

Title: I Have a Magic Pot!

Lesson Focus: Algebraic Thinking **Grade Level(s):** 1-3

<p>Problem: Using a die, create an algebraic rule for your magic pot. Create a picture to show your rule, but leave your pot blank so we have to figure out your rule.</p>	<p>Big Ideas:</p> <ul style="list-style-type: none"> • Reasoning • Beginning algebraic thinking with unknown quantities 																																							
<p>Materials: What materials might I need to set the context or model this problem? Blank paper, counters, magic pot, unifix cubes, magnetic dots, <u>Two Of Everything</u> by Lily Toy Hong</p>																																								
<p>Teaching Plan</p>																																								
<p>Before</p> <p style="font-size: small;">Ideas for pre-teaching before presenting the problem</p>	<p>Are there concepts/strategies I want to review or introduce? What is the prior knowledge, if any, needed for this lesson?</p> <p>Begin by reading <u>Two of Everything</u> by Lily Toy Hong. Take advantage of the teachable moments in the book... ie. How could Mr. and Mrs. Haktak end up with 20 coins? Have students make predictions throughout the book about what they think will happen next? Have students turn and share their favourite part of the book with a partner.</p> <p>Put unifix cubes (snapped together in twos) into the magic pot. "Today I have my own magic pot. When I put in one cube, (put it in the pot and attach it to a stick of two that is already in the pot), 3 come out. When I put in two cubes, 4 come out... what do you think will come out when I put in 3 cubes?" Take ideas and establish that we need at least three samples to form a pattern. Put in three and pull out 5. Draw an input/output table such as shown, and fill in the first 4 spaces. Have students state my rule (adding 2).</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="border-right: 1px solid black; padding: 5px;">In</th> <th style="padding: 5px;">Out</th> </tr> </thead> <tbody> <tr><td style="border-right: 1px solid black; text-align: center;">1</td><td style="text-align: center;">3</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">2</td><td style="text-align: center;">4</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">3</td><td style="text-align: center;">5</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">.</td><td style="text-align: center;">.</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">.</td><td style="text-align: center;">.</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">10</td><td style="text-align: center;">12</td></tr> </tbody> </table>	In	Out	1	3	2	4	3	5	10	12																									
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<p>During</p> <p style="font-size: small;">Watch and listen to students engaged in the task</p>	<p>Observe and support the students by asking questions such as: What are you doing? Why are you doing it? How does it help you?</p> <p>Invite a student to come up to the front and roll a die to create a new rule. Ask the student to draw the input/output table, leaving the magic pot (algebraic rule) blank. Have the student fill in the first four lines and have the rest of the class try to guess the rule. Send students back to their desks with their own die to create their own input/output tables.</p> <p>Vary the die according to individual needs (the die could range from six-sided dot die to 20-sided die, to a die within a die for double-digit numbers etc – see spectrum catalogue for a large variety of dice.)</p>																																							
<p>After</p> <p style="font-size: small;">Facilitate sharing of strategies</p>	<p>Small group focus: Ask the students to pair up and exchange papers. Try to figure out the rule that goes in your partner's magic pot. Confirm or explain your pot's rule to your partner.</p> <p>Whole group focus: Ask students to bring their papers to the carpet. Choose a few students to share their magic pots with the class. Draw the input output tables on the board. Try to find one that is basic, one that uses a higher number, and one that is not ascending in order:</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 10px;">1</td> <td style="text-align: center; padding: 10px;">2</td> <td style="text-align: center; padding: 10px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">+4</td> <td style="text-align: center; padding: 5px;">+12</td> <td style="text-align: center; padding: 5px;">+6</td> </tr> <tr> <td style="text-align: center; padding: 5px;"> <table style="border-collapse: collapse;"> <thead> <tr> <th style="border-right: 1px solid black; padding: 5px;">In</th> <th style="padding: 5px;">Out</th> </tr> </thead> <tbody> <tr><td style="border-right: 1px solid black; text-align: center;">1</td><td style="text-align: center;">5</td></tr> <tr><td style="border-right: 1px solid black; text-align: center;">2</td><td style="text-align: center;">6</td></tr> <tr><td style="border-right: 1px solid black; 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