Primary School Booklet

SCERACE WEEK #scienceweek 7-14 Nov 2021



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Supported by Science Foundation Ireland

CREATING OUR FUTURE: CITIES AND COMMUNITIES

Classroom Resource Booklet









INTRODUCTION

DPSM/ ESERO

CREATING OUR FUTURE

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.

BACKGROUND

This week's theme is Cities and Communities. Our resources so far have covered many aspects of our future lives: our schools, homes, farms, health and transport. This final resource is about how it all fits together and looking at where we live in a wider context. In 2020, almost 64% of Ireland's population lived in urban areas.







Discover Primary: Science and Maths www.primaryscience.ie

TRIGGER QUESTIONS FOR DISCUSSION



Cities

DPSM/ ESERO

> Is it possible to make an entire city carbon neutral? Copenhagen wants to carbon neutral by 2025 Is Copenhagen the World's Most Sustainable City? What changes could be made to your local area to become more sustainable?



Source: Freethink

How could we plan our cities to make everything readily accessible and reduce traffic congestion? The 15 minute city.



Source: Herding Together

Could more trees help to make a city sustainable? Forest City China China's first forest city - BBC News.



Source: BBC News

Lighting is important for getting around in our villages, towns and cities, but light pollution is a big problem for birds and nocturnal animals. How can we light our living areas sustainably and also protect biodiversity?



Source: National Geographic

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Do you think light pollution is a problem in your local area? What about other parts of Ireland? See Dark Sky Ireland for information and resources.







TRIGGER QUESTIONS FOR DISCUSSION

Rural Communities

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> Could Cloughjordan Eco Village in County Tipperary be a model for sustainable rural communities? Can sustainable communities be integrated into existing villages?



Source: undercurrentspaulo

How is the Eco Village doing 20 years on (longer video).



Source: justmultimedia

As a result of Covid 19, the future of work is changing. How can we support people who want to live in rural communities and perhaps work remotely?

Most countries measure success in terms of their economy. What about a sustainable country where the happiness of it's people is the most important measure of success?



Source: TED



RESEARCH PROJECT IDEAS

Draw a plan of your ideal city or community and programme Beebots to navigate around it

Take a look around your own local area and see what features make it a good place to live and what might make it better. What features would you add to make it easier and safer for people to move around, reduce energy use, waste and pollution and help biodiversity. Self driving cars could be a feature of our future cities and communities. The SFI Steam Art collaboration has an activity on designing an environment for a self-driving car on page 39.









CLASSROOM INVESTIGATION

DESIGN THE SUSTAINABLE WORKPLACE OF THE FUTURE

People are at the heart of cities and communities and an important part of a sustainable future is ensuring that there is enough employment for people and that our future jobs help to protect the environment that supports us instead of damaging it. The following resource is designed to help children imagine their future job or workplace, but the ideas could also be used to design a sustainable city or community.



DESIGN THE SUSTAINABLE WORKPLACE OF THE FUTURE

Class Level: Senior.

DESIGN

This activity as a whole is most suitable for 5th and 6th class as it involves thinking about a broad range of environmental issues and planning for the future but many elements of it could be done with any age group. See notes on adapting for younger classes below.

Curriculum Links

Strand: Environmental Awareness and Care.

Strand Unit: Environmental Awareness; Science and the Environment; Properties and Characteristics of Materials.

Curriculum Objectives: Recognise how the actions of people may impact on environments; Come to appreciate the need to conserve resources; Recognise and investigate human activities which have positive or adverse effects on local and wider environments; Explore the origins of materials; Investigate how materials can be used in construction.

Skills Development: Design; Plan; Make; Evaluate.

New Words/Vocabulary: Sustainability, Sustainable Development, Biodiversity, Ecosystem, Resources, Renewable, Restoration.

Focail Nua: Bithéagsúlacht (Biodiversity), Athcursáil (recycling) Fuinneamh (Energy) Dramháil (Waste) Forbairt inbhuanaithe (Sustainable Development).

Cross Curricular Links: (General) Geography: People at work, trade and development issues; History: Work and lifestyles in the past; SPHE: Wellbeing and Citizenship.









WORKPLACE OF THE FUTURE

Equipment/Materials

For Planning: Pencils and paper or ICT tools.

For Making: Choose from a number of options (some materials may be more suitable than others depending on your chosen workplace.

- Reused / Recycled materials (materials diverted from recycling or waste bins): Cereal or other boxes, old magazines, newspapers, reused foil from biscuit packets or similar, 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
- Digital technologies: Design using tablets or computers and software such as Minecraft

Note on sustainability for Design and Make Activities

- Using waste materials for Design and Make is more sustainable than using single use items such as craft foam, plastic film, polystyrene balls or beads disposable plates or cups or tinfoil. Glitter is a microplastic, which spreads everywhere and is harmful to the environment so is best avoided.
- Use paper tape rather than plastic tape where possible.
- Use construction toys such as bricks, Lego, K'Nex and others for design and make projects.
- 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 jobs do people have at the moment?
- What jobs did people have in the past?
- Have the types of jobs changed over time?
- Do you think things are changing more quickly now than they did in the past?
- What type of job do you think you might work in when you finish your education?
 - What do you think the word Sustainable means?











WORKPLACE OF THE FUTURE

Background Info

Sustainable Development was defined by the World Commission on Environment and Development as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." At present we are not living sustainably in Ireland. We are using and wasting a lot of the Earth's resources. As a result of this, people in other countries around the world do not have enough resources to meet their needs. Future generations will also find it impossible to meet their daily needs and will have to deal with the effects of air, soil and water pollution, climate change, biodiversity loss and waste caused by our wasteful lifestyles.

Real world application

As our world is changing rapidly with advances in technology and an increasing awareness of the need to make more sustainable choices, many of the industries and services that people work in such as peat extraction will no longer exist and many industries will have to change in order to reduce waste, energy, packaging, and pollution. Many new technologies and services will need to be developed, to restore damaged ecosystems, design more sustainable products and reduce waste and pollution.

As the children of today will be the ones working in these future jobs and perhaps leading the way in sustainable innovation and infrastructure, this challenge is a way for them to imagine their own future. It is also a good way to address the problem of climate anxiety among learners by showing them that their opinions are valued and that they can play a part in shaping their own future.

Design challenge

Explore

Brainstorm in groups and as a whole class on the types of jobs that people have at present. Did all of these industries / services exist 100 years ago? If not, why not? Have any of these industries or services had to adapt over time because of changes in society or technology?

Now think about how things are changing in the world today. We are building more, buying more, wasting more, and polluting more. Where do we get the materials and resources to make all the objects that we use? Look around the classroom for examples. What happens to them after we use them? Many of the things we use are made of plastic that is in turn made from oil. A lot of items are disposable and not easily reused or recycled. The making of goods involves a lot of energy and pollution.

Sustainability means making and using things in a way that doesn't use up all of the Earth's resources and leaving a mess for other people to clean up. Are there any new industries or services that need to be developed to make the world more sustainable? What issues would they focus on? Examples might include renewable energy generation, sustainable fashion and beauty, sustainable plastic manufacture, more advanced recycling, the circular economy, restoration of habitats such as wetlands, native forests, hedgerows and flood plains.







WORKPLACE OF THE FUTURE

Plan

Each group (or individual) could concentrate on a different industry or service. Learners might choose a workplace that a parent works in or one that they themselves would like to work in in the future. Examples might include manufacturing of goods, postal services, hair and beauty industries, farming and food production, retail, waste and recycling, offices, energy production, wildlife protection and habitat restoration.

Think about the various issues that need to be addressed to make that job sustainable.

- Water: Reducing water pollution from oil, chemicals, plastics, especially microplastics, human and animal waste. Using less water in production or using new technologies to recycle water or harvest rainwater.
- **Energy and Climate Change:** Reducing energy use in manufacturing, transport, refrigeration and powering lights and electrical devices. Using renewable energy to power buildings, processes and transport
- **Biodiversity:** Restoring old buildings and reusing built land (brownfield sites) to avoid destroying more habitats, avoiding habitat destruction for ingredients such as Palm Oil, restoration of habitats for wildlife, nature-based solutions to flooding and climate change
- Waste and the Circular Economy: Using less materials, making less stuff, eliminating most single use products, materials that can be separated, reused, composted, or recycled (always remember that reduction and reuse are far more important than recycling).

Make

Each group or individual could make a model of their future workplace as a whole using a variety of materials or digital tools. Alternatively, learners could concentrate on making a model of a particular aspect of their future workplace such as a renewable energy device, a new method of recycling waste, a biodiversity friendly farm, office complex or factory or a new type of packaging.

Evaluate

Learners should showcase their work and talk about practical applications. Are any aspects of their plans possible right now? What parts would require more work or technologies that haven't been invented yet? Do they think their ideas could be implemented in the future? What did they like best about their plans? Would they like to work in their future workplace? Does it help them to feel hopeful or excited about the future?



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WORKPLACE OF THE FUTURE

Take the Next Step

Look at how we can apply the concept of sustainability to our lives right now? Research some workplaces that are working on becoming more sustainable.

Visit the website of the Rediscovery Centre and find out about their work and education resources on the circular economy. They are also an SFI Discover Centre and run educational workshops for primary schools. Are there any other Discover Centres near you that offer programmes on sustainability?

Research the work of Boyan Slat who founded The Ocean Cleanup at the age of 18. Can you find out about other young inventors who have come up with sustainable ideas for the future?

Instead of designing a sustainable workplace, you could plan a sustainable housing development or even a town or city, incorporating waste reduction, water conservation, sustainable transport, renewable energy and protection of biodiversity.

Follow-up challenge/project/citizen science link

- Focus on waste reduction rather than recycling always fill up and bring your reusable water bottle when leaving home so you don't have to buy plastic bottles, don't buy a new schoolbag, pencil case, phone etc. each year unless you need it.
- Reduce energy in the classroom by opening blinds fully to make use of daylight, only using lights when necessary and switching off the whiteboard when not in use
- How does our use of resources impact on the environment or people in other countries?
- Look at how technologies developed for space travel can help with sustainability on Earth, for example Water Recycling on the International Space Station

Adapt for Home

Following some brainstorming in school, this activity could easily be set as an individual project to be completed at home. Learners could be encouraged to talk to their families about jobs in the past, present and future and to complete their model workplaces at home for showcasing in school.

Adapt for Junior/Senior level

Junior classes will be less likely to think about their own future jobs but they might make a list of past and present jobs and imagine a future workplace or even an invention that they could then make. For infants this could be incorporated into Aistear. They could also be encouraged to do some brainstorming aspects on sustainability by getting them to look at items that they use in school, every day and talking about what they are made of and where they come from. A lot of emphasis is placed on recycling but by looking at where things come from, even young children can understand that reducing waste by not buying things in the first place is best. Concentrating on eliminating single use items such as tinfoil and plastic from lunchboxes and encouraging children to avoid food waste by eating all their lunch is an easy way to introduce the concept of sustainability.







DESIGN CHALLENGE

DESIGN THE SUSTAINABLE

WORKPLACE OF THE FUTURE



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