull @Huntspool



Any Other Comments?

Iain was so excited and loved investigating what was magnetic and what wasn't! We really enjoyed the activity!

Science can be a daunting subject for some people and we wanted to support parents in taking part in science at home. The SSERC mentors in our cluster created science homelink bags to encourage science to be explored at home. These bags were designed to support the development of skills within science and numeracy through fun, engaging activities.

OCTF – KEY OBJECTIVE 1 - Raise Educational Attainment and Achievement for all

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Quality Indicator: HGQS 3.2

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### STEM Homelink Bags Questionnaire

Please complete this with your child after you have completed the STEM homework activity.

Did you enjoy this Science homework activity?

Draw, write or add a photo to the box below to show what you did.

1. Poured the oil into an empty bottle.  
2. What happened? The oil is on top of water & oil has bubbles.  
3. Put blue food coloring in. Gave through oil ~~and~~ <sup>and</sup> went straight through to the bottom.  
4. Put Velcro in. Sunk to bottom. Fizzed and made lots of blue balls ~~some~~ <sup>some</sup> at the top of oil. Some balls sunk to top of water.

Any Other Comments? It was really fun watching what happened when you did something. I wasn't expecting it to fizz up and produce lots of little balls that kept on coming from the water.

Parents commented on how much fun the science bags were and how easy it was to support science at home.



# STEM family learning

## Family and community: Maths and Numeracy Homelink Bags



Results of numeracy questionnaire

Parents shared the successes that they have experienced using the maths bags.

Parents have commented on how engaging the bags have been and they have enjoyed interacting with their children at home, using the resource. Above is a video made by a parent in Sgoil-Araich of their child using the bags at along with an older sibling.



The bags contains fun, active resources to support a particular areas of maths. They contain a support card for parents that highlights a wide range of activities that can be played at home. They also list the appropriate mathematical vocabulary to further support parents, in both English and Gaelic.





# STEM family learning

## Family and community: STEM Mornings



### Cook Along Mornings

Last year, we planned for a whole school food technology topic. Through local funding, we purchased portable ovens and cooking equipment. Parents joined our cook along mornings where the children demonstrated how to make their chosen recipes.



### Maths Mornings

Parents are invited to join us for maths open mornings. They join the class in participating in active, numeracy activities.

This is a good opportunity for parents to engage in numeracy activities with their children and for them to gain an understanding of their children's progress within numeracy.



# STEM family learning

## Family and community: Seesaw and Twitter

Seesaw is used throughout the school to empower children to create, reflect and share their learning. Children upload videos, photos, drawings and texts to showcase their learning with parents and carers. Our data has shown us that parents are increasingly engaging with this online PLP.

All Time Stats for Your School

1216

Total Posts

586

Total Comments

1694

Total Likes

1883

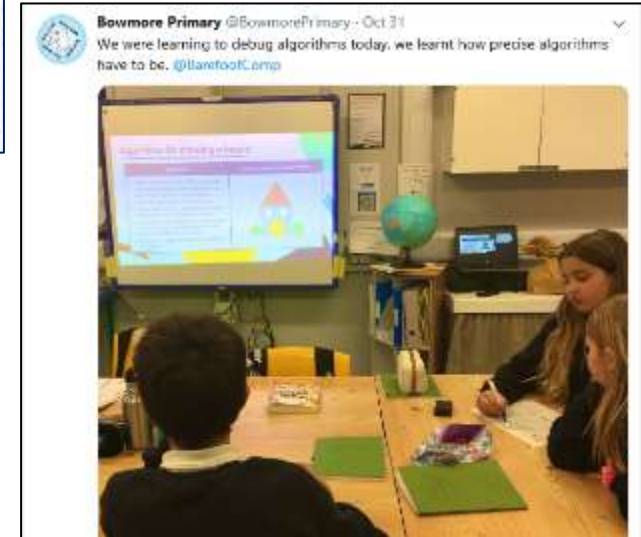
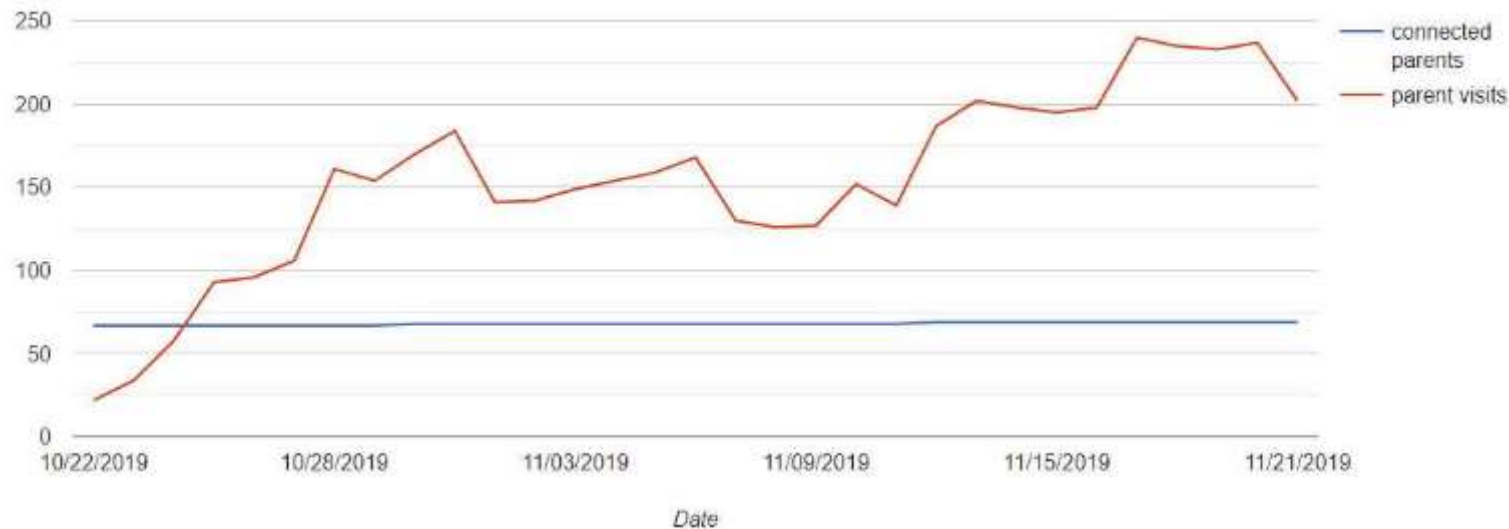
Total Parent Visits

Start Date: 10/22/2019

End Date: 11/21/2019

Download

### Weekly parent engagement



Staff in Bowmore Primary use [twitter](#) to showcase learning, share achievements and keep up to date with current educational resources.



# Employability and STEM partnership working

## Archaeology



### Dunyvaig

For the past few years we have worked alongside **Islay Heritage and Reading University** on an archaeology topic. The children applied their numeracy skills to draw scale drawings and conduct surveys at the Dunyvaig Archaeological site.



**Bowmore Primary** @BowmorePrimary · Mar 22, 2017  
BPS archaeologists enjoyed working with @islayheritage to conduct a Geophysical survey in our local area. What an experience!



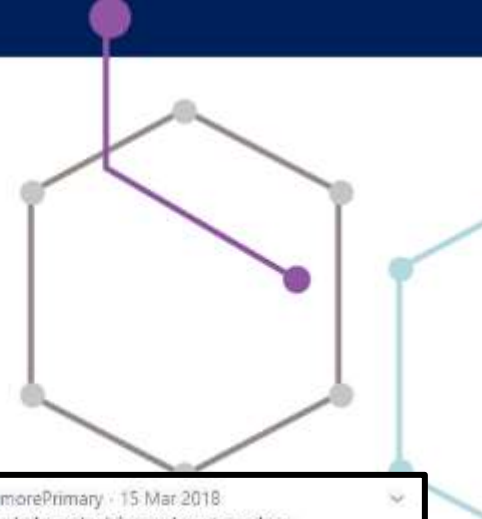
4 9 20

### Giant's Grave

The children worked with Islay Heritage and Reading University and were introduced to the technology required to conduct a full archaeological dig. They used geo-physics and technology to create an image of the site with the archaeologists.



# Employability and STEM partnership working



## Islay High School



### P7 Transiion

Primary 7 pupils visit the science department as part of their transition experience. They are introduced to staff and engage in fun, science experiments.

### Maths Transition

As part of the transition process, staff from the mathematical department visit our school to observe maths learning. This supports a smooth transition as staff discuss maths progression from second to third level.

## Endeavour

Islay High School staff have supported the children's endeavour projects. The children develop the skills for learning, life and work through an independent study, these are often STEM based. Islay High School staff have shared their expertise to support our pupils.



## Professional Development

Islay High School science staff have attended and contributed to science twilights which aim to increase staff confidence in teaching science skills.



# Employability and STEM partnership working



## Gartbreck Recycling Plant

They continually support us as we learn how to recycle and live more sustainably.



## RSPB

Visits to and from the RSPB support us as we learn about our environments and the wildlife within it.



## Islay Natural History Trust

We worked with INHT to plan and deliver cluster wide topic on pollination. They visited the school to share expertise and to deliver high quality learning experiences focused on science.



## Re-jig

Re-jig help us carry out beach cleans and be more eco-friendly.





# Employability and STEM partnership working



## Islay Community Gardens

Visits to our local gardens support us as we learn about planting and growing. We have applied this knowledge when developing our own grounds.



## Islay Energy Trust

As we learn about renewable energy, the Islay Energy Trust supported us by visiting the school and allowing us access to our local wind turbine.



## Argyll College

They supported us with a chocolate engineering topic. The children visited the college to take part in fun engineering activities.



## Local Businesses

We have been visited by local businesses to learn about the skills required to run a business. Discussing finances and spreadsheets was an important feature of this discussion.



# Employability and STEM partnership working

## Generation Science and AFRIS



## Blue Planet

As a rural school, it is important that our children are exposed to STEM through outdoor agencies. This widens their knowledge of STEM in the working world and also supports enthusiasm for STEM.

## Outside Agencies

### SSERC

In addition to training a member of our staff as a SSERC mentor, SSERC remains a constant support for our teachers. The website is used for activity ideas and the members of the team have advised and supported us with purchasing science equipment.



## STEM Visits

We incorporate STEM into our annual Primary 6/7 trip. The children have visited Stirling University and Dundee Science Centre. It is important that the children have the opportunity to learn about careers in STEM, especially since we do not have these jobs on our doorstep..



# STEM curriculum and learner pathways IDL



**PLASTICS**

**THE PROBLEM**

**RESEARCH**

**BEACH CLEANS**

**SURVEYS**

**SCIENTIFIC RESEARCH**

**GRAPHS**

**DIGITAL LITERACY**

**Plastics:** research, beach cleans, surveys, scientific research, graphs, digital literacy

**GAME DESIGN**

**CONDUCTED SURVEYS AND ANALYSED AUDIENCES NEEDS/WANTS**

**APPLIED COMPUTATIONAL SKILLS TO CREATE DIGITAL GAMES**

**Game Design:** Conducted surveys and analysed audiences needs/wants, applied computational skills to create digital games



Digital Literacy is taught across many curricular areas. P1 used Book Creator to spread the word on plastic pollution.

P7 created a genially about plastic pollution, applying science and digital knowledge and skills.

**STEM is frequently taught through Interdisciplinary learning.**

**BIODIVERSITY**

**HABITATS**

**LIFE CYCLES**

**CARING FOR THE ENVIRONMENT**

**POLLINATION**

**Biodiversity:** Habitats, life cycles, caring for the environment, pollination

**THE HUMAN BODY**

**INVESTIGATING BODY SYSTEMS**

**IDENTIFYING HEALTHY LIFE CHOICES**

**The Human Body:** investigating body systems and identifying healthy life choices

**STUDENT REFLECTIONS**

I can explore digital technologies and use what I learn to solve problems and SPAG ideas and thoughts. TCH 0-11a

I can collect ideas and ask questions to gather information, organising and displaying my findings in different ways. WHF 0-10a

As I listen and talk in different situations, I am learning to take turns and am developing my awareness of when to talk and when to listen. LIT 0-02a / ENG 0-02a

I enjoy exploring events and characters in stories and other texts and I use what I learn to invent my own, sharing these with others in imaginative ways. LIT 0-03b / LIT 0-01a

**What I have done...**

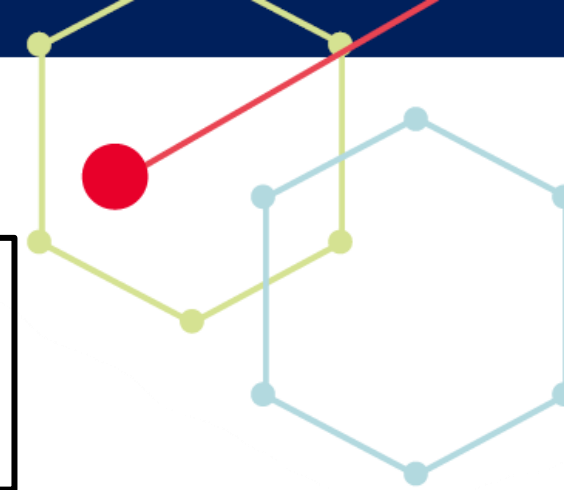
I think	I am learning to investigate current scientific news.	My teacher thinks
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	I am learning to use digital technology to spread a message to my community.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	I am learning to gather information.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	I am learning to talk and listen to others when working in a group.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	I am learning to invent a poster to tell people what I think.	<input checked="" type="checkbox"/>

The children evaluate their learning within STEM.





# STEM curriculum and learner pathways



	Year One	Year Two	Year Three	Year Four	Year Five	Year Six	Year Seven	Year Eight	Year Nine	Year Ten	
Early	Living & Non-Living SCN 0-02a	What makes things go? SCN 0-03a	Shedding Plants SCN 0-04a	What does a plant need to grow? SCN 0-05a	Food Chains SCN 0-06a	Energy SCN 0-07a	Force & Magnetism SCN 0-08a	Electricity SCN 0-09a	Light SCN 0-10a	Sound SCN 0-11a	Science in my world SCN 0-20a
First											Science in the News SCN 0-20

STEM is fully embedded into our discrete planning, we use a rolling programme to ensure breadth of learning across the year.



Outdoor Maths



Digital Skills



Potions

Engineering

Downgrove Primary School		
Class: C1-3	TITLE: Electricity in our lives/Electrical circuits	Term: 2
<b>CURRICULAR AREAS:</b> Science <b>BUNDLE OF EXPERIENCES AND OUTCOMES</b> I know how to stay safe when using electricity. I have helped to make a display to show the importance of electricity in our daily lives. <b>SCN 0-09a</b> I can describe an electrical circuit as a continuous loop of conducting materials. I can combine simple components in a series circuit to make a game of marbles. <b>SCN 1-09a</b>		
<b>LEARNING INTENTIONS</b> <b>EARLY</b> We are learning the importance of electricity and how to protect ourselves. <b>FIRST</b> We are learning to create electrical circuits using different resources.		
<b>SUCCESS CRITERIA</b> (formulated with children, work in progress) <b>EARLY</b> I MUST sort objects depending on their source of electricity (mains, batteries etc.) I SHOULD identify risks and describe how to keep myself safe. <b>FIRST</b> I MUST describe a simple electrical circuit and explain how it works. I SHOULD combine simple components to create an electrical circuit. I COULD explain what a conducting material is.		
<b>PLANNED TEACHING AND LEARNING EXPERIENCES</b> <b>EARLY/FIRST</b> <b>Early</b> Sort objects which require electricity. Different types of electricity – mains, batteries, solar etc. What do we need electricity? What would our lives be like without electricity? How can electricity harm us? – low current, high voltage, safety.		
<b>HINGE/ KEY QUESTIONS</b> <b>BENCHMARKS:</b> <b>EARLY</b> • Group objects into those which get electricity either from mains electrical sockets or alternative sources, such as batteries and solar cells. • Talk about		

Problem solving in maths often involved using technology.

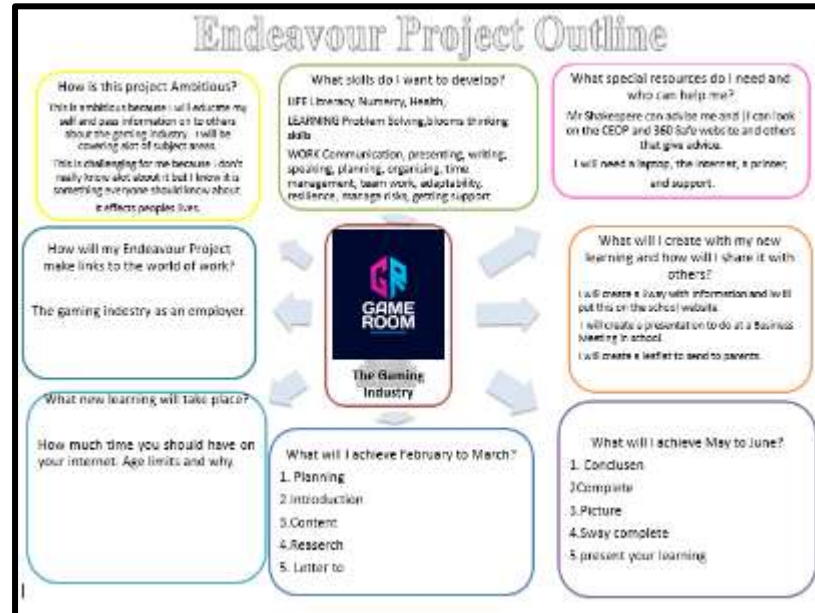
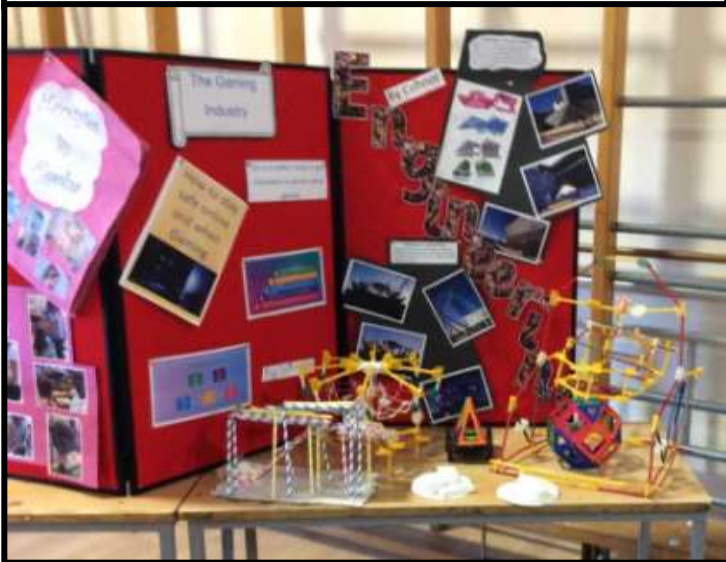




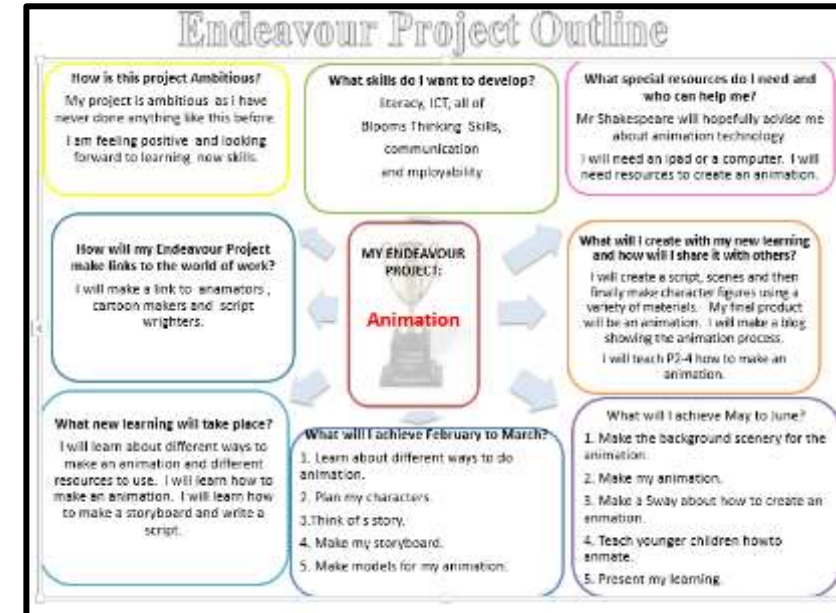
# STEM curriculum and learner pathways

Endeavour projects promote independent learning and provide an exciting context for the children to develop the skills for life, learning and work. STEM is a topic that many children select as their endeavour project.

Engineering was a topic chosen by a P7 pupil. They used GLOW to create a [SWAY](#) to share their learning.



The Gaming Industry



Animation



# STEM curriculum and learner pathways



## ICT Changemakers E-safety Assembly!

Posted on March 4, 2017 by gw16shakespearebenja@glow

As part of their Changemakers work, the ICT group recently held their own E-safety assembly. Inspired by Safer Internet Day, the children talked about how to be safe online, and what to do if they received messages they didn't like. The 'Don't Delete, reply or Meet - Report it!' message was made clear to the rest of the school.

Each pupil in Bowmore is part of a Change Maker group, these groups focus on developing certain areas of our school.



## Digital

Our digital leaders highlighted the importance of internet safety by holding an informative assembly. They are also responsible for the house keeping of our laptops and ipads.

The groups create an action plan to record their main focus for the term.

## Eco Leaders

Our eco group has the responsibility of supporting many eco-friendly initiatives throughout the school. We have earned 5 eco flags and we are currently working on our 6<sup>th</sup>.



# STEM curriculum and learner pathways

Moderation has fully supported the development of STEM within our school. At the beginning of our journey, staff commented that they had little confidence in teaching STEM. We have moderated numerous STEM topics including Space, Game design, plastics, archaeology, food technology and mental agility in maths. All teachers work together to create a progression of learning to ensure challenge at each stage and we support each other when planning for STEM activities.



**Plastic Pollution**

**AIMS:** Understand the impact of plastic pollution on the environment and human health. Investigate the different types of plastic and their uses. Explore the different ways plastic is recycled and the challenges involved.

**KEY CONCEPTS:** Plastic pollution, recycling, environmental impact, human health, plastic waste management.

**ASSESSMENT:** ...

LEVELS	EARLY	FIRST	SECOND
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a

**Food Technology Progression**

**PLASTICS**

**AIMS:** Understand the different types of plastic and their uses. Investigate the environmental impact of plastic pollution. Explore the different ways plastic is recycled and the challenges involved.

**KEY CONCEPTS:** Plastic pollution, recycling, environmental impact, human health, plastic waste management.

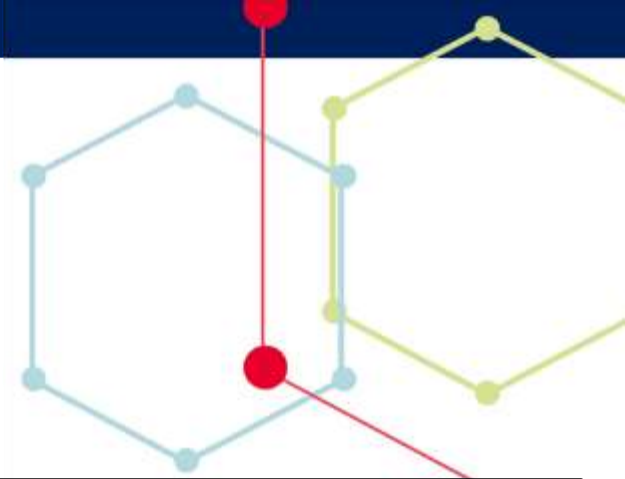
**ASSESSMENT:** ...

LEVELS	EARLY	FIRST	SECOND
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a
Experiences and outcomes	TC1 1-20a	TC1 1-20a	TC1 1-20a

**Plastics Technology Progression**



# Equity and equality in STEM

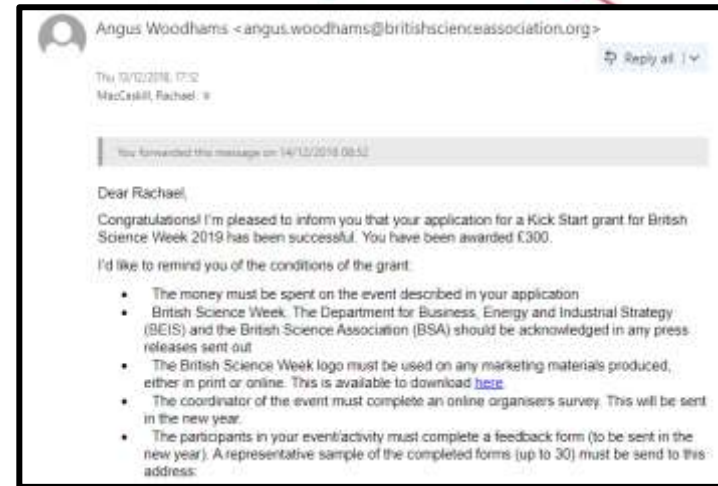


Item	Appn No	Category/Number	QTY	Unit Price	Total Price
1.0000	2019/01	1.0000	1.00	1.00	1.00
2.0000	2019/01	2.0000	2.00	2.00	4.00
3.0000	2019/01	3.0000	3.00	3.00	9.00
4.0000	2019/01	4.0000	4.00	4.00	16.00
5.0000	2019/01	5.0000	5.00	5.00	25.00
6.0000	2019/01	6.0000	6.00	6.00	36.00
7.0000	2019/01	7.0000	7.00	7.00	49.00
8.0000	2019/01	8.0000	8.00	8.00	64.00
9.0000	2019/01	9.0000	9.00	9.00	81.00
10.0000	2019/01	10.0000	10.00	10.00	100.00

The Edina Trust supported our plastics and biodiversity topics.



The Argyll and Bute health and wellbeing Fund supported our Food for Thought topic, we were able to equip the school with cooking equipment to support the teaching of food technology.

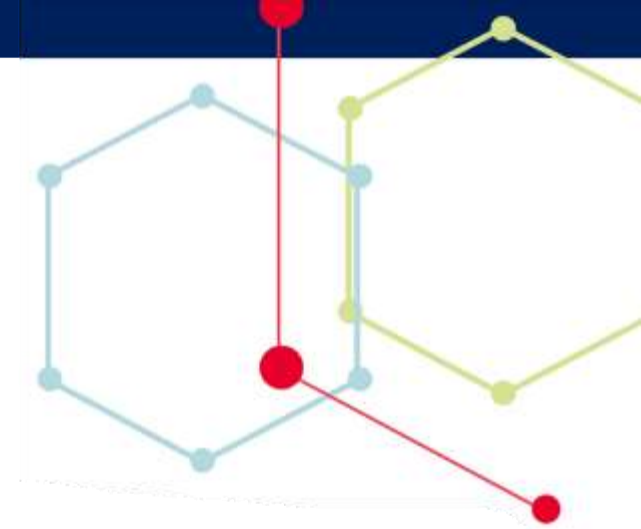


The Kick Start Grant supported our forces topic, this was carried out by our Early Years and Primary 1 class.

Living on a rural island has the risk of limiting our children’s exposure to STEM. We have made full use of the grants available to us to support the teaching of STEM in our school. These grants have supported us in buying science resources for our school.



# Equity and equality in STEM



We strive to make STEM subjects accessible to all of our children.



Technology is used to support many children in literacy tasks, making them accessible to all children.



Children with additional support needs experience a range of STEM activities. The sensory aspect of science is very enjoyable for these children.





# Equity and equality in STEM

## Bilingual Approach



**Robotics**  
Our Gaelic Primary 6/7 class attended a Gaelic robotics transition event in Islay High School.

As we are a bilingual school, it is important to us that STEM subjects are delivered in both Gaelic and English. Each year the Gaelic P6/7 class go on a Gaelic trip, we ensure that STEM is highlighted in this trip through the medium of Gaelic.

We learned about Engineering at the [Titanic Museum](#) on our P7 Gaelic Trip

We apply our maths skills through [Gaelic Orienteering](#).

We gained more science knowledge when visiting [Dynamic Earth](#).

We use Seesaw to share our learning with parents.



STEM topics are carefully selected in the Gaelic early years classroom to support the early development of Gaelic vocabulary.



# Equity and equality in STEM



Every child in our school deserves the best start and we have implemented the use of SEAL to support the development of number work in our Early Years settings.



We provide many engineering and science opportunities through play in our ELC settings.







Education  
Scotland  
Foghlam Alba



**STEM  
Nation**

