

# GOAL – Getting the students doing the thinking in Digital Technology

## Transforming tasks strategy: From procedure to problem solving



Let students identify the 'problem to solve'

Give some irrelevant information

From procedure to problem solving

Provide insufficient information at first

Don't give any of the steps - at first

Technique	Before	After	Reflection: Why and how?
<p><b>Students identify the 'problem to solve'</b></p> <p>Present a provocation and ask students to determine the problem to solve.</p>	<p>Program your Bee-Bot so it goes from the hive in A1 to the flower in D4.</p> <p>Record the commands in the space provided.</p>	<p>Move your Bee-Bot on this map. What challenge do you want to try?</p> <p>Record your challenge and the commands you use in the space provided.</p>	<p><b>WHY would you have students create their own challenges for the Bee-Bots?</b></p> <p>To develop creative thinking provoke the development of skills in computational thinking, including; decomposing the problem, finding patterns, using abstraction and creating an algorithm.</p> <p><b>HOW does this develop powerful / expert learners</b></p> <p>Students learn to think flexibly and creatively in order to solve a problem</p>
<p><b>Provide insufficient information at first</b></p> <p>Give a perplexing problem and slowly provide information as needed.</p>	<p>Move your Bee-Bot from the hive to the flower. Follow the procedure. Make a record of all your commands. Start at the hive.</p> <ul style="list-style-type: none"> <li>Move down to avoid the bird.</li> <li>Avoid the insect spray.</li> <li>Avoid the lizard.</li> <li>Fly left over the hills.</li> <li>Go to the fountain and pause for a drink.</li> <li>Move left and down to the flower.</li> </ul> <p>Give the commands you have recorded to someone else to test.</p>	<p>Give a sequence of steps to a friend, so that they can move the Bee-Bot safely from the hive to the flower.</p> <p>Be careful. Make sure they avoid the hazards.</p> <p>What questions do you have?</p>	<p><b>WHY would you have students develop a safe route for the Bee-Bot through the hazards on a map?</b></p> <p>Students think creatively to develop skills in organising their thinking in a multistep problem, using simple programming language and spatial terms.</p> <p><b>HOW does this develop powerful / expert learners</b></p> <p>Students learn to draw conclusions and make inferences while creating a safe path for their Bee-Bot.</p>
<p><b>Don't give any of the steps - at first</b></p> <p>Provide prompts and support to scaffold the learning as needed.</p>	<p><b>The Bee-Bot can be programmed to move different ways.</b></p> <ul style="list-style-type: none"> <li>↑ means move forward 15 cm</li> <li>↓ means move backward 15 cm</li> <li>↻ means turn 90 degrees right</li> <li>↺ means turn 90 degrees left</li> <li>✕ means clear</li> <li>   means pause</li> </ul> <p>Follow the instructions on the Bee-Bot program cards to make the Bee-Bot follow the lines of these different shapes, without leaving the path. Why isn't there a card for the triangle? Did you notice that the Bee-Bot cannot move on diagonal lines?</p>	<p><b>The Bee-Bot can be programmed to move different ways.</b></p> <p>Play with your Bee-Bot to see what it can do.</p> <p>Can you make the Bee-Bot follow the lines of these different shapes, without leaving the path? What do you notice?</p> <p>Record your programmed movements using symbols. The control symbols on the back of the Bee-Bot might help. What other symbols will you need?</p>	<p><b>WHY would you have students experiment with different pathways for their Bee-Bot?</b></p> <p>To develop skills in generating and evaluating a range of possible solutions for a problem.</p> <p><b>HOW does this develop powerful / expert learners?</b></p> <p>Students learn to approach problems in different ways and use trial and error in order to think logically and apply what they know in different situations.</p>
<p><b>Include some irrelevant information</b></p> <p>Give additional information that is not required to do the task.</p>	<p>The Bee-Bot can be programmed to move forward and back along the street.</p> <ul style="list-style-type: none"> <li>The Bee-Bot can be made to turn in a circle to go back along the road.</li> <li>Notice that there are two side roads that it can turn into, as well as 'entering' the houses.</li> <li>The houses are numbered.</li> <li>Record the path that makes the BeeBot visit the odd numbered houses - 1,3,5,7,9.</li> </ul> <p>Use the command symbols to record your path.</p>	<p>The Bee-Bot can be programmed to move forward and back along the street.</p> <ul style="list-style-type: none"> <li>The Bee-Bot can be made to turn in a circle to go back along the road.</li> <li>There are 10 spaces on the road.</li> <li>There are two side roads that it can turn into, as well as 'entering' the houses.</li> <li>The houses are numbered.</li> <li>The blue fairy lives in the toadstool.</li> </ul> <p>Record the path that makes the Bee-Bot visit the odd numbered houses - 1,3,5,7,9.</p> <p>Use the command symbols to record your path.</p> <p>Dimensions = 45 cm by 120cm</p>	<p><b>WHY would you have students programs a Bee-Bot to move through a gridded Street Map adding irrelevant information.</b></p> <p>Develop skills in representing a sequence of steps to solve problems.</p> <p><b>HOW does this develop powerful / expert learners.</b></p> <p>Students learn to use abstraction by disregarding the information they do not need.</p>

