5 Coins and the Magic Doubling Pot or 1000 Coins
Lesson Plan

What are your mathematical goals for this lesson?

In this lesson students will:

- Use words to describe the doubling pattern they heard about and investigated in the previous lesson.
- Connect words to mathematical symbols and equations.
- Predict outcomes.
- Build and extend a pattern to solve a problem.
- Share findings/solutions.

Which PSSM algebraic benchmarks will you be focusing on?

In this lesson students will:

- Represent and analyze a function using words, numbers and tables.
- Describe, extend and make generalizations about a numeric pattern.
- Model a problem situation with objects and use representations such as tables and equations to draw conclusions.
- Organize and consolidate their mathematical thinking through communication.

How does this lesson fit into the broader unit you are teaching?

Our focus on algebra began with a series of explorations with patterns. Students have modeled a variety of patterns using unifix cubes and have learned to predict outcomes by analyzing patterns. I read Two of Everything by Lily Toy Hong and students used interlocking cubes and t-table to extend the doubling pattern that was introduced in the book. After exploring this pattern in depth students will learn the mathematical word "function" and work on an activity called Mystery Pots where they will have opportunities to model a variety of functions with manipulatives and connect the functions to words and equations that describe them. Students will also be challenged to created their own functions and students will model, talk about, write and identify equations that describe the student-created functions. Toward the end of the study students will create stories to match their functions, giving them real contexts in which to think about patterns and functions. Finally, they will learn to graph their functions enabling them to compare relationships between functions.

What has the class done just prior to this lesson?

I read the book, Two of Everything and students learned to use a t-table to record what happened when different numbers of cubes were placed in a magic doubling pot. Sixteen out of nineteen students were able to use a t-table to record models of the function.

What skills and knowledge are you assuming students bring to the class?

- Students have some knowledge of 1000, but it is varied and limited.
- They have used base-ten blocks to play Race to 100.
- They know how to share materials and word with partners.
- They understand that the magic pot in the story doubles anything that is put inside but have not explored the language that describes the function.
- They know how to use a t-table to record their findings.

What skills and knowledge are still being developed during this lesson?

- Students are learning that there are different ways of describing functions (e.g., double, x 2, and adding the same number to itself).
- They are building understanding of how much 1000 is.
- Students are learning to articulate mathematical ideas.
- They are learning how to describe mathematical ideas with numbers and symbols.

What tasks or activities are you planning to use?

After a discussion reviewing the work we've accomplished prior to this lesson and talking about ways to describe what is happening to objects placed in the pot with words and equations, I will pose the following problem: if you had to choose between 1000 coins or 5 coins and a magic pot that works ten times, which one would you choose and why?

- The book, Two of Everything by Lily Toy Hong
- A Choice About Coins recording sheet and chart (see attached)
- A chart to record students' ideas about words and equations that describe the function.
- Base-Ten blocks

How do you plan to organize the students in your classroom?

At the beginning of the lesson I will gather students on the rug for the opening discussion. After they understand the problem, I will excuse them to their desks with their partners. Students will write their predictions about the problem and then start working with the manipulatives. For the last 15 minutes, we will gather again on the rug to share what we learned.

How will you assess student understanding of the mathematics you are teaching?

While students work on the problem I will confer with partner groups and ask them to tell me about their work and what they notice about how the numbers are growing. I will ask them to describe what the pot "does to" the number (facilitating connections to the idea of function).

How will you know if students develop the mathematical understanding you expect?

I will ascertain the class's general understanding in the discussion at the beginning and end of the lesson. During partner conferences I will assist students in describing what is happening to the numbers using words and mathematical symbols. Student writing will inform me of their initial thoughts about the problem and how their thinking changed as a result of working through the problem and engaging in conversations about the problem.

What do you expect will be easy for your students? Difficult for your students?

Students will probably have an easy time:

- Remembering the story and what happened to everything that went into the pot.
- Using the base-ten blocks to model the problem.
- Using the In-and-Out chart to record what happens.

Students might have difficulty:

- Articulating their mathematical ideas.
- Writing about their reasoning.
- Saying, writing, and working with big numbers.

Is there any other information that you believe observers should be aware of?

I get nervous when people watch me teach. I imagine what they are thinking rather than focusing on what my students are doing and how best to facilitate their thinking and understanding. I'm going to try hard not to be distracted by the observers but I know this will be a challenge for me.

Name

Date

What did the Magic Pot in Two of Everything do?

What is the function?

In	Out

Say it in Words	Say it Mathematically

Name

Date

A Choice About Coins

What would you rather have:

A. 1000 coins or

B. 5 coins and a Magic Doubling Pot that works 10 times?

Which is the best choice and why?

How many coins do you think will come out on the tenth time?

Model with Base-10 Blocks and Record:

In	Out

What do you notice?

On the back:
Did you make the right choice? How do you know?