Primary School Booklet

SCIENCE WEEK

#scienceweek

7-14 Nov 2021

Supported by Science Foundation Ireland

CREATING OUR FUTURE: SCHOOLS

Classroom Resource Booklet

Discover Primary Science and Maths
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CREATING OUR FUTURE

INTRODUCTION

Creating Our Future is a Government of Ireland campaign to stimulate a national conversation between everyone in Ireland on their ideas on how to make our country better for all. While we might not always think about it, research and innovation affect nearly every part of our lives. The COVID-19 pandemic in particular has shown the importance and value of research and innovation in our lives – medically, socially, politically, and economically. Ideas are the starting point for all research and innovation. Anyone, anywhere can have an idea that inspires research and innovation. It could be based on an opportunity or challenge that someone has identified in their own life, for their community, for Ireland or for the world. Or it could be based on a topic that someone is curious or passionate about. Creating Our Future wants to hear them all – in particular from primary school learners. All ideas will be captured and will help inform the future direction of research and innovation in Ireland.

Science Foundation Ireland is inviting primary schools to get involved in the process of generating ideas. We will be introducing six themes over a period of six weeks and presenting a lesson resource on these themes. Each resource will incorporate some different ideas for introducing the topic in your classroom with trigger questions to aid discussion, a related science investigation or design and make project and some ideas for carrying out your own research on the topic.

The resource is not designed as a complete lesson plan but rather some suggestions to inspire you to create your own lesson on the theme. Teachers can choose to engage with any of the resources or even all six.

For Science Week, we are asking teachers to capture their learners' ideas and submit them to Creating Our Future to ensure that the ideas and voices of primary school students are incorporated into Creating Our Future. Fill out our PowerPoint template during Science Week or in the weeks leading up to Science Week. Each learner will create a slide with their idea for the future of research in Ireland in one sentence, along with any images, drawings or anything extra that they would like to add in. Email this presentation back to creatingourfuture@sfi.ie and present your ideas to another class in your school as part the show and tell step (step 5) of your Discover Primary Science and Maths Award! More information can be found at CreatingOurFuture.ie

This week's theme is Future Schools. Teachers and pupils had to adapt very quickly to new ways of learning and interacting with each other last year. We have all had to quickly get used to new digital technologies and learning platforms. With a return to school came more emphasis on health and wellbeing and on outdoor learning. All of this has forced us to think more about how people learn, where they learn best and what tools can help them. We would like to get learners involved in thinking about these topics.

TRIGGER QUESTIONS FOR DISCUSSION

These questions, or questions that your class come up with, could be used as a basis for class discussion or debate, artwork, creative writing or as an introduction to the suggested design and make activity.

- When do you learn best: In the morning, after lunch, after school in the evening?
- Did you like learning from home of do you prefer to be in school?

How do you learn best: Video Link: Learning Styles:
Discover Your Learning Style - Bing video

TRIGGER QUESTIONS FOR DISCUSSION

Do you like learning outdoors?
Video Link: Outdoor learning Lanark Primary

- What new ways of learning have been introduced in your school since March 2020?
- Do you think schools will be the same in the future or what will they be like?

Would you like to have a robot teacher?
Video link: Robot Schools Finland

- What changes would you like to see in your school that would make you healthier, happier or make it easier for you to learn?

What do you think of this school in New Zealand where there are no rules in the school playground? Video Link: New Zealand School without Rules

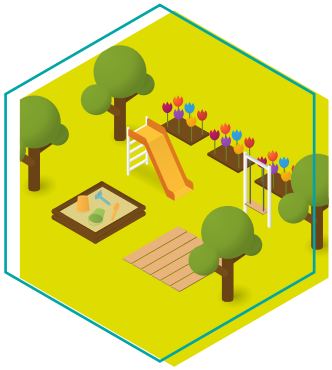
RESEARCH PROJECT IDEAS

Maybe your class would like to come up with their own simple research project using some of the trigger questions for inspiration. They might carry out surveys within their own class or with other classes or design a simple investigation to test the best time of day for learning or the effect of exercise or time outdoors on their ability to learn.

INVESTIGATION

DESIGN AND MAKE ACTIVITY:

DESIGN YOUR SCHOOL GROUNDS FOR WELLBEING



This activity was first introduced as part of the primary school resource for Science Week 2020. It encourages learners to assess their school grounds, think of what changes they would like to introduce and build a model of their ideal future school.

DESIGN YOUR SCHOOL GROUNDS FOR WELLBEING

Investigation or Challenge: Challenge

Duration: Long (>1hr)

Class Level: All

Curriculum Links:

Strand: Environmental Awareness and Care; Living Things; Materials
Strand Unit: Environmental Awareness; Caring for the Environment; Properties and Characteristics of Materials
Curriculum Objectives: Identify positive aspects of natural and built environments through observation, discussion and recording; Examine a number of different ways in which the local environment could be improved or enhanced; Investigate how materials may be used in construction
Skills Development: Explore freely how a range of shapes, objects and other constructions could be made using a variety of materials; Recognise a need to adapt or change an object or surroundings; Work collaboratively to create a design proposal: Communicate and evaluate the design plan using sketches, models and information and communication technologies use small models and/or sketches showing measurements and materials required, list the equipment needed consider the resources available; Evaluate the effectiveness of the new product and suggest modifications to the designing and making task suitability of materials chosen, aesthetic outcomes, the extent to which objects fulfil needs identified earlier

Equipment/Materials:

For Exploring: Base map of the school (Can be sourced online or drawn as a sketch map, pencils, crayons, camera)
For Planning: Pencils and paper or ICT tools
For Making: Choose from a number of options

- **Reused / Recycled materials (materials diverted from recycling or waste bins):** Cereal or other boxes, old magazines, newspapers, foil from biscuit packets, plastic containers and lids, wood offcuts, fabric scraps, lollipop sticks, string
- **Construction toys:** LEGO, K'nex etc.
- **Natural Materials:** Leaves, twigs, stones, bark, grass clippings, soil
- **ICT Equipment and software:** Design using tablets or computers and software such as Minecraft

INVESTIGATION

DESIGN YOUR SCHOOL GROUNDS FOR WELLBEING

Note on sustainability for Design and Make Activities:

- Avoid using single use items such as craft foam, plastic film, disposable plates, cups etc. tinfoil and polystyrene balls or beads for design and make activities. Never use glitter as it is a microplastic which spreads everywhere and is very harmful to the environment.
- Avoid mixing man-made and natural materials as this makes waste separation and especially composting difficult.
- Make use of outdoor resources. Fallen leaves, twigs, pinecones and stones can be used outdoors for lots of design and make projects and returned to their natural environment afterwards. When making items outdoors either make them entirely out of natural objects which can then biodegrade or check on them regularly to ensure there is no breakdown of plastics, flaking of paints etc and resulting environmental damage

Engage

Trigger questions

- What do we need to keep our bodies healthy?
- What do we need to keep our minds healthy?
- What about the long-term health of our planet?
- Are our school grounds designed well for promoting the health of our minds and bodies?

Background Info.

Spending time in the outdoor environment is essential for people's physical and mental wellbeing. Numerous international research projects collated by The Children and Nature Network have documented the benefits of outdoor time and contact with nature. Reported physical benefits include increased vitamin D levels, improved eyesight, improved health and increased physical activity. Reported mental and emotional benefits include reduced, stress, anger and aggression, increased self esteem and increased levels of environmental awareness and care for the environment. Reported academic benefits include increased attention span and engagement, better behaviour in class and improved academic performance.

Learners spend time in the school grounds during break times, but they can also be used for a huge variety of curriculum based outdoor lessons. This challenge encourages learners to think about their own health and wellbeing and about the potential uses of the school grounds to enhance their physical and mental health. It also encourages them to critically evaluate their own designs in terms of what is realistic and what is physically and financially possible.

INVESTIGATION

DESIGN YOUR SCHOOL GROUNDS FOR WELLBEING

Real World Application

The designs and models may be very imaginative and in some cases may include unrealistic elements but learners should be encouraged to evaluate their designs in terms of which elements would be most useful in the school and which could most easily be implemented. The focus on our outdoor spaces for health and wellbeing has wider implications and can lead to discussions and studies on local, national and global outdoor spaces and the need for reducing pollution and waste and protecting biodiversity

Design challenge

Explore

Take a walk around the school grounds and evaluate them.

- What do you like about the outdoor spaces in your school and what would you like to improve?
- What are the outdoor spaces in our school currently used for? – make a list.
- What else could your outdoor spaces be used for? – brainstorm ideas.
- Is your school wildlife friendly? – Think about trees and wildflowers, birds and insects
- Has your school got a vegetable garden to grow healthy food?
- Has your school got space for creative and imaginative outdoor play?
- Is your school designed for outdoor learning?

Plan

What improvements would you like to see in your school grounds?

- As a whole class, set criteria for your design e.g. what elements must be included, what tools and materials can be used, what size should your completed model be?
- Work in groups to design your ideal school, grounds
- Brainstorm ideas
- Draw a sketch or map of your school – you can draw your own map or source a base map online and add to it
- Sketch your ideas on to your map or write them into your plan

DESIGN YOUR SCHOOL GROUNDS FOR WELLBEING

Make

In your groups, make a model of your plan in 3-D.

- Outdoors: You could make your models outdoors in the school grounds using leaves, twigs, stones and other natural items.
- Indoors: You could build your design indoors with LEGO, K'nex or other construction toys or use recycled materials to make it.
- Using Technology: You could use computers or tablets and software such as Minecraft to design your ideal school grounds.

Evaluate

Evaluate your initial design and your completed model

- Were you happy with your initial plan?
- Did the plan change as you developed it?
- Were you happy with the final model?
- Did you encounter any problems and how did you overcome them?
- What was your favourite part of your design and why?
- Which parts of your design were the most realistic?
- Which parts would be possible / easy to implement in your school?
- What barriers would there be – cost, space, work involved, only suitable for small numbers?

Take the Next Step

Adapt for Home: The project could be given as a task to be completed wholly or partially at home. Instead of designing the school grounds, some learners might instead look at designing their own garden, yard or balcony, a local park or the area around their house or apartment block.

Adapt for Junior/Senior level: Junior classes could all work in one medium such as Lego or recycled materials with the teacher outlining the task and setting criteria. For example, as a Lego challenge, each group could be given the same size base board and asked to design a school yard with space for exercise or play, space for nature and space for growing food.

Senior classes could be given more scope to set criteria and choose what materials and tools to work with. They could also be encouraged to plan their design around their own school using scale drawings and models and to critically evaluate their own work and give constructive feedback on other groups' work.

Follow-up challenge/project/citizen science link: As a class, look at all the designs and see which elements it would be possible to implement in your school. Could you take something on as a class project? What improvements might you see as a result?

INVESTIGATION

DESIGN YOUR SCHOOL GROUNDS FOR WELLBEING

Think of creative way to bring some elements of your classwork outdoors – Science, Geography, Art and Creative writing are all very well suited to an outdoor environment as are elements of all other subjects.

Apply what you have learned from this project to evaluate the design of outdoor spaces in the local area. Are they well designed for people, for wildlife and for sustainability? Local county councils often look for submissions from the public on environment and recreation. Contact your local council and give your views.

Evaluate outdoor spaces in Ireland and other countries. Think about places you have been and research other places. Develop case studies on some good National and International examples.

While looking at outdoor spaces in your school, take a look at the plants and animals that are found in your school. Has the amount of biodiversity increased as a result of your actions? There are lots of citizen science projects you can take part in:

- Schools can take part in the Birdwatch Ireland Garden Bird Survey from December to February every year
- You can get involved with the All Ireland Pollinator Plan, download resources, posters and signs and map any actions you have taken for pollinators
- You can record any wildlife spotted in your school with the National Biodiversity Data Centre

SDG Links:

3 Good health and wellbeing

11 Sustainable cities and communities

15 Life on land

Have your ideas heard!

Now that you have discussed your ideas for Future Schools, collect the classes ideas using this template and email them to creatingourfuture@sfi.ie

DPSM/ ESERO

FRAMEWORK FOR INQUIRY - PROMOTING INCLUSION

When planning science activities for students with Special Educational Needs (SEN), a number of issues need to be considered. Careful planning for inclusion using the framework for inquiry should aim to engage students in science with real purpose. Potential areas of difficulty are identified below along with suggested strategies. This list is not exhaustive, further strategies are available in the Guidelines for Teachers of Students with General Learning Disabilities (NCCA, 2007).

ENGAGE

POTENTIAL AREA OF DIFFICULTY	STRATEGIES
Delayed language development/ poor vocabulary/concepts	• Teach the language of science demonstrating meaning and/or using visual aids (material, property, strong, weak, textured, dimpled, absorbent, force, gravity). • Have the student demonstrate scientific phenomena, for example gravity —using 'give me, show me, make me,' as much as possible. Assist the student in expressing ideas through scaffolding, verbalising a demonstration, modelling. Use outdoor play to develop concepts.

INVESTIGATE

POTENTIAL AREA OF DIFFICULTY	STRATEGIES
Fear of failure/poor self-esteem/ fear of taking risks Understanding Time and Chronology Fine/Gross Motor Difficulties Short Term Memory	• Model the speculation of a range of answers/ideas. • Repeat and record suggestions from the students and refer back to them • Practice recording the passing of time, establish classroom routines that draw the students' attention to the measurement of time. • Teach and practice the language of time. • Allow time to practice handling new equipment. • Allow additional time for drawing diagrams, making models etc. • Give students the option to explain work orally or in another format. • Provide the student with visual clues/symbols which can be used to remind him/her of various stages of the investigation.

TAKE THE NEXT STEP

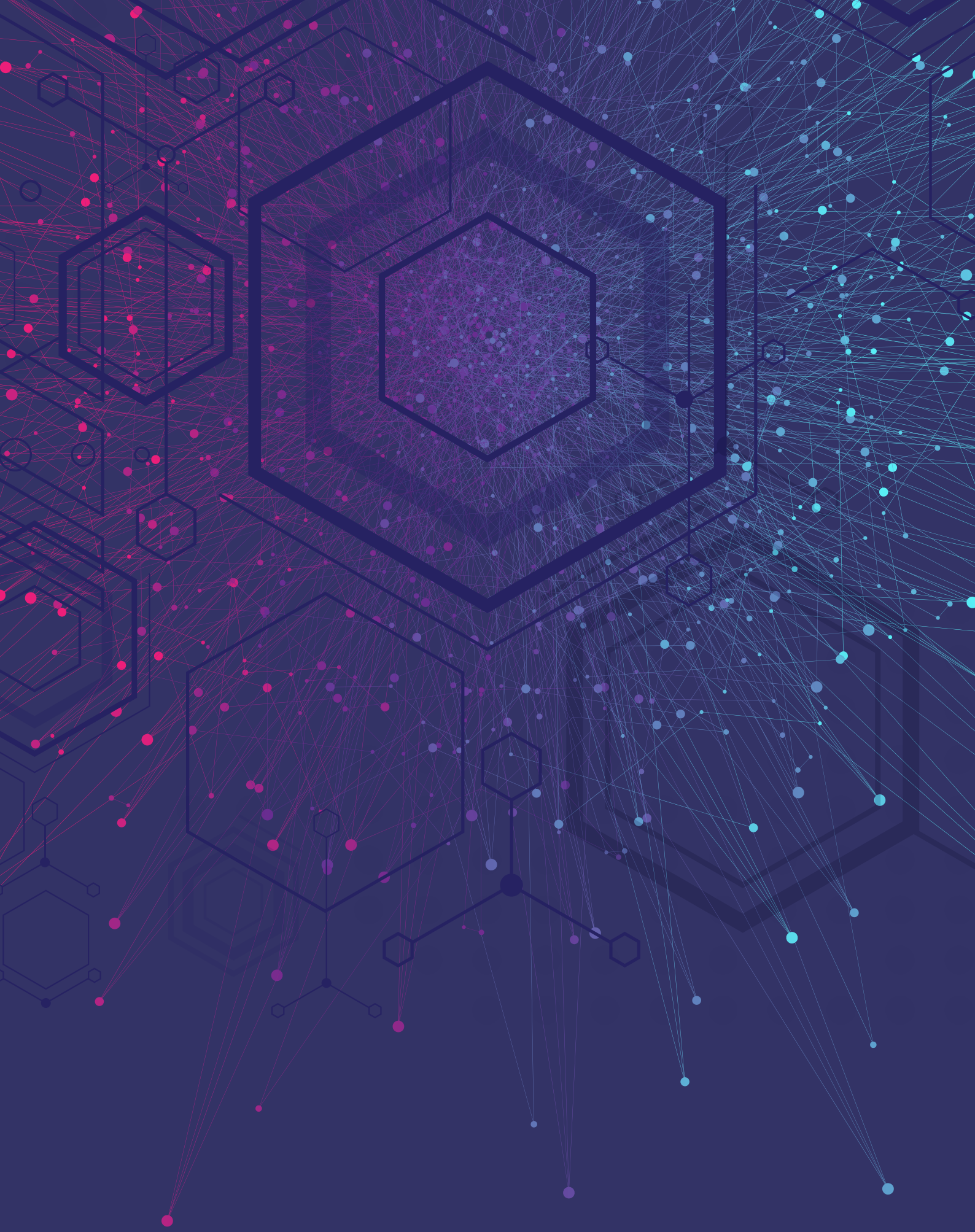
POTENTIAL AREA OF DIFFICULTY	STRATEGIES
Developing Ideas Communicating Ideas	• Keep ideas as simple as possible, use visuals as a reminder of earlier ideas. Discuss ideas with the whole group. • Repeat and record suggestions from students and refer back to them. • Encourage work in small group and in pairs. • Ask students to describe observations verbally or non-verbally using an increasing vocabulary. • Display findings from investigations; sing, do drawings or take pictures. • Use ICT: simple written or word-processed accounts taking photographs, making video recordings of an investigation.

REFLECTION

- Did I take into account the individual learning needs of my students with SEN? What differentiation strategies worked well?
- Did I ensure that the lesson content was clear and that the materials used were appropriate?
- Was I aware of the pace at which students worked and the physical effort required?
- Are there cross curriculum opportunities here?
- Are the students moving on with their skills?
- Did the students enjoy the activity?

More strategies, resources and support available at www.sess.ie

The full resource can be downloaded here.



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