Creative Science Goes Outdoors

dynamic earth LEARNING

Science Outside

Taking learning outside is a great way to expand the breadth of creative opportunities available. The benefits of outdoor learning have received much attention in recent years and research has shown that taking learning outside offers a plethora of benefits including increasing learner engagement and academic achievement, enhancing educational experiences, as well as aiding mental health and well-being. A recent study of teachers in Scotland reported that, when compared to indoor settings, learning outside resulted in the significant enhancement of (in order of incidence): 'challenge and enjoyment', 'personalisation', 'relevance', 'breadth', and 'progression'*.

Science is defined in the Oxford English dictionary as '*the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment*.' Where better to explore this subject than in the natural world itself? Here learners can experience scientific enquiry first hand in an environment that is inspiring, challenging and relevant to them.

Furthermore, outdoor learning offers first-hand experiences in nature which have the potential to foster a connection between the individual and the natural world. Being connected to nature has positive impacts on young people's lives, enhancing physical and mental health, aiding personal and social development, and encouraging responsible citizenship. Understanding that we are a part of the natural world and the role we play within it is key to a sustainable future where people recognise and develop behaviours and practices that are healthy for themselves and our planet.

It is impossible to cover the wide range of opportunities for science learning outdoors within this brief resource. We have included a few simple activities that are great for starting explorations and introducing pupils to learning outdoors. If you are interested in finding out more about outdoor learning and enhancing your skills as an outdoor practitioner, there are links to some great resources included below. You can also get in touch with Dynamic Earth for more information about outdoor learning CLPL.

*Mannion, G., Mattu, L. & Wilson, M. 2015. Teaching, learning, and play in the outdoors: a survey of school and pre-school provision in Scotland. Scottish Natural Heritage Commissioned Report No. 779.

Curriculum Links

The potential to link outdoor learning with the curriculum is vast and could apply to almost all the experiences and outcomes. There are extensive possibilities within the Science and Social Studies sections of the curriculum. Planet Earth, Biological Systems and People, Place and Environment are especially suited to outdoor learning. The activities included here have particular relevance to the following:

Sciences

I have observed living things in the environment over time and am becoming aware of how they depend on each other. **SCN 0-01a**

I can distinguish between living and non living things. I can sort living things into groups and explain my decisions. **SCN 1-01a**

I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. **SCN 2-02a**

I can identify my senses and use them to explore the world around me. **SCN 0-12a**
I have explored my senses and can discuss their reliability and limitations in responding to the environment. **SCN 1-12b**

Social Studies

I explore and discover the interesting features of my local environment to develop an awareness of the world around me. **SOC 0-07a**

I can describe and recreate the characteristics of my local environment by exploring the features of the landscape. **SOC 1-07a**

I can describe the major characteristic features of Scotland's landscape and explain how these were formed. **SOC 2-07a**

I explore and appreciate the wonder of nature within different environments and have played a part in caring for the environment. **SOC 0-08a**

I can consider ways of looking after my school or community and can encourage others to care for their environment. **SOC 1-08a**

Environmental Art

This is a simple and effective way to encourage your pupils to observe and explore the natural world and be creative at the same time. The idea is to create natural collages or 'installations' along any theme; these can even be left in situ for others to enjoy. We are especially fond of using a volcanic theme recreating what Scotland's landscape would have looked like when it was much more tectonically active (see the Volcanoes Creative Science resource pack). However the inspiration for the art could come from anywhere. Some other suggestions include:

- Footprint tracks and trails. Investigate habitats and which different creatures you have living in your school grounds. Create trails that show where they may have been.
- Be inspired by autumn colours and create natural rainbows. This could lead to an investigation into which kinds of trees are best for each colour. How many different species do you have growing around school and what creatures like to make their home in them?
- Link in with a conservation theme and make some environmental art that emphasises the importance of picking up litter and looking after our outdoor spaces.

Nature Dice

Kit List:

- Nature images, including mini-beasts, birds, different habitats, weather
- Textured materials
- Nature dice template (provided at the back of this resource pack)
- Card
- Scissors
- Glue
- Sellotape

Instructions:

1. Choose one of the dice templates and either print it onto thin card and cut it out or print it on to paper, cut it out, and glue it to some thin card.

2. Assemble the dice by pre-folding each flap and then gluing together. You may want to add sellotape to make sure the edges are stuck firmly. You can make the dice any size depending on how you intend to use them - just scale up or down before you print the template.
N.B. Assembling the dice is quite fiddly; if you want to use this activity with younger children, you will probably need to do this stage for them.

3. Cover each side of the dice with a different image, texture or colour.

4. Go exploring! Roll the dice and take the challenge to find whatever it lands on.

Nature dice are a great tool for encouraging exploring with all the senses and you never know where your discoveries may take you. It is also a great way to introduce the concept of habitats and that different creatures require different living conditions. For example, you are not likely to find a slater/woodlouse in the middle of a playground, but if you can find an old log or dark damp place the chances are there will be plenty scuttling around.

Bee Hotels

Bees are great for exploring topics such as biodiversity, interdependence, and conservation issues. In the UK, bee numbers have been declining dramatically due to a number of reasons including habitat loss and pesticide use. Bees are a vital part of our ecosystem because we rely on them for pollinating many of the plants that we eat. Creating a bee hotel, which can be hung in your schools grounds, is a great way to help bees and also increase your chances of observing these wonderful creatures. You could link this activity in with finding out about all the different bees we have in the UK, the habitats they need to survive, their lifecycles, and which plants they are vital for pollinating.

When we think of bees most of us also think of honey but in fact the honey bee is only one of over 200 species of bee found in this country. The bee hotels described here are suitable for solitary bees. They will use your hotel for shelter and females use the hotel to raise the next generation of bees. First, she chooses an unoccupied tube in the hotel and collects a ball of pollen about the size of a dried pea on to which she lays an egg. She then seals it with a mud wall and starts the next pollen ball, lays an egg, and so on until she has filled the tube from front to back – usually between eight and 11 eggs per tube.

The great thing about solitary bees is that they are harmless and not aggressive. They would only sting if squeezed hard and even then they do not have painful stings like honeybees.

Kit List:

- Plastic drinks bottle with the top (drinking end) cut off
- String
- Filling: bamboo cane (pre-cut to bottle length), strips of cardboard, twigs, leaves, dead wood, plastic straws, corrugated card or other hollow stems
- Glue
- Scissors
- Stickers and/or pens for decoration (optional)

Instructions:

1. Pack the bottle with a collection of the filler material – ensure there are plenty of hollow tubes.

2. Decorate your hotel with paint/stickers – and maybe create a sign welcoming the bees.

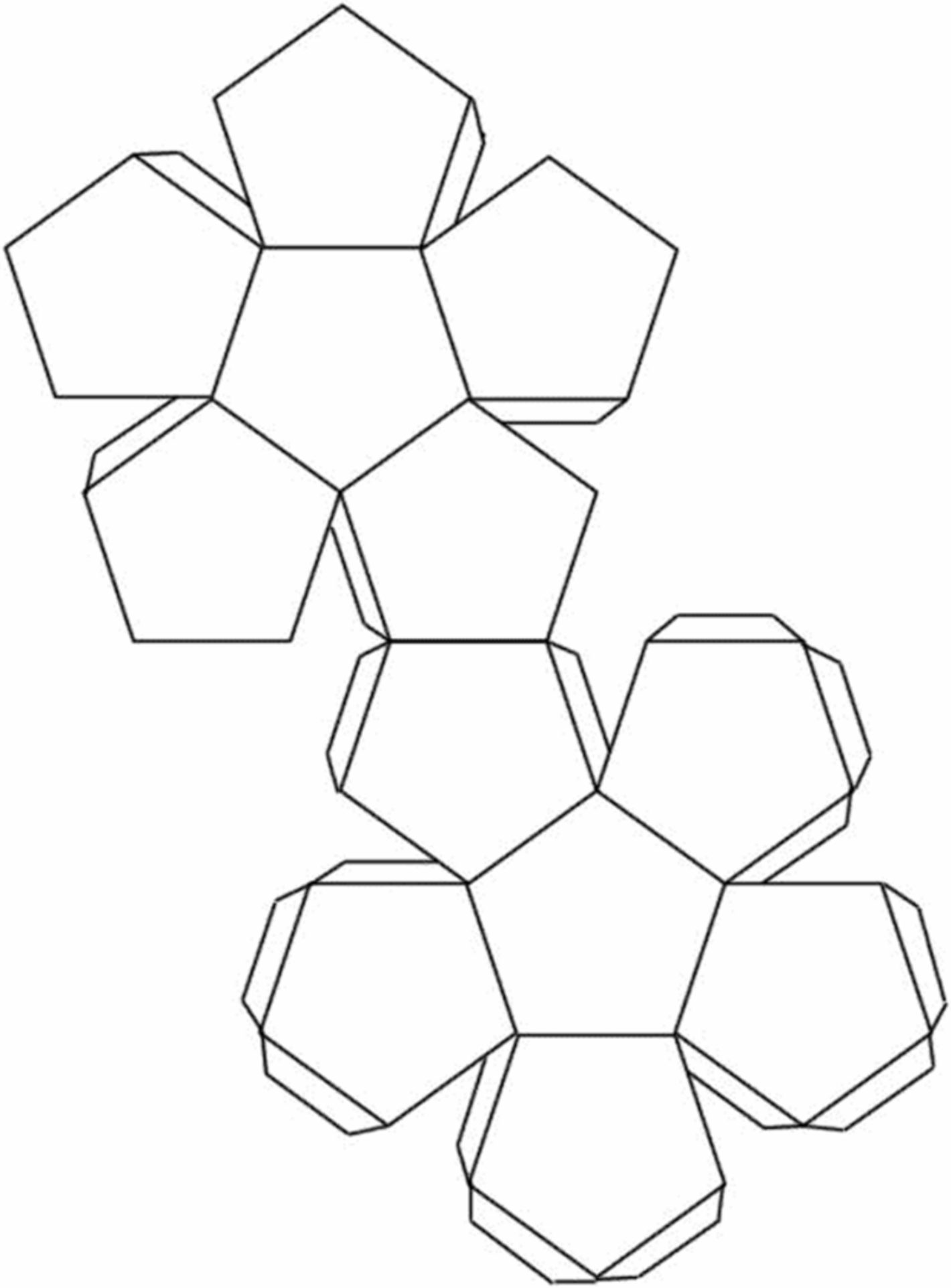
3. Tie the string tightly around the tube at 2 points. Now connect these loops with a loose length of string to make a handle.

4. Find a suitable spot to hang up your hotel and watch and wait for the bees to come.

Where do I put my Bee Hotel?

- Choose a nice sunny spot of fence or wall in your garden to hang up your hotel with the opening pointing east. Solitary bees love early morning sun!
- Ask an adult to hammer in a nail. Attach your bee hotel to this with the string handle. Make sure it is level.
- The Bee Hotel needs to be fastened so it can't move or rotate. (The bees are very sensitive to nest orientation once they start using it.)
- The height of the Bee Hotel doesn't matter, but ensure you can check it safely.
- The hotel you are making is suitable for solitary bees. You might spot red mason bees, blue mason bees, leaf-cutter bees or white-faced bees.

Nature Dice Template 1



Nature Dice Template 2