VEYLDF Learning Outcome
Planning Cycle Resource

Children are confident and involved learners
Introduction

The Planning Cycle Resource has been designed to:

- demonstrate how the VEYLDF Early Years Planning Cycle can be applied to observe, assess and respond to evidence of children's learning
- illustrate and provide a model for the teaching of specific concepts to children aged from birth to eight years within everyday learning environments.

Each Planning Cycle Resource is supported by sample evidence markers. It is important to note that learning plans and their sample evidence markers are examples of planning and not comprehensive lists.

Structure of the learning plans

The learning plans in the Planning Cycle Resource are written in everyday language and are structured as follows:

- **Collect Information** – the educator briefly records evidence of a child (or group of children) engaged in an activity that demonstrates child learning.
- **Question/Analyse** – the educator analyses the observation to clarify what the child knows already and what the child may be ready to learn next. The educator then links this information to VEYLDF Outcome Evidence Markers or the first three levels of the Victorian Curriculum F–10 Achievement Standards.
- **Plan** – the educator identifies learning aims that are linked to VEYLDF Evidence Markers or the first three levels of the Victorian Curriculum F–10 Achievement Standards, and writes a brief outline of what the educator will provide to consolidate or extend the child’s learning. This
includes specific vocabulary the educator will model and scaffold. It also includes some open-ended questions the educator may ask to encourage the child (children) to explain or demonstrate their thinking.

- **Act/Do** – the educator sets up and delivers the learning activity, paying attention to the extent to which the child engages with the aims of the learning plan.
- **Reflect/Review** – with the learning aims in mind, the educator evaluates what the child learnt and considers whether to repeat, refine or extend the plan. Alternatively, the educator may choose to keep the learning aims and apply them to other playful activities.
- **Collect Information** – the educator briefly records evidence of a child (or group of children) engaged in the planned learning activity that demonstrates child learning.
- … and the planning cycle continues.

The learning plans are organised by the age ranges birth to two years, three to five years and six to eight years to make navigation through the document easier.

**Content**

- This Planning Cycle Resource focuses on evidence of science and mathematics to support educators’ understanding of the continuity of learning in these concept areas. The Planning Cycle Resource illustrates how knowledge of the trajectory of children’s learning informs an educator’s decision-making: decisions about what is worth noting and observing, and decisions about what could be planned next for children.
- The sample evidence markers reflect science or mathematics concepts for the key components of learning in the VEYLDF Learning and Development Outcome ‘Children are confident and involved learners’. In turn, these key components of learning are mapped against the achievement standards in the first three levels of the Victorian Curriculum F–10.

**Clear learning aims support assessment and planning**

The learning plans are a useful model for making children’s learning visible. In addition, when educators develop learning aims that are based on evidence of child competency, it is possible to follow a child’s interests while still addressing the planned learning aims. For example, if a learning aim is to support a child's exploration of the measurement of length using informal units, the learning aim can be achieved regardless of whether the child measures the length of a rug with building blocks or the length of the sandpit using spades.

When educators have clear aims for planned learning activities, it becomes possible for the educator to assess whether, and to what extent, the learning aims are achieved – either during the planned activity or later in the context of a different activity. This equips educators to feel confident about what constitutes evidence of learning. This learning should be documented in order to meet the requirements of the National Quality Standard (in particular 1.2.1, 1.3.1 and 1.3.3). Developing confidence about the learning observed equips educators to make decisions about links to appropriate VEYLDF Learning and Development Outcomes. Alternatively, the educator is equipped to make decisions about which achievement standard of the first three levels of the Victorian Curriculum F–10 the observation is best related to.

The Planning Cycle Resource supports educators’ conversations with families and other professionals. This evidence can be used in discussion with families and other professionals to extend children’s learning in a range of settings, including the home learning environment. This approach strengthens the monitoring of child learning over time by educators and families.
Learning Plans & Sample Evidence Markers

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Block bridge

<table>
<thead>
<tr>
<th>Collect information</th>
<th>Twenty-month-old Zaharah often plays with wooden blocks, stacking them on top of each other. The blocks are all different shapes. There are cylinders, semi-circular blocks, triangular blocks, pyramids and cones, as well as cubes and rectangular blocks. Zaharah stacked blocks into towers up to six blocks high before they fell or she knocked them down. She used a cylinder in many of her towers, always rotating the cylinders to stand on a flat side before adding them to the towers. When she sometimes put a triangle or conical block on her tower, she would later remove it before placing a different block on the tower.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question / Analyse</td>
<td>Zaharah understands that blocks need to be placed with a flat side plane on a flat side for the greatest stability. She is very good at rotating the blocks to do this. She removes the triangular blocks without first trying to balance a block on their tips. She repeatedly builds vertical towers. Has she worked out other ways to build with blocks? <strong>VEYLDF Learning Outcome Evidence Marker:</strong> • manipulate objects and experiment with cause and effect, trial and error, and motion</td>
</tr>
<tr>
<td>Plan</td>
<td><strong>Aims:</strong> For the learner to: • balance a block across two others to build a simple bridge • experiment with different bridge designs <strong>VEYLDF Learning Outcome Evidence Marker:</strong> • use the processes of play, reflection and investigation to problem-solve • develop an ability to mirror, repeat and practise the actions of others, either immediately or later Set up some fabric to represent a river in the block corner. Join Zaharah in her play. Create a simple bridge across the river using two towers with a long rectangular block balanced across them. Make up a story about why you need to get from one side of the river to the other. Ask Zaharah if she can make a bridge like yours. If necessary, scaffold this by using simple language to narrate your actions as you demonstrate how you built the bridge. Zaharah may need assistance to ‘line up’ the blocks on both sides, or to hold them steady as she places the long block across the towers. Encourage Zaharah to build more bridges so that she can consolidate her skill. Demonstrate the process of estimating the distance between the two supporting towers. Build them too far apart to begin with, and then right next to each other, showing and describing the difference to Zaharah. Experiment with using towers of different heights as bridge supports, and talk about what happens when you try to put the long block on top. Ask open-ended questions such as, ‘What do you think what will happen now?’ as you try to place long blocks on supports that are different heights, or on supporting blocks that are spaced either too far apart or too close together. <strong>Vocabulary</strong> same, different, long, short, tall, height, straight, far apart, close together, next to, along, across, over, under, balance.</td>
</tr>
<tr>
<td>Act / Do</td>
<td>Look back at the aims of this learning experience to guide your reflection/review. • Did Zaharah try and arrange the blocks in bridge formations? • Does Zaharah experiment by making other interesting shapes over the following days? What will you plan next to consolidate or extend this learning?</td>
</tr>
<tr>
<td>Reflect / Review</td>
<td></td>
</tr>
</tbody>
</table>
Sinking and floating

Twenty-month-old Thomas was playing outside. It had rained overnight and there was a large muddy puddle in the playground. Thomas picked up a stone and dropped it into the puddle. It disappeared from view in the muddy water. ‘Gone,’ said Thomas, turning his hands up and shaking his head. He dropped a leaf in the water and it floated on top of the water. Thomas said nothing. He picked up another stone and dropped it into the puddle. ‘Gone’ he said again as it went under the water.

Thomas has discovered that rocks and leaves behave differently when dropped into water. He communicates this by using the word ‘gone’ for the stones and no word at all for the leaf. He experiments to test that he gets the same result with another stone.

**VEYLDF Learning Outcome Evidence Marker:**
- explore their environment
- explore ideas and theories using imagination, creativity and play

**Aims:**
For the learner to:
- experiment with objects that either float or sink
- develop their vocabulary related to sinking and floating

**VEYLDF Learning Outcome Evidence Marker:**
- use reflective thinking to consider why things happen and what can be learnt from these experiences
- engage with and co-construct learning

Set up a water play tub and gather a number of objects that sink or float. Play with Thomas and a small group of learners at the tub. Model dropping objects into the water one at a time. Before you drop each object into the water, tell the learners whether you think it will sink or float. After you drop it in, say whether you were right or not.

Encourage the learners to choose an object to drop into the tub. Each time, ask them to guess whether their object will sink or float before they drop it in. Use this opportunity to introduce new language as you describe what happens to their object after they’ve dropped it in. It’s okay if your questions are not answered – providing learners with opportunities to hear new words many times over is the best way to extend their vocabulary. With time, they will make a prediction.

Try to make an object that usually sinks, balance on an object that floats (like a rock on top of a leaf). Talk to the learners about what you are doing. Describe what happens as you experiment.

Try to push floating objects under the water and then describe what has occurred.

**Act / Do**
Ask open-ended questions such as, ‘I wonder what will happen when …?’ to encourage the learners’ thinking and to encourage them to express their understanding of mathematical and scientific concepts.

**Vocabulary** sink, float, top, bottom, underneath, below, light, heavy, absorb, hollow.

**Reflect / Review**
Look back at the aims of this learning experience to guide your reflection/review.
- Did the learners experiment with objects that float and objects that sink?
- Learners at this age understand a lot more than they can express with words. Did you provide plenty of vocabulary and modelled language?
- Did you allow enough time for learners to speak as well? This can be a tricky balance, especially with learners aged younger than three years. Try ‘pulling back’ and allowing longer pauses between questions to see if the learners speak if they are given more thinking time.

What will you plan next to consolidate or extend this learning?
### Springtime

**Collect information**

Thirty-month-old Amelia had been walking around the garden with an adult. As they walked, the adult pointed to new buds on the bushes and trees, and to bulbs that were beginning to grow out of the earth. 'Look, Amelia!' the adult said each time as she pointed to a bud or bulb. She explained, 'It’s springtime. Look at the plants beginning to grow again.'

A short time later, Amelia was playing in a different part of the garden when she called the adult over. 'Look!' she said, smiling and pointing to a bulb emerging from the earth.

**Question / Analyse**

Amelia is repeating the actions of the adult. She understands that the adult is drawing attention to a certain kind of new growth, and has applied this knowledge in a new setting. She demonstrates enthusiasm in observing changes in her environment, and takes pleasure in sharing these observations with an adult.

**VEYLDF Learning Outcome Evidence Marker**

- develop an ability to mirror, repeat and practise the actions of others, either immediately or later
- express wonder and interest in their environments
- experience the benefits and pleasures of shared learning exploration

**Aims**

For the learner to:

- learn about the life cycle of a plant
- role-play the life cycle of a daffodil

**VEYLDF Learning Outcome Evidence Marker**

- make connections between experiences, concepts and processes
- follow and extend their own interests with enthusiasm, energy and concentration

Find some pictures of a bulb, a bulb with a stem, a stem with some leaves, a stem with leaves and a flower, and finally a wilting plant with dead leaves. Display these in the sequence that shows the life cycle of a plant.

Talk about the pictures with the learners.

Invite the learners to join you in copying the picture sequence:

- Curled up into a tiny ball, sleeping under the ground like a bulb.
- Like an emerging shoot growing to a stem, slowly pushing one hand into the air, then gradually standing up and stretching as high as they to be the stem.
- Becoming a flower by cupping their hands above their head while they keep their roots (feet) firmly in the ground; swaying from side to side as in the breeze.
- After swaying gently in the breeze, slowly wilting and crumpling to the ground then curling into a ball again to become the bulb waiting for the next spring.

You could add music with a slow tempo to this role play. Repeat the life cycle sequence a few times.

After repeating the sequence a few times, observe whether the learners are able to make the shapes associated with each picture out of sequence. For example, if you point to the flower picture, do the learners reach up with their hands cupped?

**Act / Do**

Ask open-ended questions such as, 'I wonder how the shoot knows which way to grow?' or 'I wonder what is inside the bulb?' (Find the answers to your questions beforehand.)

**Vocabulary** bulb, shoot, stem, leaf, flower, root, wind, breeze, spring, summer, autumn, winter, season, up, down, under, stretch, high, sun, sky.

**Reflect / Review**

Look back at the aims of this learning experience to guide your reflection/review.

- How much did the learners learn about the life cycle of a plant? How do you know this?
- Did the learners role-play the life cycle of a daffodil? Did this support their learning?
- Can the learners connect each picture with a particular body movement or shape?
- If you used music, how did this affect the learners’ movement?

What will you plan next to consolidate or extend this learning?
**Lunchtime percussion**

<table>
<thead>
<tr>
<th>Collect information</th>
<th>Six learners in the toddler room were sitting around the meal table waiting for lunch to be served. Harry started to bang his cup loudly on the table, grinning. His friend Levi copied him, and soon all the other learners started banging their cups on the table.</th>
</tr>
</thead>
</table>
| Question / Analyse | Harry is initiating his own activity as he waits. His enthusiasm draws other learners in. Together they experiment with sound making. Harry has discovered that he can make a loud noise by banging the cup against the table. What else does he know about making percussive noises?  
**VEYLDF Learning Outcome Evidence Marker**  
- use their senses to explore natural and built environments |
| Aims | For the learner to:  
- copy the rhythm of an adult or another group member  
- experiment with tempo, volume and patterning  
**VEYLDF Learning Outcome Evidence Marker**  
- initiate and contribute to play experiences emerging from their own ideas  
- develop an ability to mirror, repeat and practise the actions of others, either immediately or later |
| Plan | Start by tapping a medium volume, steady beat on the edge of the table with your hands. Invite the learners to join in with you. See if they can follow your beat.  
Next, tell the group of learners that you’re going to switch to a loud beat, and raise your voice to reinforce this. Beat on the table a little harder, but keep the tempo the same.  
Now, switch to just two fingers and tap very softly, with the same tempo. Change your voice to a whisper to further signal this change.  
Now speed up your beats. Say ‘let’s go as fast as we can!’  
Then slow your beats right down, and slow your voice down as well.  
You can also tap out a simple rhythm, like, one-two-three-wait, one-two-three-wait.  
Once the learners are able to copy you, invite a learner to be the leader and choose a rhythm. Everyone follows the new leader. Encourage learners to take a turn being the leader.  
Describing the rhythm or volume helps to expand the learners’ vocabularies and introduces them to concepts like loud, soft, fast and slow. It also introduces opposites. Counting out the rhythm helps the learners to identify the pattern. |
| Act / Do | As the tapping patterns change, encourage the learners to listen carefully to the patterns before joining in. Ask open-ended questions such as, ‘I wonder what the next tapping pattern will be?’ Use your voice to provide hints. For example, speak quietly (to indicate quiet tapping) or quickly (for a fast tempo tapping pattern).  
**Vocabulary** fast, slow, loud, quiet, tap, beat, rhythm, pattern, volume, tempo, speed. |
| Reflect / Review | Look back at the aims of this learning experience to guide your reflection/review.  
- Did the learners copy the rhythm of an adult or a peer?  
- Did the learners experiment with tempo, volume and patterning?  
What will you plan next to consolidate or extend this learning?  
**Note**  
Routines can require young learners to spend time waiting, but this needn’t be ‘empty time’ – routines can easily become learning time.  
Watch how the learners’ ability to copy your rhythm improves with practice. In the beginning, it may be challenging but if you continue to scaffold their understanding of tempo, volume and rhythm, they will develop this ability over time. |
### Oobleck colour mixing

**Collect information**
Twenty-four-month-old Pawan was at the finger-painting table with a friend, Sascha. Pawan was using blue fingerpaint and his friend was using yellow paint. Pawan reached across with a hand covered in blue paint and wiped it over his friend’s yellow paint. He rubbed it back and forth many times, watching closely as the yellow paint turned green. Sascha stopped his own painting and watched Pawan closely and then joined in, rubbing blue paint into the yellow to make green.

**Question / Analyse**
Pawan demonstrates observation skills, watching closely as the two colours become a third colour when mixed together. Although he doesn’t use verbal cues, his sustained engagement and body language communicates this learning. Pawan models colour mixing to Sascha. The two boys co-operate to mix the colours together, creating the new paint colour.

**VEYLDF Learning Outcome Evidence Marker**
- use play to investigate, imagine and explore ideas

**Plan**

<table>
<thead>
<tr>
<th>Aims</th>
<th>For the learner to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• transfer new knowledge about colour mixing to a different sensory medium</td>
</tr>
<tr>
<td></td>
<td>• learn new colour and texture vocabulary</td>
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</tbody>
</table>

**VEYLDF Learning Outcome Evidence Marker**
- make connections between experiences, concepts and processes
- experience the benefits and pleasures of shared learning exploration

Make a large tub of oobleck using cornflour and water. Oobleck is a ‘non-Newtonian’ fluid that sometimes behaves like a liquid and sometimes like a solid, depending on what you do with it. The learners can help you to mix the oobleck. Discuss the steps as you make it. Make connections to processes familiar to the learners like mixing a cake, mixing paint or mixing sand and water. Once the oobleck is ready, add a few drops of red, blue and yellow food colouring in different parts of the tub. Mix them in a little with a spoon to avoid colouring hands too much! Then encourage the learners to mix the coloured oobleck together, and narrate what you see happening. Ask questions about what colours they see, as well as what shapes and textures they experience.

**Act / Do**

| Oobleck is a great medium to try for colour mixing because it is quite difficult to mix the colours quickly, and they swirl together in a very appealing way. You should have a colourful marbled pattern for some time before it becomes one uniform colour. Discuss the marbling with the learners as it occurs. Make comparisons with other familiar experiences as you play with the oobleck. For example, it runs through your fingers like water, but when we slap a hand into it, it doesn’t splash. What could be the reason for this? Ask open-ended questions such as, 'Why do you think the colour is dark here but lighter here?’ and 'What do you think will happen when these two colours mix together? Why do you think that?’ |

**Vocabulary**
- colour names, mix, swirl, blend, liquid, solid, marbled, lines, squiggly, blob.

**Reflect / Review**

Look back at the aims of this learning experience to guide your reflection/review.
- Were the learners able to transfer new knowledge about colour mixing paint to colour mixing oobleck?
- Have the learners gained new colour and texture vocabulary? (Which words have they learnt?)
- Watch how the learners interact with the unique texture of oobleck. Do they appear to like it? What other interesting textures could you introduce?

What will you plan next to consolidate or extend this learning?

**Note**
When you plan for other experiences involving mixing powders and liquids, like mixing powder paint or cooking, connect the learners’ understandings by reminding them of this activity.
Shells and bumps

<table>
<thead>
<tr>
<th>Collect information</th>
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</thead>
<tbody>
<tr>
<td>Hazel and Sebastian are interested in shells. Yesterday, you planned a learning experience that extended their interest in the patterns on the shells (stripes and spots) and planned a treasure hunt for natural materials. The learners grouped their treasure according to a particular attribute of the objects they collected (size, shapes, patterns on the natural materials). One of the objects they found on their treasure hunt was a leaf with some raised bumps on it. This leaf was placed in the ‘spots’ category. The learners wondered what the bumps were, and responded enthusiastically when you suggested they try to find out more.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question / Analyse</th>
</tr>
</thead>
<tbody>
<tr>
<td>The experience demonstrated that the learners have a good understanding of classification according to visual features including colour, shape and pattern. They also expressed interest and enthusiasm in finding out what the bumps on the leaves were. How could the learners be supported to find out more?</td>
</tr>
</tbody>
</table>

**VEYLDF Learning Evidence Marker**
- express wonder and interest in their environments
- explore their environment

<table>
<thead>
<tr>
<th>Plan</th>
</tr>
</thead>
</table>
| **Aims**
For the learner to:
- hypothesise about the bumps on the leaf they have found
- resource their own learning, using known and new tools for research

**VEYLDF Learning Evidence Marker**
- participate in a variety of rich and meaningful inquiry-based experiences
- make predictions and generalisations about their daily activities, aspects of the natural world and environments, using patterns they generate or identify, and communicate these using mathematical language and symbols
- use the processes of play, reflect and investigation to problem-solve

First, invite the learners to imagine and guess what the bumps might be. Encourage them to think about the environment where the leaf was found — what else might be found there? Look closely at the bumps, perhaps with a magnifying glass. Are there any clues? The size? The shape? The colour? If the learners think they know the answer, ask them how they know, or why they think that.

Ask the learners how they could find out more about the bumps, or find the answers to any other questions that came up during your discussion.

Learners may suggest:
- asking an adult
- looking at a book
- using ICT

Follow the learners' suggestions to find the answers to their questions. If their suggestions lead to a dead end, encourage them to think of another way to find the answers.

This activity gives the learners autonomy over their learning. Hypothesising and researching answers are important skills that will continue to develop with rehearsal. They also support learning dispositions, perseverance and a sense of achievement when the answers to questions are found.

<table>
<thead>
<tr>
<th>Act / Do</th>
</tr>
</thead>
</table>
| Each research method you use with the learners gives you an opportunity to develop the learners’ knowledge.

- If the learners decide to ask someone, brainstorm together who this person could be and write a list of the people they suggest. Then discuss who is most likely to know the answer and why. Discuss how they could approach the person. Learners may suggest the person be contacted by letter, telephone call, email or a video from the group.

- If the decision is to use a book, use the opportunity to model how we use an index or a table of contents to organise information and to help make answers easy to find.

- If the decision is to use ICT, agree on a search term. Then, show the group of learners how to use a search engine.

Don't be afraid to tell the learners if you don't know the answers to their questions. This makes you a co-learner.
<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>This will vary, depending on the suggestions learners make and the research questions they have. You could make a list of the new words and plan ways to include them in your program to consolidate the learning.</th>
</tr>
</thead>
</table>
| Reflect / Review | Look back at the aims of this learning experience to guide your reflection/review.  
• How much knowledge about plants was demonstrated by the learners’ hypotheses about the bumps on the leaves?  
• Were the learners familiar with different ways of looking for answers to their questions? If not, this could itself be a focus for future planning.  
• How challenging was it to find answers to their questions? How much support did the learners need? Adjust future planning accordingly.  
• Were the learners’ hypotheses about the bumps based in reality or fantasy? If their answers were fantasy-based, include the bumps in stories and drama activities, or create a fairy, pixie or elf garden together so that the learners have an opportunity to further explore imaginative play.  
What will you plan next to consolidate or extend this learning? |
**Hearts**

Four-year-old Evie was painting hearts all over a large piece of paper on an easel. 'I've got so many hearts on mine – maybe 50!' she said to her six-year-old sister, Zara. ‘One, two, three, four, five, six, seven, eight, 11, 12, 27, 22, 65, 50!' she said, very quickly, as she pointed with her paintbrush at the hearts on her paper. She said the number words one to eight as she pointed to the first eight hearts, and then waved her finger quickly over the other hearts as she continued saying number words. Zara shook her head. 'That's not how you count,' she said, and proceeded to count the hearts, pointing to each heart in turn and tagging it with one number word. She counted correctly and identified that Evie had painted 23 hearts. ‘There's only 23, not 50,' she said.

**Question / Analyse**

- See Planning Cycle Resource for 3-5 years – Communication Outcome: Hearts for another planning direction for Evie
- See Planning Cycle Resource for 6-8 years – Communication: Hearts for analysis and planning for Zara

Evie appears to be using her painting to record and/or practice making heart shapes. She understands that she has done 'so many' hearts, and that this description is connected to a final (cardinal) number count and that this number should be a large number. Evie counts accurately to eight, skips nine and ten, but says 11 and 12 in the correct sequence. Consolidating an accurate count to 12 would be an appropriate plan for Evie.

**VEYLDF Learning Evidence Marker**

- create and use representation to organise, record and communicate mathematical ideas and concepts

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**Plan**

**Aims**

For the learner to:
- use marks on a page to represent and record a real-world reference
- create and use representation to organise, record and communicate mathematical ideas and concepts

Assemble a collection of objects that are the same apart from one feature, be it colour, pattern, size. This example uses animal counters that are identical apart from being different colours (red, blue, green and yellow).

Put all the animal counters in a bag. Aim to have enough counters so that each person gets 12 counters. Give each participating learner a tally sheet, divided into four columns, and have pencils, textas or crayons available.

Show the learners the animal counters, and explain that the idea is to see how many of each colour each person gets. Show the learners how to label the columns at the tops of their tally sheets by drawing an animal in each colour.

**Act / Do**

Pass the bag around the circle. Each person closes their eyes and takes a turn to remove one (or two) animal counter(s), placing the counters in front of them until the bag is empty.

Then, everyone opens their eyes and looks at their animal counters. Demonstrate how to count all of the counters you took from the bag, tagging each animal with one number word. Emphasise the last number word that you say and explain that it is special because it tells us how many you have. Invite each learner to count their animals, supporting an accurate count if necessary.

Then, count how many (red/blue/green/yellow) animals you have, starting with one colour. Record this on the tally sheets. Depending on the learners' number knowledge, you could make tally marks (lines or circles) in the appropriate column, draw the correct number of counters in the appropriate column, or write the numeral. Then count the next colour.

Each learner records their animals on their sheet. Place the sheets next to each other to compare their data. Be aware that learners may draw similar objects, different sizes – discuss this, and emphasise that it is the number that is important, not the size of the drawing.

Ask questions such as, 'Who got the most red animals? Who got the least blue?' Follow these questions with open-ended questions such as, 'How do you know?' and 'Show me how you worked that out?'

**Vocabulary** number words, more than, less than, same as, different, same, most, least
<table>
<thead>
<tr>
<th>Reflect / Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look back at the aims of this learning experience to guide your reflection/review.</td>
</tr>
<tr>
<td>• Did the learners use marks to represent and record a real-world reference?</td>
</tr>
<tr>
<td>• Did the learning experience support their counting skills?</td>
</tr>
<tr>
<td>• Were the learners able to compare quantities and explain their thinking?</td>
</tr>
<tr>
<td>What will you plan next to consolidate or extend this learning?</td>
</tr>
</tbody>
</table>
Pipe and ball

| Collect information | Noah was holding a length of PVC pipe at an angle. He put a ball into the top of the pipe, and watched it roll down and out of the pipe, and a little way across the paved area. Noah stacked some nearby blocks into a tower. Then he picked up the pipe again and put the end on the ground right next to the tower. He sent the ball down the pipe again, and the ball knocked over the tower. Noah laughed and began building the tower again. |
| Question / Analyse | Noah is using the simple machine of an inclined plane (the PVC pipe) to direct an object’s force at his tower, knocking it over. Noah tested the ball and pipe first and then he built the tower to knock over. This reflects that his actions were deliberate. It suggests that he developed and then tested a hypothesis about what would happen when the ball hit the tower. |
| Aims | For the learner to:  
• experiment with force and inclined planes  
• understand that various factors may influence the amount of force exerted by an object |
| Plan |  
• manipulate objects and experiment with cause and effect, trial and error, and motion  
• use reflective thinking to consider why things happen and what can be learnt from these experiences  
| Act / Do | Invite Noah to help you position the pipe at a table angle. You could tape it to the edge of a table or chair, or rest it on a soft surface (like a cushion) to prevent it from rolling around.  
Gather an assortment of objects of different shapes and sizes. Make sure they will all fit into the pipe.  
Build the tower of blocks with Noah a distance away from the lower end of the pipe. |
| Reflect / Review | Encourage Noah to try to knock the tower down by sending each of the objects down the pipe.  
Try building a taller tower and a shorter tower to see if this makes a difference to the results.  
Try building the tower closer to the pipe and further away from the pipe.  
Try increasing the angle of the pipe to make it a steeper slide. Try reducing the angle of the pipe.  
Ask open-ended questions such as, 'Why do you think that happened?' Or, 'What made (that object) knock the tower down?' |
| Vocabulary | angle, slant, ramp, heavy, light, big, small, tall, short, strong, weak, roll, slide, up, down, high, low |
| VEYLDF Learning Evidence Marker | • initiate and contribute to play experiences emerging from their own ideas |
| VEYLDF Learning Evidence Marker | • manipulate objects and experiment with cause and effect, trial and error, and motion  
• use reflective thinking to consider why things happen and what can be learnt from these experiences  
| Reflect / Review | Look back at the aims of this learning experience to guide your reflection/review.  
• Did the learning experience support Noah’s experimentation with force and inclined planes?  
• What evidence did you observe that Noah learnt that various factors influence the amount of force exerted by an object?  
• Would Noah be interested in extending this play by using a plank instead of a pipe?  
• Did Noah consider strengthening the structure to make it harder to knock over?  
What will you plan next to consolidate or extend this learning? |
# Floating and sinking

Three-year-old Jake visited his brother Thomas in the Toddler Room while the toddlers were investigating floating and sinking. (See Planning Cycle Resource for Birth to Three Years – Learning Outcome: Floating and Sinking.) Thomas' teacher told Jake's teacher that he had enthusiastically hypothesised about whether his objects would sink or float before putting them in the water. Although his hypotheses were not always correct, he was able to describe the objects correctly as sinking or floating after putting them in the water. ‘Is there any way we could make this foam square sink?’ Thomas’s teacher asked Jake. Jake pushed it under the water and let go. It bobbed to the surface again. ‘Nope,’ he said.

Jake participates enthusiastically in the learning experience, and he has a solid understanding of the concepts of sinking and floating. However, as his hypotheses are not always correct, he may not yet be thinking about what factors affect whether objects sink or float in water. Further evidence is that he did not suggest ways to make an object that floats become an object that sinks in the water. He does test one hypothesis – pushing the foam square under the water – but he stops testing here and gives a definite negative answer. A possibility for extension would be to encourage further testing.

**VEYLDF Learning Evidence Marker**
- are curious and enthusiastic participants in their learning
- manipulate objects and experiment with cause and effect, trial and error, and motion

## Aims
For the learner to:
- suggest how an object that floats can become an object that sinks, and test his hypothesis

**VEYLDF Learning Evidence Marker**
- use reflective thinking to consider why things happen and what can be learnt from these experiences
- participate in a variety of rich and meaningful inquiry-based experiences.

Read the book *Who Sank the Boat?* by Pamela Allen. Before you read, look at the cover and ask the learners to predict which animal might be the one to sink the boat. Ask them to explain their reasons.

At the beginning of the book reading, ask Jake if the boat is floating or sinking. How do we know? As each animal gets into the boat, what happens? At the end of the story, ask the learners if the boat is floating or sinking? Why? How did the boat sink? What made it sink? Encourage Jake to explain.

Prepare the water play tub and provide objects to represent the animals in the book and the foam square to represent the boat. (Try out your learning experience ahead of time – you may need to change some of the animals you have chosen to use.)

## Act / Do
Return to the water play tub. Ask Jake if he thinks we could make the foam block sink. Ask Jake if he can remember which animal got in first. Then choose an object to represent that animal. Put the object on the ‘boat’. What happens?
Which animal was next in the story? Choose another object to add to the boat. Continue to add objects to the foam square and observe changes until the foam square sinks.
Ask open-ended questions such as, ‘Why do you think that happened?’

**Vocabulary** sink, float, top, bottom, underneath, below, light, heavy, absorb, hollow, many, few, more, low, high, heavy, light

## Reflect / Review
Look back at the aims of this learning experience to guide your reflection/review.
- Did Jake make suggestions about how to make an object that floats (the foam square), sink?
- Did Jake try adding ‘animals’ until the ‘boat’ sank? What conclusions did he come to?

What will you plan next to consolidate or extend this learning?
Water volume

Three-year-old Liam was playing with two containers in the water play trough. He filled the larger container with water using the smaller cylinder as a scoop. A teacher asked Liam how many small cups of water could fit in the larger one. Liam responded, ‘Three’. The teacher asked Liam how he could be sure of his answer. Liam immediately emptied both containers and began to fill the small container and pour the water into the large container, counting, ‘One, two, three, four, five.’ Each number accompanied one pour, but the smaller container was not filled to the top each time. He stopped and held up the large container, which was less than half full, and said, ‘Five’.

Liam appears to have grasped the counting principle of one-to-one correspondence, as he tags each pour with one number word. He also understands the principle of cardinality – that the final number in the counting words that he uses in this activity answers the teacher’s question.

Liam's grasp of volume measurement may benefit from some support. Because the smaller cup is not filled to the brim each time, his units of measurement are not the same. He doesn't seem to understand why the small container should be full each time.

**VEYLDF Learning Evidence Marker**
- use play to investigate, imagine and explore ideas

**Aims**

For the learner to:
- understand that equal units must be used for measurement to be accurate
- consolidate his understanding of 'full' and 'empty'

**VEYLDF Learning Evidence Marker**
- manipulate objects and experiment with cause and effect, trial and error, and motion
- create and use representation to organise, record and communicate mathematical ideas and concepts

Use two containers at a large water trough: one small container and one about three or four times the capacity of the smaller container. It is helpful if the containers are transparent. Adding a couple of drops of food colouring to the water makes the water level easier to see.

**Act / Do**

First, ask Liam, 'What does full mean?' Establish that full means that the water goes all the way to the top of a container. You may fill one container and leave the other empty, asking which is full and which is empty.

Ask Liam to fill the small container and then to pour the water into the larger container. Ask 'Is the large container full? How can we make it full?'

Continue to fill the small container and pour the water into the large container until the large container is full. Count aloud together to keep track of how many small containers it takes to fill the large container, then pour the water out again.

Next, ask Liam to put some water in the small container, but not to fill it up. Point out to him that the small container is not full.

Next, see how many part-filled containers it takes to fill the large container. Count aloud together. Did you get the same result as the first time?

Encourage experimenting several times to check results.

This learning experience could be delivered to a small group of learners with different size containers that they use to fill larger containers of the same size.

Ask open-ended questions such as, 'Why do you think that happened?' Or, 'Why did Liam's big container hold three but Max's held six?'

**Vocabulary** full, empty, top, bottom, more, less, lots, a little, large, small, many, few

**Reflect / Review**

Look back at the aims of this learning experience to guide your reflection/review.
- Do the learners understand that units of measurement need to be the same size to measure volume accurately?
- Did the learners use the words 'full' and 'empty' appropriately?

What will you plan next to consolidate or extend this learning?
**Counting on, counting back**

A Foundation Year teacher was working with a small group of learners. Freya was counting blocks, which she’d arranged in a line, separate from the rest of the blocks that were piled on the table. ‘One, two, three, four, five,’ she counted, touching each block in turn. The teacher added one block to her line and asked, ‘How many blocks are there now?’ Freya started at the beginning of the line and counted, ‘One, two, three, four, five, six!’ The teacher took away the last block. ‘How many are there now?’ she asked. ‘One, two three, four, FIVE,’ said Freya.

**Collect information**

Freya can count confidently and correctly to at least 6, using one-to-one correspondence. She understands cardinality, that the final number in the sequence represents the total number of objects. She also arranges her blocks systematically to make counting easier. She is not yet using the strategy of counting on or counting back from the previous known number – she goes back to the beginning to count the whole set each time the teacher asks.

**Question / Analyse**

**VEYLDF Learning Evidence Marker**

- create and use representation to organise, record and communicate mathematical ideas and concepts

**Victorian Curriculum F–10**

- Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond (VCMNA070)

**Aims**

For the learner to:

- introduce and practice the strategies of counting on and counting back
- consolidate counting fluency

**VEYLDF Learning Evidence Marker**

- apply a wide variety of thinking strategies to engage with situations and solve problems, and adapt these strategies to new situations

**Victorian Curriculum F–10**

- Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point (VCMNA069)

**Plan**

Make laminated number ladders (see example in the Appendix) for use with erasable markers. Number ladders can be used horizontally or vertically. They can start and end at any number because the numbers can be erased. For this lesson, write the numerals 1 to 6 on the ladder.

Give pairs of learners a ladder, a die and some coloured counters in two different colours.

Children take turns rolling the die and then finding the corresponding numeral on the ladder that matches the number they rolled. The learners place one of their coloured counters on the ladder in the corresponding square.

Students continue taking turns until all the numbers are covered with at least two dots (one placed by each learner).

To extend the lesson:

- Students find the number that is either one more or one less than the number they rolled.
- Students use two dice and a longer ladder of numbers.
- Students find numbers that are two more or two less, than the total number rolled.

**Act / Do**

Support learners to find the number they rolled. If necessary, count with the learners, emphasising the cardinal number.

If a learner says how many they have rolled, ask them to explain how they know. This will add to your understanding of the number and counting strategies being used by the learner.

**Reflect / Review**

Look back at the aims of this learning experience to guide your reflection/review.

- Observe Freya during the lesson – does she count on and count back? Does her number knowledge become more fluent?

What will you plan next to consolidate or extend this learning?
Musical skip counting

**Collect information**
The Year Two class had been playing the skip-counting game ‘sam-yuk-gu’ with clapping to practise skip counting by threes. The teacher then asked them to place counters on the relevant numbers of a number square to represent counting by threes. Some learners identified the visual pattern that the counters made on the number square and completed the task very quickly. Others confidently counted by threes, but did not appear to notice or use the visual patterning clues. Others seemed to struggle just with counting by threes, counting on ‘one, two, three’ from each counter in order to place the next counter.

**Question / Analyse**
The class demonstrates different ability levels in this task. Many of the learners are not yet using the shortcut of visual clues to help them complete the skip counting task, even if they are able to confidently count by threes. Some learners are not yet confident counting by threes at all. Linking the skip counting game with the visual pattern of skip counting with the whole class provides an opportunity for peer scaffolding of this connection. This benefits some learners by consolidating their knowledge and benefits others by providing opportunities for rehearsal.

**VEYLDF Learning Evidence Marker**
- create and use representation to organise, record and communicate mathematical ideas and concepts
- Victorian Curriculum F–10
  - investigate number sequences, initially those increasing and decreasing by twos, threes, fives and ten from any starting point, then moving to other sequences (VCMNA103)

**Plan**
For the learner to:

**Aims**
- participate in an experience of skip counting that requires physical movement to support the count

**VEYLDF Learning Evidence Marker**
- create and use representation to organise, record and communicate mathematical ideas and concepts
- Victorian Curriculum F–10
  - Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and 10s from any starting point, then moving to other sequences (VCMNA103)

Learners are seated in a circle, each with a musical instrument placed on the floor behind them so as to avoid temptation to play while you explain the game.

First, skip count by twos. Ask the learners to strike their instrument only on the odd numbers, and to say the even numbers aloud. For example: bang, two, bang, four etc.

Once the learners have understood the concept, try moving round the circle counting by twos again, with individual learners either striking their instrument or saying the number on their turn.

Skip count by threes and fives in the same way.

To make it more challenging, switch the instruments and the counting so that learners play their instrument unless they ‘are’ one of the targeted numbers. For example, if counting by threes: bang, bang, ‘three,’ bang, bang, ‘six’... This requires a lot of concentration, especially as the targeted numbers become further apart.

**Act / Do**
Highlight the pattern the learners are making with the skip counting.

**Extension**
Have the learners seated on the floor in a ‘tight’ circle. Give each learner a small bean bag or a small block that is easy to pick up with one hand. Ask the learners to put the object on the floor in front of them.

Tell the learners that on each multiple of (two, three, five, 10...), they should pick up the object in front of them and place it in front of their neighbour. Make sure you agree whether to pass to the left or to the right.

Count aloud ‘one, two, three, four...’, passing occurring on the even numbers. No learner should ever have more than one object in front of them!

**Reflect / Review**
Look back at the aims of this learning experience to guide your reflection/review.

- Did the incorporation of physical movement support the learners’ accurate skip counting?

What will you plan next to consolidate or extend this learning?
## Making yoghurt

### Collect information

During morning snack time, many of the learners were eating yoghurt. ‘Yoghurt is good for you, because it’s made out of milk,’ said Grace, a Year One learner.

‘That’s true,’ said the teacher. ‘Do you know how yoghurt is made?’ He addressed the question to the group. They all shook their heads.

‘You don’t make yoghurt, you buy it,’ said Grace.

Grace demonstrates knowledge of the different nutritional value of different foods, and provides sound scientific reasoning and evidence to back up her claim: ‘Yoghurt is good for you because it’s made of milk’.

Grace does not seem to know how yoghurt is made. Exploring where different foods come from can be a rich line of inquiry to follow.

### Question / Analyse

- VEYLDF Learning Evidence Marker
  - show an increasing awareness of healthy lifestyles and good nutrition

- Victorian Curriculum F–10
  - Objects are made of materials that have observable properties (VCSSU044)
  - Compare observations and predictions with those of others (VCSIS054)

### Plan

**Aims**

For the learner to:
- assist as you follow a sequence of instructions to make yoghurt
- develop hypotheses about the outcomes of two temperature variables in an experiment and test the hypotheses

**VEYLDF Learning Evidence Marker**
- use reflective thinking to consider why things happen and what can be learnt from these experiences
- participate in a variety of rich and meaningful inquiry-based experiences

**Victorian Curriculum F–10**
- Participate in guided investigations, including making observations using the senses, to explore and answer questions (VCSIS051)
- Respond to and pose questions, and make predictions about familiar objects and events (VCSIS050)
- Everyday materials can be physically changed or combined with other materials in a variety of ways for particular purposes (VCSSU045)
- Represent and communicate observations and ideas about changes in objects and events in a variety of ways (VCSIS055)

Present this lesson at the start of the day as the yoghurt needs at least five hours to set. Encourage the learners to assist you as much as possible.

### Ingredients

- 500 ml whole milk
- 2-3 tablespoons plain yoghurt with live cultures (‘pot set’ varieties are good for this)

### Equipment

- Measuring jug and saucepan
- Portable cooktop (or see instructions for alternative process)
- Spoons
- Food thermometer
- Bowl
- Two medium glass jars
- Towel
- Esky
- Hot water bottle or several more jars for hot water
1. Sterilise the jug, spoons, bowl, thermometer and both jars by washing them thoroughly and then pouring boiling water over them. Keep the sterilised equipment on a clean tray covered with a clean tea towel until it is used.

2. Measure the milk and heat until just boiling. Cool the milk to between 43 and 46°C. (You can use an ice bath to speed up the cooling. Alternatively, boil the milk before class in the staffroom. It should cool to the required temperature by the time you’re ready to use it.)

3. Remove any skin that has formed on the milk with a sterile spoon. Mix about half a cup of the warm milk with the yoghurt in a small bowl, then pour the yoghurt mixture into the rest of the milk.

4. Separate the mixture into the two jars and put lids on the jars.

5. Explain that the class is going to test two temperature variables:
   - putting the mixture in the fridge to cool
   - leaving it in a warm (but not hot) place.

   Put one jar in the fridge. Wrap the other in the towel and put it into the Esky with a hot water bottle or several jars of hot water. Ask why the learners to suggest reasons for wrapping the jar in a towel, and what effect the Esky will have. (See Planning Cycle Resource for 6-8 years – Learning: Insulation Experiment for a possible extension of this aspect of this lesson.)

   Ask open-ended questions such as, ‘What may happen to the mixture in each jar? Why do you think this?’ and ‘Which environment (cool or warm) is better for making yoghurt? Why?’

   Encourage learners to think about possible reasons and express them using appropriate language. For example, ‘I think the fridge will make better yoghurt because you keep yoghurt in the fridge.’

   Later, check the results. Then ask more questions such as ‘Which environment was better for yoghurt making? Did this match your predictions?’ and ‘Why was the warmer environment better than the cooler environment?’

   Discuss other items in lunch boxes that have undergone some production process that the learners may never have considered.

   - Talk about the ingredients of some of these familiar items.

   Discuss where the ingredients come from, and what processes took place before ending up in lunchboxes.

---

### Reflect / Review

Look back at the aims of this learning experience to guide your reflection/review.

- Did the learners attend to the sequence of instructions to make yoghurt? Did the lesson involved a lot of waiting and watching rather than hands-on participation? How could you improve this in future?
- How did the learners benefit from developing and testing hypotheses about the outcomes of two temperature variables?

What will you plan next to consolidate or extend this learning?

- This lesson could be extended into an inquiry-based project into food growing and manufacturing processes, as well as the supply chain, linking with a broad range of subjects in the curriculum.
- This lesson could form the basis for an inquiry-based project into bacteria and other tiny organisms.
Insulation experiment

**Collect information**
In the Planning Cycle Resource for 6 – 8yrs - Learning: Making Yoghurt, the teacher asked why the warm yoghurt mixture needed to be wrapped in a towel. ‘Because the towel is like a blanket that will help heat up the yoghurt, and we want to make this jar warm,’ said William.

**Question / Analyse**
William appears to have a misconception about the way that blankets/insulators work. Rather than understanding that the heat is already present in the jar and is being trapped by the towel, his answer shows that he thinks the towel is the source of the heat. This is a common misconception in young learners.

However, William shows good reasoning skills, and understands the experimental variable (temperature) that is being used for the yoghurt making experiment. He communicates his thinking clearly using appropriate language (heat, warmth).

VEYLDF Learning Evidence Marker
- use reflective thinking to consider why things happen and what can be learnt from these experiences

**Victorian Curriculum F–10**
- Respond to and pose questions, and make predictions about familiar objects and events (VCSIS050)

**Plan**
**Aims**
For the learner to:
- observe that some materials slow down temperature cooling and warming; others speed it up
- develop hypotheses and test the insulation properties of several materials

VEYLDF Learning Evidence Marker
- manipulate objects and experiment with cause and effect, trial and error, and motion

**Victorian Curriculum F–10**
- Objects are made of materials that have observable properties (VCSSU044)
- Represent and communicate observations and ideas about changes in objects and events in a variety of ways (VCSIS055)

Explore the characteristics and properties of materials and components that are used to create designed solutions (VCDSTC017)

Learners often have misconceptions about heat as it is a complex concept. Presenting hands-on experiments about heat and energy transfer that the learners will enjoy remember are more appropriate than telling learners about it. Once they observed for themselves that different materials change the rate of heating and cooling in this experiment, they will be able to draw on this experience when thinking about how and why this happens.

**Materials**
- 4 small plastic cups
- 4 larger plastic cups
- Cotton wool
- Aluminium foil
- Paper
- Hot tap water in a jug

Pour hot water into a plastic cup, and ask the learners:
What would happen to the temperature if you left the cup on the table for 10 minutes.
What would happen if you put the cup in the fridge? Why?
What would happen if you wrapped the cup in a towel. What about wrapping with cotton wool? Foil? Paper?
Ask the learners to explain their thinking in each case.

With the learners' assistance, set up the experiment by putting the smaller cups inside the larger cups, and filling the space between the two cups with the different materials. Scrunch the foil and paper into small balls to fill the space. Have one cup that is inside a larger cup but without any insulation. When the cups are ready, pour hot water into each small cup and put a thermometer in each. Measure and record the temperatures of the water in the cups. (These temperatures should be similar.)

Ask for predictions about which cup will cool down fastest and slowest. Or, will they all cool at the same
rate? Have each learner write down a prediction and a reason for their prediction. Every five minutes, record the temperature of each cup. (With advance planning, you could have the learners plot the temperatures of a graph for each cup.) Discuss the results once all the cups reach roughly the same temperature. How long did it take each cup of water to reach the same temperature? What may be the reason for this?

Ask the learners to imagine they are going to make a hot-water bottle to keep them warm. Explain that the best hot-water bottle is the one that will keep them warm for the longest period of time. Thinking about what they learned in the experiment, which material do they think would be the best to use? Ask the learners to explain their thinking.

Draw attention to the fact that the temperature of the water lowered in each cup. Ask the learners what this tells us. (Lead learners to the conclusion that the materials helped to keep the heat in, but didn’t produce any extra heat.)

**Extension**

Try conducting the same experiment using ice instead of hot water, using the same insulators. Ask the learners to predict the results. Are the results as the learners expected them to be?

<table>
<thead>
<tr>
<th>Reflect / Review</th>
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<tbody>
<tr>
<td>Look back at the aims of this learning experience to guide your reflection/review.</td>
</tr>
<tr>
<td>- Did the learners observe how different insulators influence cooling (and heating, if applicable)?</td>
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<tr>
<td>- What did the learners gain from developing and testing their hypotheses?</td>
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<tr>
<td>- How effectively were the learners able to express their understanding?</td>
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</tbody>
</table>

What will you plan next to consolidate or extend this learning?
Developing a sequence of instructions

Year Two learners, Sam and Harnoor, were seated side by side playing a physics-based problem-solving game on the class computers. Sam tried several times to solve a puzzle. ‘I can’t do it!’ he said, frustrated. Harnoor looked over at his friend’s screen. ‘Oooh, that one’s really hard, I did it yesterday,’ he said. ‘You have to put this bit there, and then you put the block on it. That means the ball bounces high enough to go over.’ He pointed to Sam’s screen as he spoke. Sam followed Harnoor’s instruction, and completed the puzzle successfully.

Sam and Harnoor are both experimenting to find solutions to solve problems. Sam persisted for some time; however, he required assistance from Harnoor to solve the problem. Harnoor provided a sequence of instructions to explain the solution, demonstrating that he had retained the memory of the steps involved. He was also able to explain the steps clearly and concisely to his peer.

VEYLDF Learning Evidence Marker
- persist even when they find a task difficult
- persevere and experience the satisfaction of achievement
- engage with and co-construct learning

Victorian Curriculum
- Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (VCDTCD017)

Plan

Aims
For the learner to:
- identify a sequence of steps to follow to complete a task
- create a set of instructions detailing one of these sequences

VEYLDF Learning Evidence Marker
- use information and communications technologies (ICT) to investigate and problem-solve

Victorian Curriculum F–10
- Sequence steps for making designed solutions (VCDSCD022)
- Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (VCDTCD017)

Ask the learners to think of times when they need to follow instructions, step by step. Brainstorm answers to questions like, ‘What do instructions have in common? What makes instructions easy to follow? What makes them hard to follow?’

Ask each learner to write a sequence of instructions for a task. These could be building a Lego construction, baking a cake, doing a dance move, or planting a seed. The sequence should have at least five steps.

Working in pairs, learners swap sets of instructions and follow each other’s instructions. Do the instructions make sense to the other person? Are there any steps missing?

Make a final draft of the instructions on the computer, using a slideshow program such as PowerPoint. Children may choose to illustrate their presentations with drawings, photographs or images from safe search engines.

Have each child present their instructions to the class.

Act / Do

Encourage learners to think about using linking and sequencing language such as ‘First…, then…’

Encourage learners to other conventions such as numbering the steps.

Encourage the learners to include reasons for each step where appropriate, such as ‘Grease the pan, so that the cake doesn’t stick to it.’

Extension
Using a barrier to prevent learners seeing what they are doing, have the learners play a block construction game in which one learner tells the other where to place blocks. At the end of the game, learners on each side of the barrier should end up with the same finished product.
Reflect / Review

Look back at the aims of this learning experience to guide your reflection/review.

- These activities required learners to record and follow a sequenced set of instructions. Some learners may have been challenged by developing the steps, others may have been challenged by following the steps.
- Analyse what made the tasks challenging for those learners: was it the need to rely on language? Was it deconstructing a process into steps? Did the challenge relate to the learner's spatial thinking?

What will you plan next to consolidate or extend this learning?
## Sample Evidence Markers: Learning Outcome

### VEYLDVF

**Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity, commitment, enthusiasm, persistence, imagination and reflexivity**

<table>
<thead>
<tr>
<th>This is evident, for example, when children:</th>
<th>This develops, for example, when students:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Express wonder and interest in their environments</strong></td>
<td><strong>Science</strong></td>
</tr>
<tr>
<td>Respond to and pose questions, and make predictions about familiar objects and events (F-2) (VCSIS050)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Participate in a variety of rich and meaningful inquiry-based experiences</th>
<th>Science</th>
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</thead>
<tbody>
<tr>
<td>Participate in guided investigations, including making observations using the senses, to explore and answer questions (F-2) (VCSIS051)</td>
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<tr>
<td><strong>Design and Technologies</strong></td>
<td></td>
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<tr>
<td>Explore how plants and animals are grown for food, clothing and shelter (F-2) (VCDSTC015)</td>
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<tr>
<td>Explore the characteristics and properties of materials and components that are used to create designed solutions (F-2) (VCDSTC017)</td>
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<tr>
<td>Explore how technologies use forces to create movement in designed solutions (F-2) (VCDSTC014)</td>
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<tr>
<td><strong>Digital Technologies</strong></td>
<td></td>
</tr>
<tr>
<td>Explore how people safely use common information systems to meet information, communication and recreation needs (F-2) (VCDTCD018)</td>
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</tbody>
</table>
Children develop a range of skills and processes such as problem solving, inquiry, experimentation, hypothesising, researching and investigating

<table>
<thead>
<tr>
<th>Apply a wide variety of thinking strategies to engage with situations and solve problems, and adapt these strategies to new situations</th>
<th>Mathematics</th>
<th>Represent practical situations to model addition and subtraction (F) (VCMNA073)</th>
<th>Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts (L1) (VCMNA089)</th>
<th>Solve simple addition and subtraction problems using a range of efficient mental and written strategies (L2) (VCMNA107)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Design and Technologies</td>
<td>Identify how people create familiar designed solutions and consider sustainability to meet personal and local community needs (F-2) (VCDSTS013)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Digital Technologies</td>
<td>Identify and explore digital systems (hardware and software components) for a purpose (F-2) (VCDTDS013)</td>
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<tr>
<td>Explore their environment</td>
<td>Mathematics</td>
<td>Describe position and movement (F) (VCMMG082)</td>
<td>Give and follow directions to familiar locations (L1) (VCMMG099)</td>
<td>Interpret simple maps of familiar locations and identify the relative positions of key features (L2) (VCMMG122)</td>
</tr>
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<td></td>
<td>Design and Technologies</td>
<td>Identify how people create familiar designed solutions and consider sustainability to meet personal and local community needs (F-2) (VCDSTS013)</td>
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<td>Digital Technologies</td>
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<tr>
<td>Manipulate objects and experiment with cause and effect, trial and error, and motion</td>
<td>Science</td>
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<tr>
<td>Everyday materials can be physically changed or combined with other materials in a variety of ways for particular purposes (F-2) (VCSSU045)</td>
<td>The way objects move depends on a variety of factors including their size and shape: a push or a pull affects how an object moves or changes shape (F-2) (VCSSU048)</td>
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<td>Explore how technologies use forces to create movement in designed solutions (F-2) (VCDSTC014)</td>
<td>Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (F-2) (VCDTC017)</td>
</tr>
</tbody>
</table>

| Connect days of the week to familiar events and actions (F) (VCMMG080) | Identify outcomes of familiar events involving chance and describe them using everyday language such as 'will happen', 'won't happen' or 'might happen' (L1) (VCSP100) | Identify practical activities and everyday events that involve chance. Describe outcomes as 'likely' or 'unlikely' and identify some events as 'certain' or 'impossible' (L2) (VCSP125) |

<table>
<thead>
<tr>
<th>Make predictions and generalisations about their daily activities, aspects of the natural world and environments, using patterns they generate or identify, and communicate these using mathematical language and symbols</th>
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## Children transfer and adapt what they have learnt from one context to another

<table>
<thead>
<tr>
<th>Make connections between experiences, concepts and processes</th>
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<th>Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line (L1) (VCMNA087)</th>
<th>Recognise, model, represent and order numbers to at least 1000 (L2) (VCMNA104)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond (F) (VCMNA070)</td>
<td>Recognise practical situations to model addition and subtraction (F) (VCMNA073)</td>
<td>Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts (L1) (VCMNA089)</td>
<td>Apply repetition in arithmetic operations, including multiplication as repeated addition and division as repeated subtraction (L2) (VCMNA114)</td>
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</table>

### Science

Respond to and pose questions, and make predictions about familiar objects and events (F-2) (VCSIS050)

### Use the processes of play, reflection and investigation to problem-solve

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<td>Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language (F) (VCMMG078)</td>
<td>Measure and compare the lengths, masses and capacities of pairs of objects using uniform informal units (L1) (VCMMG095)</td>
<td>Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units (L2) (VCMMG115) AND</td>
<td>Compare masses of objects using balance scales (L2) (VCMMG116)</td>
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</tbody>
</table>

### Design and Technologies

Explore how technologies use forces to create movement in designed solutions (F-2) (VCDSTC014)

Explore needs or opportunities for designing, and the technologies needed to realise designed solutions (F-2) (VCDSCD018)

### Digital Technologies

Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (F-2) (VCDTCD017)
## Children resource their own learning through connecting with people, place, technologies and natural and processed materials

| Experience the benefits and pleasures of shared learning exploration | **Science**  
Compare observations and predictions with those of others (F-2) (VCSI054) |
|---|---|
|  | **Digital Technologies**  
Independently and with others create and organise ideas and information using information systems, and share these with known people in safe online environments (F-2) (VCDTD1016) |
| Use their senses to explore natural and built environments | **Science**  
Participate in guided investigations, including making observations using the senses, to explore and answer questions (F-2) (VCSI051) |
|  | **Design and Technologies**  
Explore the characteristics and properties of materials and components that are used to create designed solutions (F-2) (VCDSTC017) |
|  | **Digital Technologies**  
Collect, explore and sort data, and use digital systems to present the data creatively (F-2) (VCDTD1015) |