

Summary	Duration
<p>In this unit, students are introduced to and begin to practise the scientific skills of observing, questioning, predicting and communicating. Students use skills in Working Scientifically and Working Technologically to develop ideas about what living things need. They use these ideas to investigate what plants need in order to grow.</p> <p>Students take part in simple investigations to find out about the properties of different materials. They use their ideas to make a model of a <i>beanstalk</i> and a free-standing tower. Students use mathematical skills in three-dimensional space and length as they manipulate a variety of shapes in their environment. They record data informally using uniform informal units.</p>	<p>Sample term 5 weeks Detail: End of Early Stage 1</p>

Teacher Background Information
<p>Manipulating and playing with objects in their environment is a familiar experience for Early Stage 1 students. In the context of play, students extend their understanding about two-dimensional shapes and three-dimensional objects and start to develop their vocabulary about the features of shapes and objects in their environment. This unit uses the traditional English fairytale 'Jack and the beanstalk' as a resource to generate ideas about the needs of living things. Students conduct simple investigations to find out about the needs of plants, such as sunlight and water. 'Jack and the beanstalk' provides a stimulus for students to investigate, sort and categorise materials according to their properties. Opportunities for play, including investigative play, assist students as they describe their thinking and test their predictions. This unit provides opportunities for students to use their developing science, technology and mathematics skills in an integrated way. The integration of Science, Technology and Mathematics in this context is the forerunner to developing STEM skills in primary students. The use of STEM related vocabulary is encouraged.</p>

Key inquiry questions	Vocabulary
<ul style="list-style-type: none"> ▪ What do plants need to grow? ▪ How can we test what plants need? ▪ What do we need to use to make a block tower strong? ▪ How can we sort materials into categories? 	<p>air, animals, bend, coil, dark, environment, flexible, fruit, germination, grow, healthy, leaves, light, living, man-made, materials, mud, natural, plants, properties, roots, sand, seeds, soil, stalk, stem, strong, sunlight, things, transpiration, twist, vegetable, water</p>

Outcomes

Science K-10 (inc. Science and Technology K-6)

- › STe-4WS explores their immediate surroundings by questioning, observing using their senses and communicating to share their observations and ideas
- › STe-5WT uses a simple design process to produce solutions with identified purposes
- › STe-6NE identifies that the way objects move depends on a variety of factors
- › STe-9ME identifies that objects are made of materials that have observable properties

Mathematics K-10

- › MAe-4NA counts to 30, and orders, reads and represents numbers in the range 0 to 20
- › MAe-9MG describes and compares lengths and distances using everyday language
- › MAe-13MG sequences events, uses everyday language to describe the durations of events, and reads hour time on clocks
- › MAe-14MG manipulates, sorts and represents three-dimensional objects and describes them using everyday language
- › MAe-17SP represents data and interprets data displays made from objects

Content	Teaching, learning and assessment	Student diversity
<p>Early Stage 1 - Working Scientifically</p> <p>Students question and predict by:</p> <ul style="list-style-type: none"> ▪ responding to questions about familiar objects and events they are curious about in the natural and made environments (ACSIS014) ▪ making predictions resulting from their questions ✨ <p>Students plan and conduct investigations by:</p> <ul style="list-style-type: none"> ▪ sharing what they already know and how they could find out more about their questions relating to the natural and made environments ▪ exploring and making observations by using their senses to gather information about objects and events in their immediate surroundings (ACSIS011, ACSHE013) ✨ <p>Early Stage 1 - Natural Environment</p> <p>Living things have basic needs, including food and water. (ACSSU002)</p> <p>Students:</p> <ul style="list-style-type: none"> ▪ describe what plants and animals, including humans, need to 	<p>Week 1 Lesson 1: Beans for Jack!</p> <p>Teacher background information</p> <p><i>The focus of this activity is for students to think about what living things need to grow. Students consider the needs of living things (seeds). Lentils and mung beans are good options as they may take a day or two to sprout.</i></p> <p>Resources</p> <ul style="list-style-type: none"> ▪ Jack and the beanstalk by British Council http://learnenglishkids.britishcouncil.org/en/short-stories/jack-and-the-beanstalk <p>For each bean investigation you will need:</p> <ul style="list-style-type: none"> ▪ glass jar or bottle ▪ some cotton wool balls ▪ seeds eg lentils ▪ water ▪ spray bottle 	<p>Optional</p> <ul style="list-style-type: none"> ▪ Take digital photographs of each step.

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<p>stay alive and healthy, eg food, water and air</p> <p>Early Stage 1 - Working Scientifically</p> <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> engaging in discussions about observations and using drawings to represent ideas (ACSIS233)  using a range of methods to share observations and ideas, such as drawing, informal and guided discussion, role-play, contributing to joint construction of short texts and/or using digital technologies (ACSIS012)   	<ul style="list-style-type: none"> teacher-prepared scaffolds (key words for labelling the jars). <p>Whole-class activity</p> <p>Read 'Jack and the beanstalk' or view an animation through the British Council link.</p> <p>Discuss:</p> <ul style="list-style-type: none"> What do you think plants need to grow? How do we know? What do seeds need in order to grow? How could we find out if seeds need light to grow? (<i>Encourage students to identify light and dark places in the classroom.</i>) <p>Students will be growing some beans for Jack and testing whether or not they need light to grow.</p> <p>Small-group activity</p> <p>Organise students into groups of three.</p> <ul style="list-style-type: none"> Lightly wet the cotton wool balls. Place the bean seeds in the jars resting on the cotton wool balls. Place one jar in a light place and one jar in a dark place. Students draw a diagram of their jars and label using teacher-prepared scaffolds. Spray some water on the beans every few days. <p>Class evaluation</p> <p>Ask students what they think they might see on their seeds in a few days.</p> <p>Explain to students that their beans should start to grow roots after a few days. This is called germination.</p> <p>Ask students to think about the changes that might take place in their investigation and to make initial predictions.</p>	
<p>Early Stage 1 - Natural Environment</p> <p>Living things have basic needs, including food and water. (ACSSU002)</p> <p>Students:</p> <ul style="list-style-type: none"> describe what plants and animals, including humans, need to stay alive and healthy, eg food, water and air identify the needs of a variety of living things in a range of situations, eg pets at home, plants in the garden or plants and 	<p>Week 1 Lesson 2: How do things grow?</p> <p>Teacher background information</p> <p><i>The focus of this activity is to share observations about the jar investigation and determine the importance of light for living things to grow. Students also build upon their background knowledge about living things by reading a shared novel and listening to a song.</i></p> <p>Resources</p>	<p>Extension</p> <ul style="list-style-type: none"> With assistance, students create a video diary outlining the steps of the investigation and explaining what they see. Example resource: iPad App Tapikeo HD.

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<p>animals in bushland and/or on farms</p> <p>Early Stage 1 - Working Scientifically</p> <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> engaging in discussions about observations and using drawings to represent ideas (AC SIS233)  <p>Students communicate by:</p> <ul style="list-style-type: none"> using a range of methods to share observations and ideas, such as drawing, informal and guided discussion, role-play, contributing to joint construction of short texts and/or using digital technologies (AC SIS012)   working in groups to reflect on what they found interesting, liked or disliked about what they did, what was or was not expected and what they would do differently   	<ul style="list-style-type: none"> 'Doin' it' (<i>Helping the garden grow</i>) Justine Clarke http://www.abc.net.au/abcforkids/video/show.htm?show=JUSTINE-CLARKE-SONGS-TO-MAKE-YOU-SMILE&videoid=4057932 YouTube clips Katherine Ayres reads <i>'Up Down And Around'</i> <p>Small-group activity</p> <p>Prior to the lesson, organise students into their STEM groups. They should:</p> <ul style="list-style-type: none"> look at their jars in the light and dark place draw or take digital photos of what they see briefly discuss what changes they can see in their jars decide if this is similar or different to what they predicted. <p>Whole-class discussion</p> <p>Watch the video clip of Katherine Ayres reading <i>Up Down And Around</i></p> <p>Look at the front cover of the book and discuss what students see.</p> <p>Questions may include:</p> <ul style="list-style-type: none"> What things do you know that go 'Up'? What things go 'Down'? What things go 'Around'? What bugs would you like to have in your garden? Why? Do you have a garden at home? If not, do you know anyone with a garden? What do you/they grow in your/their garden? What would you grow if you had your very own garden? <p>DURING READING</p> <ul style="list-style-type: none"> During reading, encourage students to identify the rhyme. <p>AFTER READING</p> <ul style="list-style-type: none"> What did the characters in <i>Up, Down and Around</i> do to help their seeds grow? What does a seed need to grow into a plant? What are some of the things that might stop our seeds from growing? 	<p>Optional</p> <ul style="list-style-type: none"> Students contribute to a joint construction of their findings about their investigation using a light and a dark place. Include digital images to demonstrate results.

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	<ul style="list-style-type: none"> Listen to <i>'Doin' it' (Helping the garden grow)</i> by Justine Clarke. Ask students to identify what helps the garden to grow. <p>Home activity</p> <p>Ask students to collect pictures of things that can be grown in the garden, including a variety of plants (fruits and vegetables). Students may take photos of their own garden to share with the class.</p>	
<p>Early Stage 1 - Natural Environment</p> <p>Living things have basic needs, including food and water. (ACSSU002)</p> <p>Students:</p> <ul style="list-style-type: none"> describe what plants and animals, including humans, need to stay alive and healthy, eg food, water and air identify the needs of a variety of living things in a range of situations, eg pets at home, plants in the garden or plants and animals in bushland and/or on farms <p>Early Stage 1 - Working Scientifically</p> <p>Students question and predict by:</p> <ul style="list-style-type: none"> responding to questions about familiar objects and events they are curious about in the natural and made environments (ACSIS014) <p>Students plan and conduct investigations by:</p> <ul style="list-style-type: none"> exploring and making observations by using their senses to gather information about objects and events in their immediate surroundings (ACSIS011, ACSHE013)  manipulating objects and materials through purposeful play <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> engaging in discussions about observations and using drawings to represent ideas (ACSIS233)  <p>Students communicate by:</p> <ul style="list-style-type: none"> using a range of methods to share observations and ideas, such as drawing, informal and guided discussion, role-play, contributing to joint construction of short texts and/or using digital technologies (ACSIS012)   	<p>Week 2 Lesson 3: Soil investigation</p> <p>Teacher background information</p> <p><i>The focus of this activity is for students to investigate a soil environment in order to develop their understanding about what living things need.</i></p> <p>Resources</p> <ul style="list-style-type: none"> Scoutle 'Create a soil environment' TLF ID L188 soil, sand, water, a collection of natural loose parts (sticks, stones, seed pods, leaves, flowers, straw, etc.) buckets, spades, watering cans, old cooking utensils (mixing bowls, spoons, plates, cups, muffin trays, cake tins, cookie cutters, etc.) containers for mud brick moulds (eg take-away containers). <p>Rotating small-group investigations</p> <p>Organise students into small groups to take part in investigative play.</p> <p>Activity 1: Create a soil environment (<i>complete with the teacher or adult</i>)</p> <ul style="list-style-type: none"> What makes good soil for plants to grow? Students engage with the Scoutle interactive 'Create a soil environment' They participate in making decisions about what is needed to successfully grow vegetables Students identify air, water, food, plants and soil helpers as elements of a healthy garden. <p>Activity 2: Investigating a soil environment</p> <ul style="list-style-type: none"> Students explore and make observations to gather information about sand, soil, water and mud. They investigate their various forms, states and uses Students manipulate the materials through purposeful play. They talk about their observations and make comparisons between soil, sand, mud 	<p>Extension</p> <ul style="list-style-type: none"> What other materials could we investigate?

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	<ul style="list-style-type: none"> Students predict, observe and explain what happens to soil, sand and mud when water is added How does the water move between soil, sand and mud? What might assist the plants to grow? Why do you think that? <p>Whole-class evaluation</p> <ul style="list-style-type: none"> Students draw a picture of a healthy soil environment. <p>Safety</p> <ul style="list-style-type: none"> Soil should be handled with PPE - Protective gloves and students must wash their hands after the activity. 	
<p>Early Stage 1 - Length</p> <p>Students:</p> <p>Use direct and indirect comparisons to decide which is longer, and explain their reasoning using everyday language (ACMMG006)</p> <ul style="list-style-type: none"> identify the attribute of 'length' as the measure of an object from end to end use everyday language to describe length, eg 'long', 'short', 'high', 'tall', 'low' 📏 use comparative language to describe length, eg 'longer', 'higher', 'taller than', 'shortest', 'lower than', 'longest', 'the same a's' 📏 record length comparisons informally by drawing, tracing, or cutting and pasting, and by using words and numerals <p>Early Stage 1 - Working Scientifically</p> <p>Students question and predict by:</p> <ul style="list-style-type: none"> responding to questions about familiar objects and events they are curious about in the natural and made environments (ACSIS014) making predictions resulting from their questions 🧩 <p>Students plan and conduct investigations by:</p> <ul style="list-style-type: none"> sharing what they already know and how they could find out more about their questions relating to the natural and made 	<p>Week 2 Lesson 4: A beanstalk for Jack!</p> <p>Teacher background information</p> <p><i>The purpose of this activity is for students to apply their knowledge about what plants need (soil, light, water and oxygen) to grow their own beanstalk. This knowledge should come directly from the discussions and observations made in the classroom.</i></p> <p><i>Students will be introduced to the concept of recording scientific observations and using informal measures to record their data.</i></p> <p>Resources</p> <p>To grow the beanstalk, each group will need:</p> <ul style="list-style-type: none"> a small resealable zip lock bag paper towel or paper napkins a bean water <p>Whole-class discussion</p> <p>Explain to students they will be growing a new beanstalk for Jack</p> <ul style="list-style-type: none"> What things will Jack's beanstalk need to grow? How do we know? (<i>Students should identify water, soil and sunlight as important things based on their investigations.</i>) 	<p>Extension</p> <ul style="list-style-type: none"> What are the roles of the different parts of the beanstalk? Investigate the roles of the stem, leaves and roots. <p>Support</p> <ul style="list-style-type: none"> Provide digital images of the changes over time and provide a time lapse to demonstrate this.

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<p>environments</p> <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> organising objects or images of objects to display data and/or information engaging in discussions about observations and using drawings to represent ideas (AC SIS233)  <p>Students communicate by:</p> <ul style="list-style-type: none"> using a range of methods to share observations and ideas, such as drawing, informal and guided discussion, role-play, contributing to joint construction of short texts and/or using digital technologies (AC SIS012)  working in groups to reflect on what they found interesting, liked or disliked about what they did, what was or was not expected and what they would do differently  <p>Early Stage 1 - Data</p> <p>Organise objects into simple data displays and interpret the displays</p> <ul style="list-style-type: none"> group objects according to characteristics to form a simple data display, eg sort blocks or counters according to colour <ul style="list-style-type: none"> compare the sizes of groups of objects by counting (Reasoning) <p>Early Stage 1 - Whole Numbers</p> <p>Students:</p> <p>Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point (AC MNA001)</p> <ul style="list-style-type: none"> count forwards to 30 from a given number count backwards from a given number in the range 0 to 20 <p>Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond (AC MNA002)</p> <ul style="list-style-type: none"> read numbers to at least 20, including zero, and represent these using objects (such as fingers), pictures, words and numerals  	<p>Small-group activity</p> <p>Organise students into groups of three.</p> <p>Steps:</p> <ul style="list-style-type: none"> Place a paper napkin or a cut paper towel into the plastic zip lock bag. Add the bean. Pour in a little water (<i>just enough to saturate the paper napkin</i>). Close the bag securely. Identify a window in the classroom that receives sunlight throughout the day and tape the zip lock bags in this location. Watch the beanstalk grow! <p>As the sun warms the bags, students may notice condensation forming on the inside. The condensation will get soaked up by the paper napkin.</p> <p>Students think, pair, share in their STEM groups:</p> <ul style="list-style-type: none"> what they found interesting about their investigation what they liked or disliked about their investigation. <p>With appropriate teacher or adult support, students make daily observations about their beanstalk, and:</p> <ul style="list-style-type: none"> water their bean observe and informally record any data, including any changes or lack of growth compare their results with other students compare their results with their predictions. <p>Optional activities</p> <ul style="list-style-type: none"> Once the beanstalks have grown, identify the different parts of the plant such as the stem, leaves and roots Use uniform informal units to measure the plant as it grows. For example, students may use cubes to record growth Use counters or blocks to form a simple data display about the sizes of the beanstalks. Use the display to compare the sizes by counting Take digital images of the plant over different days. These images can form part of a class-constructed short text explaining their investigation and results 	

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<ul style="list-style-type: none"> communicate the use of numbers through everyday language, actions, materials and informal recordings (Communicating)  	<ul style="list-style-type: none"> Introduce the concept of recording data by drawing a labelled diagram of the beanstalk and noting the changes observed each day. Alternatively, students could record any changes using a digital camera and then print and label their own photos Students reflect on what was or was not expected and what they would do differently next time. 	
<p>Early Stage 1 - Working Scientifically</p> <p>Students question and predict by:</p> <ul style="list-style-type: none"> responding to questions about familiar objects and events they are curious about in the natural and made environments (AC SIS014) <p>Students plan and conduct investigations by:</p> <ul style="list-style-type: none"> exploring and making observations by using their senses to gather information about objects and events in their immediate surroundings (AC SIS011, ACSHE013)  manipulating objects and materials through purposeful play <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> engaging in discussions about observations and using drawings to represent ideas (AC SIS233)  <p>Students communicate by:</p> <ul style="list-style-type: none"> using a range of methods to share observations and ideas, such as drawing, informal and guided discussion, role-play, contributing to joint construction of short texts and/or using digital technologies (AC SIS012)   working in groups to reflect on what they found interesting, liked or disliked about what they did, what was or was not expected and what they would do differently   <p>Early Stage 1 - Time</p> <p>Compare and order the duration of events using the everyday language of time (ACMMG007)</p> <ul style="list-style-type: none"> use terms such as 'daytime', 'night-time', 'yesterday', 'today', 'tomorrow', 'before', 'after', 'next', 'morning' and 'afternoon'  sequence events in time <p>Tell time on the hour on analog and digital clocks</p>	<p>Week 3 Lessons 5 and 6: How do plants move water around them?</p> <p>Teacher background information</p> <p><i>The focus of this activity is for students to investigate how water moves through the plant and how plants need and draw water to survive. They should make connections between plants in their local environment and the investigation.</i></p> <p><i>Plants need water to survive. They draw water up from their roots through their capillaries and out through their leaves through a process called transpiration. The capillaries are hollow and act in a similar way to a straw. Adding food colouring to the water helps students to visualise this process and make connections to their beanstalk investigation.</i></p> <p>Resources</p> <p><i>Teacher resource:</i></p> <p>The Colour- changing Celery Experiment</p> <ul style="list-style-type: none"> celery with leafy tops clear containers (plastic if available; plastic drink cups would be useful) water food colouring. <p>Whole-class activity</p> <p><i>Explain the safety precautions to students: food colouring is not to be swallowed.</i></p> <p>Remind students about their investigations and how living things (plants and animals) need water to survive.</p> <ul style="list-style-type: none"> What do we know about water and plants? How does water move around in plants? <p>Show students the celery, containers, food colouring and water</p> <ul style="list-style-type: none"> How could we use these materials to see how water moves around plants? 	<p>Extension</p> <ul style="list-style-type: none"> Encourage students to make suggestions about how the celery stalks can change colour. <p>Extension</p> <ul style="list-style-type: none"> Explain to students that fruits and vegetables are living things, of which we eat certain parts: Make a picture chart with these plant parts: the seeds, stems, flowers, leaves, and roots. Students add their own examples into the chart, eg corn seeds, celery stems, broccoli flowers, lettuce leaves and carrot roots.

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<ul style="list-style-type: none"> read analog and digital clocks to the hour using the term 'o'clock' 🕒 <p>Early Stage 1 - Natural Environment</p> <p>Living things have basic needs, including food and water. (ACSSU002)</p> <p>Students:</p> <ul style="list-style-type: none"> describe what plants and animals, including humans, need to stay alive and healthy, eg food, water and air 	<ul style="list-style-type: none"> Plan the experiment with students Encourage students to make a prediction about what they think will happen and record responses. <p>Small-group investigation</p> <p>Divide the class into groups of three or four.</p> <ol style="list-style-type: none"> Provide each group with a celery stalk (cutting the pieces of celery to same length, making sure to remove the white part at the base of the stalk. The leaves can be left on top) Fill the plastic cup with water to the same level or provide students with a premeasured cup of water Add 1 teaspoon of food colouring to each cup Place the celery stalk into the plastic cup, being careful not to tip it over (eg rest celery cup against a wall) Leave the stalks in the water for intervals of 2 hours, 4 hours and overnight. Students read analogue and/or digital clocks to the hour when checking their investigation <p>Small-group activity</p> <p>Students work in their STEM groups to:</p> <ul style="list-style-type: none"> observe and share their observations about the food colouring after 2 hours (<i>aim to observe on the hour to enable students to tell the time on the analog and/or digital clock</i>) observe and share their observations about the food colouring after 4 hours observe and share their observations about the food colouring the next day compare their results with their predictions. <p>Optional activities</p> <ul style="list-style-type: none"> Students draw sketches of or take digital photographs of their investigation They may add arrows to their drawing or the photograph to show the direction of the food colouring Jointly construct a short summary of the investigation and what the class has noticed about the way water travels around a plant. 	
<p>Early Stage 1 - Made Environment</p> <p>Objects are made of materials that have observable properties (ACSSU003)</p> <p>Students:</p>	<p>Week 4 Lesson 7: Design a strong beanstalk</p> <p>Teacher background information</p> <p><i>The focus of this activity is for students to consider different materials and select these according to their</i></p>	<p>Optional</p> <ul style="list-style-type: none"> Look at some time-lapse footage or animations to see how beanstalks are strong.

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<ul style="list-style-type: none"> ▪ group a range of materials on the basis of observable properties, eg flexibility, texture, strength and colour ▪ sketch or model ideas for a product, place or space and recount how their ideas suit their purpose   <p>Early Stage 1 - Working Scientifically</p> <p>Students question and predict by:</p> <ul style="list-style-type: none"> ▪ responding to questions about familiar objects and events they are curious about in the natural and made environments (ACSIS014) <p>Students plan and conduct investigations by:</p> <ul style="list-style-type: none"> ▪ exploring and making observations by using their senses to gather information about objects and events in their immediate surroundings (ACSIS011, ACSHE013)  ▪ manipulating objects and materials through purposeful play <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> ▪ organising objects or images of objects to display data and/or information <p>Early Stage 1 - Three-dimensional Space</p> <p>Students:</p> <p>Sort, describe and name familiar three-dimensional objects in the environment (ACMMG009)</p> <ul style="list-style-type: none"> ▪ sort three-dimensional objects and explain the attributes used to sort them, eg colour, size, shape, function <ul style="list-style-type: none"> ▶ recognise how a group of objects has been sorted, eg 'These objects are all pointy' (Communicating, Reasoning) ▪ manipulate and describe a variety of objects found in the environment 	<p><i>purpose.</i></p> <p><i>Prior to the lesson, encourage students to bring in images showing different ways beanstalks can grow.</i></p> <p>Resources</p> <ul style="list-style-type: none"> ▪ a variety of images and/or video footage showing how beanstalks grow ▪ straws (plastic and cardboard/paper) ▪ pipe cleaners ▪ modelling clay ▪ rolled-up newspaper pieces ▪ 'Unifix' cubes ▪ recycled materials ▪ animation ▪ time lapse. <p>Whole-class discussion</p> <p>Ask students how real beanstalks grow.</p> <p>Show students some of the collected images of beanstalks growing in different ways, eg:</p> <ul style="list-style-type: none"> ▪ climbing up a trellis or wire ▪ climbing up a pole or a stake ▪ being tied to/attached to a pole ▪ coiling around a pole or stake. <p>Whole-class investigation</p> <p>Explain to students that they will be designing their own beanstalks. The beanstalk will have to be strong and be freestanding.</p> <p>Some materials will be better to use than others.</p> <p>Explain to students that we can test the materials by learning about their properties.</p> <p>Provide students with a range of materials to investigate, including:</p> <ul style="list-style-type: none"> ▪ straws (plastic and cardboard/paper) ▪ pipe cleaners 	<ul style="list-style-type: none"> ▪ Animation ▪ Time lapse

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	<ul style="list-style-type: none"> ▪ modelling clay ▪ rolled-up newspaper pieces ▪ 'Unifix' cubes ▪ recycled materials. <p>Small-group activity</p> <p>Organise students into groups of three or four. Provide time for students to manipulate and play with the materials to investigate their properties, encouraging them to notice which materials:</p> <ul style="list-style-type: none"> ▪ bend ▪ twist ▪ are flexible ▪ are strong ▪ are not strong ▪ hold their shape ▪ can be torn ▪ can be fixed to another object. <ol style="list-style-type: none"> 1. Ask students to sort and then group these objects into categories. (<i>Categories should be based on observable properties e.g. stiff/flexible, hard/soft,)</i> 2. Take digital photographs and make a class display of observable properties using key words 3. Ask students to sketch some ideas for making a strong beanstalk for Jack to climb <p>Whole-class evaluation</p> <p>Invite STEM groups to share some of their sketches.</p> <p>Ask questions to assess student learning about the properties of different materials, such as:</p> <ul style="list-style-type: none"> ▪ What materials are strong in your beanstalk? Why? ▪ What materials are flexible? Why is this helpful? 	
<p>Early Stage 1 - Made Environment</p> <p>Objects are made of materials that have observable properties.</p>	<p>Week 4 Lesson 8: Design a strong beanstalk for Jack</p>	

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<p>(ACSSU003)</p> <ul style="list-style-type: none"> observe, using their senses, a range of materials used to make specific objects, products, places and spaces <p>Early Stage 1 - Working Scientifically</p> <p>Students plan and conduct investigations by:</p> <ul style="list-style-type: none"> exploring and making observations by using their senses to gather information about objects and events in their immediate surroundings (AC SIS011, ACSHE013) ✨ manipulating objects and materials through purposeful play <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> engaging in discussions about observations and using drawings to represent ideas (AC SIS233) ✨ <p>Students communicate by:</p> <ul style="list-style-type: none"> working in groups to reflect on what they found interesting, liked or disliked about what they did, what was or was not expected and what they would do differently ✨ 👥 <p>Early Stage 1 - Working Technologically</p> <p>Students explore and define a task by:</p> <ul style="list-style-type: none"> discussing the purpose and main features of what they need to produce and suggesting the materials they could use <p>Students develop ideas and produce solutions by:</p> <ul style="list-style-type: none"> using play and imagination to explore possibilities of products, places and spaces following a series of steps to draw or model ideas or construct solutions safely using common classroom equipment, resources and techniques to shape and join familiar materials <p>Students evaluate by:</p> <ul style="list-style-type: none"> discussing their likes and dislikes in relation to what they have produced 👥 <p>Early Stage 1 - Three-dimensional Space</p> <p>Students:</p>	<p>Resources</p> <ul style="list-style-type: none"> straws (plastic and cardboard/paper) pipe cleaners modelling clay rolled-up newspaper pieces 'Unifix' cubes recycled materials. <p>Whole-class discussion</p> <p>Ask students to look at their sketches from the previous lesson.</p> <ul style="list-style-type: none"> Describe the properties of the materials chosen for their beanstalk design. Why are these materials suitable choices? Explain to students they will be constructing their beanstalks using the sketches to help them. Encourage students to modify their designs as appropriate. <p>Small-group activity</p> <p>Provide students with an appropriate amount of time to construct their beanstalks.</p> <p>Teacher support to be provided as appropriate.</p> <p>Materials should include those tested for properties in the previous lesson, including:</p> <ul style="list-style-type: none"> straws (plastic and cardboard/paper) pipe cleaners modelling clay rolled-up newspaper pieces 'Unifix' cubes recycled materials. <p>Encourage students to manipulate their materials and share these ideas with other students. For example:</p> <ul style="list-style-type: none"> twist the pipe cleaners like in the coiled beanstalk images join the newspaper pieces and/or pipe cleaners together to make it longer position pipe cleaners around the straws to increase the strength 	

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<p>Sort, describe and name familiar three-dimensional objects in the environment (ACMMG009)</p> <ul style="list-style-type: none"> sort three-dimensional objects and explain the attributes used to sort them, eg colour, size, shape, function manipulate and describe a variety of objects found in the environment 	<ul style="list-style-type: none"> use the modelling clay to hold the straws in place. <p>Whole-class discussion</p> <p>STEM groups present their beanstalks to the class.</p> <ul style="list-style-type: none"> Students explain which materials they used and what properties were useful in their beanstalk design. They reflect on what they liked/disliked about their beanstalk investigation. 	
<p>Early Stage 1 - Three-dimensional Space</p> <p>Sort, describe and name familiar three-dimensional objects in the environment (ACMMG009)</p> <ul style="list-style-type: none"> describe the features of familiar three-dimensional objects, such as local landmarks including Aboriginal landmarks, using everyday language, eg 'flat', 'round', 'curved' 🏠👉 recognise and use informal names for three-dimensional objects, eg 'box', 'ball' 🏠 manipulate and describe a variety of objects found in the environment predict and describe the movement of objects, eg 'This will roll because it is round' 🌟 predict the building and stacking capabilities of various three-dimensional objects (Reasoning) 🌟 <p>Early Stage 1 - Working Technologically</p> <p>Students explore and define a task by:</p> <ul style="list-style-type: none"> discussing the purpose and main features of what they need to produce and suggesting the materials they could use <p>Students develop ideas and produce solutions by:</p> <ul style="list-style-type: none"> using play and imagination to explore possibilities of products, places and spaces <p>Early Stage 1 - Working Scientifically</p> <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> engaging in discussions about observations and using drawings to represent ideas (AC SIS233) 🌟 	<p>Week 5 Lesson 9: Design a tower</p> <p>Teacher background information</p> <p><i>The focus of this activity is for students to take part in investigative block play. This will help students develop reasoning skills about stacking three-dimensional objects. Students will also develop their vocabulary as they describe and manipulate a variety of shapes and test their predictions.</i></p> <p>Resources</p> <ul style="list-style-type: none"> three-dimensional objects such as Lego bricks, Mega Bloks, Cuisenaire Rods, wooden blocks or recycled materials uniform informal units to measure height of towers, eg 'Unifix' cubes. <p>Small-group activity</p> <p>Investigative block play</p> <p>Explain to students that Jack climbed a tall beanstalk that grew high into the sky. In this lesson, students will be helping Jack get to the top of the beanstalk in a different way- by designing a strong tower.</p> <ul style="list-style-type: none"> What makes a strong tower? What shapes make a strong tower? Why? How have you tested this before? <p>Provide students with a range of materials to investigate the stacking and building capabilities of three-dimensional objects.</p> <p>During the investigation, ask students questions about three-dimensional objects, such as:</p> <ul style="list-style-type: none"> Describe the shape _____ How do we know it is a ____? If we turn the shape upside down/sideways, now describe the shape. How do we know it is still a ____? 	<p>Extension</p> <ul style="list-style-type: none"> Encourage students to make connections between places and spaces they have visited and the shapes they are made of. This may extend their thinking about packing and stacking in a real-world application.

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	<p>During the investigation, ask students questions about the size of their tower, such as:</p> <ul style="list-style-type: none"> ▪ If both buildings have the same number of blocks, what makes this one taller? ▪ How can we find out whose building has more blocks? ▪ How can we make sure that _____ is taller/shorter/same as _____? (<i>Ask questions to guide students toward measuring with uniform informal units.</i>) <p>During the investigation, ask students questions about their tower designs, such as:</p> <ul style="list-style-type: none"> ▪ What would happen if ...? ▪ What else could you try...? ▪ Is there another way to...? ▪ How could you change...? ▪ What might explain...? ▪ How can you use _____ differently? ▪ What do you think is similar to this structure (or shape)? <p>Whole-class evaluation</p> <p>Ask students to think about the following two questions:</p> <ul style="list-style-type: none"> ▪ Why doesn't your tower fall down? ▪ How can we use these blocks to make something really tall that is strong and does not fall down? 	
<p>Early Stage 1 - Working Technologically</p> <p>Students explore and define a task by:</p> <ul style="list-style-type: none"> ▪ discussing the purpose and main features of what they need to produce and suggesting the materials they could use <p>Students develop ideas and produce solutions by:</p> <ul style="list-style-type: none"> ▪ using play and imagination to explore possibilities of products, places and spaces ▪ following a series of steps to draw or model ideas or construct solutions <p>Students evaluate by:</p>	<p>Week 5 Lesson 10: Design a tall tower for Jack</p> <p>Teacher background information</p> <p><i>The focus of this activity is for students to apply their mathematics knowledge about three-dimensional objects to design a simple tower. They use play and imagination to manipulate shapes, test predictions and follow steps to construct a solution.</i></p> <p>Resources</p> <ul style="list-style-type: none"> ▪ three-dimensional objects such as Lego bricks, Mega Bloks, Cuisenaire Rods, wood blocks or recycled materials 	<p>Extension</p> <ul style="list-style-type: none"> ▪ Students may wish to investigate types of towers and collect images to identify similarities and differences.

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<ul style="list-style-type: none"> recounting the steps taken to reach a final solution  <p>Early Stage 1 - Working Scientifically</p> <p>Students question and predict by:</p> <ul style="list-style-type: none"> responding to questions about familiar objects and events they are curious about in the natural and made environments (AC SIS014) <p>Students plan and conduct investigations by:</p> <ul style="list-style-type: none"> manipulating objects and materials through purposeful play <p>Students process and analyse data and information by:</p> <ul style="list-style-type: none"> engaging in discussions about observations and using drawings to represent ideas (AC SIS233)  <p>Early Stage 1 - Length</p> <p>Students:</p> <p>Use direct and indirect comparisons to decide which is longer, and explain their reasoning using everyday language (ACMMG006)</p> <ul style="list-style-type: none"> use everyday language to describe length, eg 'long', 'short', 'high', 'tall', 'low'  use comparative language to describe length, eg 'longer', 'higher', 'taller than', 'shortest', 'lower than', 'longest', 'the same as'  <p>Early Stage 1 - Three-dimensional Space</p> <p>Students:</p> <p>Sort, describe and name familiar three-dimensional objects in the environment (ACMMG009)</p> <ul style="list-style-type: none"> predict and describe the movement of objects, eg 'This will roll because it is round'  <ul style="list-style-type: none"> predict the building and stacking capabilities of various three-dimensional objects (Reasoning)  <p>Early Stage 1 - Whole Numbers</p> <p>Students:</p> <p>Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from</p>	<ul style="list-style-type: none"> uniform informal units to measure height of towers eg 'Unifix' cubes. <p>Whole-class discussion</p> <p>Ask students to reflect on their ideas from the previous lesson about three-dimensional objects, including their answers to:</p> <ul style="list-style-type: none"> Why doesn't your tower fall down? How can we use these blocks to make something really tall that is strong and does not fall down? What other materials would help us to build our tower? <p>Small-group activity</p> <ul style="list-style-type: none"> Students use the supplied materials to construct their towers for Jack. With support, they use uniform informal units to count out how tall their towers measure. <p>Whole-class activity</p> <p>Create a class table to record the different tower measurements.</p> <p>Encourage students to use comparative, everyday language to describe length including: 'higher', 'shortest', 'taller than', 'the same as'.</p> <p>Whole-class evaluation</p> <p>Discuss the steps taken to reach the tower solution for Jack</p> <p>Discuss the features of the towers that:</p> <ul style="list-style-type: none"> made them taller helped them balance and stay standing. 	

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<p>any starting point (ACMNA001)</p> <ul style="list-style-type: none"> ▪ count forwards to 30 from a given number <ul style="list-style-type: none"> ▶ communicate the use of numbers through everyday language, actions, materials and informal recordings (Communicating)  		

Assessment overview

- Students produce a variety of work samples, including participating in STEM investigation activities. These should be evaluated to determine students' level of achievement and understanding based on their ability to manipulate objects through purposeful play.
- Student understanding may be assessed through the use of observational checklists, anecdotal records and analysis of contributions to class discussions.
- Digital photographs and teacher questioning will provide assessment for learning information.

Evaluation

Questions to guide reflection

- To what level did students achieve the learning outcomes?
- How effective were the activities in helping students to understand key concepts and achieve the learning outcomes?
- Did teaching strategies and activities facilitate high levels of student engagement? Why/why not?
- How could the unit be improved to enhance student engagement and learning?
- How well did the activities enable students to use their Science and Technology and Mathematics skills in an integrated way?