

Early Level Sciences Benchmarks with Ideas for Early Years Science Activities generated at the EY CPD on Thursday 7th September

The table immediately below has been included as a helpful guide to the scientific skills to be developed within the sciences at Early Level.

Skills	
Inquiry and investigative skills	<p><i>Plans and designs scientific investigations and enquiries</i></p> <ul style="list-style-type: none">- Explores and observes through play.- Asks questions arising from play activities.- Makes simple predictions of what might happen.- Makes suggestions about what to do to answer the selected question. <p><i>Carries out practical activities within a variety of learning environments</i></p> <ul style="list-style-type: none">- Discusses obvious risks and takes appropriate steps to protect themselves and others.- Uses their senses to acquire information.- Measures using simple equipment and non-standard units. <i>(Possible link to MNU 0-11a)</i> <p><i>Analyses, interprets and evaluates scientific findings</i></p> <ul style="list-style-type: none">- Presents and sorts data/information, for example, using displays, photographs, simple charts and drawings. <i>(Possible link to MNU 0-20a)</i>- Provides oral descriptions of what was done and what happened.- Recognises similarities, patterns and differences in the findings and links these to the original question.- Discusses, with support, how the experiment might be improved.- Relates findings to everyday experiences.- Identifies and discusses new knowledge and understanding. <p><i>Presents scientific findings</i></p> <ul style="list-style-type: none">- Communicates findings to others verbally and through drawings, photographs, displays and simple charts.- Responds to questions about their investigation.

Scientific analytical thinking skills	<ul style="list-style-type: none"> - Demonstrates natural curiosity and shows development of basic skills of analysis in simple and familiar contexts, for example, through asking questions, experimenting and making predictions. - Demonstrates creative thinking by offering suggestions and solutions to everyday problems. - Demonstrates reasoning skills by explaining choices and decisions.
Skills and attributes of scientifically literate citizens	<ul style="list-style-type: none"> - Talks about science, showing developing understanding of risks and benefits, and listens to the views of others. - Demonstrates awareness of the importance of respecting living things and the environment and of managing the Earth's resources responsibly. - Demonstrates a developing understanding of science in the world around them. - Explores the ways in which people use science and science skills as part of their job.

Curriculum Organisers		Experiences and Outcomes for planning learning, teaching and assessment	Benchmarks to support practitioners' professional judgement	Ideas for Science Activities from Early Years Practitioners in Moray
Planet Earth	Biodiversity and interdependence	<p>I have observed living things in the environment over time and am becoming aware of how they depend on each other.</p> <p style="text-align: right;">SCN 0-01a <i>(Possible link to TCH 0-02a)</i></p>	<ul style="list-style-type: none"> • Explores and sorts objects as living, non-living or once living. • Describes characteristics of living things and how they depend on each other, for example, animals which depend on plants for food. 	<ul style="list-style-type: none"> • Bug Hotel – Jumble of wood, bark, tubes etc. Habitats for bugs – see what comes along... • Bees – visited gardens, Lack of bees – Why have they gone? How can we help them? Grow flowers - https://schoolgardening.rhs.org.uk/home Free to join - lots of resources • Bird watching; making Bird feeders, trying out different foods and putting out food/water to attract birds • Butterfly farm (https://www.insectlore.co.uk/) • Wormery • Bug Hunt – can use yoghurt pots with holes in (to let water out) planted in the ground to trap bugs • Tree mini beast hunt – hold a large white sheet under a tree branch and shake branch - identify what came off e.g.

				<p>caterpillar/spider etc</p> <ul style="list-style-type: none"> • Sorting materials – living/non-living/once living • Looking at fossils – making your own with air-drying clay • Hatching eggs – make sure that the chicks have a good home to go to afterwards! <p>http://www.sserc.org.uk/images/Publications/Biology/SSERC-Materials_of_Living_Origin_Code_of_Practice.pdf gives additional Health & Safety Advice</p>
		<p>I have helped to grow plants and can name their basic parts. I can talk about how they grow and what I need to do to look after them.</p> <p>SCN 0-03a (Possible link to LIT 0-26a)</p>	<ul style="list-style-type: none"> • Explores, observes and discusses basic needs of plants and what they need to grow including water, heat, sunlight and soil. • Demonstrates understanding of how plants grow from seeds. 	<ul style="list-style-type: none"> • Grow flowers - https://schoolgardening.rhs.org.uk/home Free to join - lots of resources • Seed bombs – seeds and soil – throw them and see what happens when they land • Grow sunflowers and bulbs – measure plants! • Fairyland Topic – grow Jack’s Beanstalk using broad beans in plastic zip-lock bag (investigate with/without water) • Cress egghead/Grass sock monster • Grow plants in darkness with a wee bit of light in one direction and in full light – plants grow towards light • White carnations with food colouring shows how plants draw up water • Grow vegetables – excellent for link to HWB • Sunflower topic – grow from seeds, measure height, eat seeds and sunflower seed bread or sunflower seed spread, touch sunflower oil and look at foods cooked using sunflower oil.
		<p>I have experienced, used and described a wide range of toys and common appliances. I can say what makes it go and</p>	<ul style="list-style-type: none"> • Ask questions and describes what can ‘make things go’, for example, batteries, wind-up toys and sunlight. • Talks about toys and common appliances and what they do when they work, for example, produce heat, light, 	<ul style="list-style-type: none"> • Simple show and tell of toys – Investigating what makes them move, work? • Knex/Lego challenges – Lighthouse Challenge – newspaper to make a lighthouse to hold a tennis ball (beacon) at the top • Wind up cars ot toys and Windmills • Balloon racing to show how a rocket works
<p>Energy sources and sustainability</p>				

	<p>say what they do when they work.</p> <p>SCN 0-04a (Possible links to SCN 0-07a, TCH 0-01a/0-05a)</p>	<p>movement or sound.</p>	
<p>Processes of the planet</p>	<p>By investigating how water can change from one form to another, I can relate my findings to everyday experiences.</p> <p>SCN 0-05a</p>	<ul style="list-style-type: none"> • Investigates the different properties of water and shares their findings with others. • Talks about water in nature and how it influences their everyday lives. • Identifies three main states of water (ice, water and steam) and uses scientific vocabulary such as ‘melting’, ‘freezing’ and ‘boiling’ to describe changes of state. 	<ul style="list-style-type: none"> • Ice experiments – Lego man in Ice/Ice Gardens, Ice bombs – exploring by adding salt, food colouring sugar etc • Snowman’s coat experiment – freeze bottles of water and dress in different materials to see what prevents him melting • Evaporation of water – outdoor play – we have a few puddles that we could investigate or make your own and draw a circle round it with chalk and come back later to see evaporation
<p>Space</p>	<p>I have experienced the wonder of looking at the vastness of the sky, and can recognise the sun, moon and stars and link them to daily patterns of life.</p> <p>SCN 0-06a (Possible links to MNU 0-10a &</p>	<ul style="list-style-type: none"> • Describes how the rotation of the Earth in relation to the sun gives us day and night. • Talks about how the pattern of night and day changes over the course of a year. 	<ul style="list-style-type: none"> • Night Monkey, Day Monkey Book by Julia Donaldson • Papier Mache planets – be aware of not hanging these equally spaced from each other if doing the whole solar system! • Different balls to represent planets, moon and sun sizes e.g. marbles to space hopper • Experiments shining a torch on tilted globe (inflatable) suspended from a string to investigate day/night (or use balloon with a few countries marked) • https://www.nasa.gov/audience/forstudents/index.html • http://www.esa.int/Education is the European Space Agency’s page for Educators • https://www.esa.int/esaKIDSen/ is the European Space Agency’s page for Kids – It has some great background information about space without going way too in-depth! • http://www.kidsgeo.com/geography-for-kids/0020B-solstices-and-

LIT 0-26a)

equinoxes.php has a great bit about how we have summer and winter!

- Sorting Day & Night: Use a selection of images to represent Day and Night e.g. sunny beach scene, outside play, open flowers, bats, owls, birds, foxes etc with a few tricky ones throw in – sunrise/sunset and get pupils to work collaboratively to sort them and explain why they have sorted them in this way.
- Day & Night Collages: Using collage materials children create a day picture. Brainstorm words that relate to day and night pictures, to be made into flashcards to display alongside collage pictures.
- Day & Night Role Play - Create 2 role play areas within nursery or classroom to explore and experience differences between daytime and bedtime routines.
- Day & Night Rhymes - Teach children a selection of rhymes and songs connected to day and night
- Musical Appreciation – have a selection of music that would be appropriate for daytime or night time. Children listen and respond by holding up a sun or moon picture. Children can use a variety of percussion musical instruments to represent sun, moon, and stars to create a piece of music.
- Summer/winter washing line
- The Pattern of Night and Day over a Year <https://sunrise-sunset.org/calendar> allows you to get a calendar of sunrise and sunset throughout the year for your location.
- Outdoors – get children to stand on an x and chalk outline at different times of day to show us moving relative to sun.

Forces, electricity and waves	Forces	<p>Through everyday experiences and play with a variety of toys and other objects, I can recognise simple types of forces and describe their effects.</p> <p style="text-align: right; color: #2e8b57;">SCN 0-07a (Possible link to SCN 0-04a)</p>	<ul style="list-style-type: none"> • Explores and sorts toys and objects into groups according to whether they need to be pushed or pulled. • Measures, using simple equipment, how the movement of an object is affected by the size of the force or the weight of the object. • Demonstrates, through play, how a force can make an object stay still, start to move, speed up, slow down and change shape. 	<ul style="list-style-type: none"> • Cars/Toys – Push and pull, use a ramp with varying gradients to see the effect • Sports/Games – which ones use push/pull – sorting • Exploring forces in a play park (swings/see saw etc) • Magnets • Make an elephant game – piece of play-do given to each pair to be passed back and forth. Only allowed to do the action shouted out – push/pull or twist to try and create their elephant! • Sit on mats (carpet tiles, carpet side down on wooden floor works well) and working in pairs discuss what would make you move – pushing or pulling • Make a parachute for a toy (I used elf on the shelf to help safe movement between shelves) using cut up plastic bags and string • Kite flying • Creating cars with sails to move them along
	Electricity	<p>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.</p> <p style="text-align: right; color: #2e8b57;">SCN 0-09a (Possible links to LIT 0-02a, TCH 0-03a)</p>	<ul style="list-style-type: none"> • Groups objects into those which get electricity either from mains electrical sockets or alternative sources, such as batteries and solar cells. • Talks about the importance of electricity in their daily lives. • Identifies the risks that can be caused by electricity and recognises how to stay safe. 	<ul style="list-style-type: none"> • Use microwave/ovens for baking • Pretend Power cut – talks about things affected • Tinker table with old computers, hoovers, DVD players etc for children to take apart to explore how they work; talk about risks and how to stay safe • Observation walk round nursery/school or other building – look for lights, electrical items etc • Risks and safety –show that we let electricity through our bodies using - Energy Cosmic Ball - Sensory educational lightup toy by Safari. Can be bought from Amazon or http://www.learningspaceuk.co.uk/energy-cosmic-ball-p1998
	Vibrations and waves	<p>Through play, I have explored a variety of ways of making sounds.</p> <p style="text-align: right; color: #2e8b57;">SCN 0-11a (Possible link to</p>	<ul style="list-style-type: none"> • Predicts, then investigates, ways to make sounds louder and quieter. • Identifies different sources of sound. 	<ul style="list-style-type: none"> • https://www.scholastic.com/teachers/articles/teaching-content/science-sound/ • Making shakers - loud and quiet • A sound walk: Ask students to pay attention to all the different sounds they hear along the way. Then have members of the class compare their experiences. What different sounds did each person hear along your journey?

		EXA 0-17a)		<ul style="list-style-type: none"> • Either a sound infant toy or a collection of materials: Uses vocabulary to describe different sounds, for example, loud, quiet, noisy, soft, hard and squeaky. • Investigate ways to make sounds louder and softer, higher and lower pitched: You could use a variety of household objects or musical instruments depending on what you have access to. • Work in pairs to put objects into a range of high to low pitched – look at the size of the objects! SKILL – Predicting: Give pupils an unknown and without trying it out get them to predict where it would go in the range. • Experiment: Make a stringed instrument from a shoebox and rubber bands – how would you tune it to make a range of pitch? How could you make it louder? SKILLS - Makes suggestions about what to do to answer the selected question, Uses their senses to acquire information, Provides oral descriptions of what was done and what happened, Responds to questions about their investigation. • Link to music and musical instruments. • Link to how we hear – senses. • Link to solids, liquids and gases – which one allows sound to travel further and why.
Biological systems	Body systems and cells	I can identify my senses and use them to explore the world around me. SCN 0-12a (Possible link to HWB 0-47b)	<ul style="list-style-type: none"> • Identifies specific parts of the body related to each of the senses. • Uses their senses to describe the world around them, giving examples of things they see, hear, smell, taste and feel. 	<ul style="list-style-type: none"> • Smell jars – put a cotton pad with a “smell” on it e.g. perfume, curry powder etc into a jar for pupils to smell • Painting using your hands – mixing paint • Ice experiments – cold/hard • Sorting materials and describing textures • Outside - Listening with eyes closed. Use of questions to tease out sounds heard nature? Cars etc • Stations of sensory objects and encouraging descriptions of taste/smell/feel • Feely boxes
	Inheritance	Link to HWB 0-47a		
Materials	Properties and uses of substances	Through creative play, I explore different	<ul style="list-style-type: none"> • Explores and sorts materials into different groups depending on their 	<ul style="list-style-type: none"> • Floating and sinking – show and tell; children bring in two objects one they think will float and one sink – categorise objects • Making boats out of different materials

		<p>materials and can share my reasoning for selecting materials for different purposes.</p> <p>SCN 0-15a (Possible links to MNU 0-20a & LIT 0-07a)</p>	<p>properties, for example, whether they are strong, smooth, rough and if they float or sink.</p> <ul style="list-style-type: none"> • Justifies the selection of appropriate materials for different uses based on their physical properties. 	<ul style="list-style-type: none"> • Snowman's coat experiment – freeze bottles of water and dress in different materials to see what prevents him melting • Egg Experiment (Risk Assessed in case of allergy etc). Children each given a hardboiled egg – how could it be wrapped up to prevent it breaking? Children predicted what materials would protect the egg • Egg Bounce Experiment – Egg in Vinegar and observe changes over 5 days – pupils predicted if egg would bounce on different surfaces • Make plastic from milk and vinegar https://sciencebob.com/make-plastic-milk/ • Gingerbread man wants to go on an adventure – they would get soggy. Waterproof materials selected through play and exploration.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Topical science</p>	<p>Topical science</p>	<p>I can talk about science stories to develop my understanding of science and the world around me.</p> <p>SCN 0-20a (Possible links to LIT 0-01a, 0-02a, 0-11b & TCH 0-01a, 0-07a)</p>	<ul style="list-style-type: none"> • Talks about the science they encounter in their everyday experiences. • Explores, through role-play, how science and science skills are used in a variety of jobs. 	<ul style="list-style-type: none"> • Barrier Reef – Pollution Experiment – different colours of food colouring in a fish bowl with plastic fish to show how pollution spreads • Interesting task to see perceptions of science – draw a scientist/engineer etc (often come out as male and with very specific clothing). Women in Science: 50 Fearless Pioneers Who Changed the World Book by Rachel Ignotofsky • STEM Ambassadors – You can book a STEM Ambassador to come out to visit your nursery for free through http://aberdeensciencecentre.org/stem-ambassadors/ Opportunity to talk about their work with your children.

Health & Safety – ASE Be Safe Book is very helpful and gives clear guidelines for science experiments!