

States of Matter with Block Code		Grade 2 Matter and Energy	
<b>Lesson Plan</b>	Coding Tool	Block Coding	
	Cross-curricular		
<b>Big Ideas</b> <ul style="list-style-type: none"> <li>The properties of liquids and solids can be used to tell them apart</li> <li>The procedure to do this can be expressed in code</li> </ul>	<b>Specific Expectations</b> <ul style="list-style-type: none"> <li>investigate the properties of liquids and solids</li> </ul>		
<b>Description</b> Students use code blocks to design a thought experiment to identify if an imaginary sample is solid or liquid.			
<b>Materials</b> <ul style="list-style-type: none"> <li>Code blocks (see associated handout)</li> </ul>	<b>Computational Thinking Skills</b> <ul style="list-style-type: none"> <li>block coding</li> <li>Conditional statements</li> </ul>		
<b>Introduction</b> <p>Coding is just creating lists of instructions. By providing precut paper slips as ‘blocks’ with possible instructions, we make the act of ‘coding’ very much doable for grade 2. Since every program must have a goal, our goal is to instruct an imaginary robot how to run an experiment that will allow it to tell a liquid from a solid.</p> <p>Imaginary robots, just like the real ones, are very, very stupid. They only do what they are told, and cannot guess the steps in between. So, for example, if the imaginary robot is told to take a sample out of a container, it <b>MUST</b> be told to open the container first, or its program will freeze.</p> <p>The imaginary robot can only make simple yes/no determinations, and only when given an IF block, called a ‘conditional statement’ by Computer Scientists.</p>			

### Action

An imaginary robot needs to be able to tell if a sample is solid or liquid. Robots cannot do anything they aren't programmed to, so your student's challenge is to program this robot, using the 'code blocks' provided as puzzle pieces to create a set of instructions.

(Note: if your class has been exposed to coding concepts often enough, they may find block coding too easy for this activity. If you believe that will be the case, don't give them the blocks. Have them come up with their instruction sets as written algorithms without it.)

### Consolidation/Extension

- Challenge students to find exceptions to their own code: a substance that might fool the robot. (For example, sand will pour and take the shape of its container like a liquid, but each grain of sand is a solid.)
- If you did not skip the block code following the note in action, try that version of the exercise where the students write the code themselves.

### Assessment

Assess the logical flow of your student's programs from a programming point of view (does one step follow another?) and if they show the proper understanding of solids and liquids. (Does the program reach the correct conclusion?)