Module/Chapter Planning Activity
What Does Mastery Look Like?

April Mouton & Dan Wekselgreene

Focus

Professional Learning Community (PLC) Question 1:

What do we expect our students to learn?

Module/Chapter/Unit Lesson Design Steps

1. Identify Learning Targets
2. Develop levels of mastery for each Learning Target
3. Create common formative assessments for each Learning Target
4. Re-examine the curriculum and modify/supplement as needed

Module/Chapter/Unit Lesson Design Steps

1. Identify Learning Targets
   - Examine your given curriculum
   - Review the Common Core standards (content and practice)
   - Think about your experience; especially consider common student misconceptions
   - Determine academic vocabulary demands

Module/Chapter/Unit Lesson Design Steps

2. Develop levels of mastery for each Learning Target
   - Focus on student misconceptions to build a proper scaffold
   - Keep in mind the DOK levels
   - Think about the CCSS Math Practice standards

Table 1: *Math Descriptors* – Applying Depth of Knowledge Levels for Mathematics (Webb, 2002) & NAEP 2002 Mathematics Levels of Complexity (M. Petit, Center for Assessment 2003, K. Hess, Center for Assessment, updated 2006)

Level 1 Recall	Level 2 Skills/Concepts	Level 3 Strategic Thinking	Level 4 Extended Thinking
a. Recall, observe, or recognize a fact, definition, term, or property b. Apply/compute a well-known algorithm (e.g., sum, quotient) c. Apply a formula d. Determine the area or perimeter of rectangles or triangles given a drawing and labels e. Identify a plane or three dimensional figure f. Measure g. Perform a specified or routine procedure (e.g., apply rules for rounding) h. Evaluate an expression i. Solve a one-step word problem j. Retrieve information from a table or graph k. Recall, identify, or	a. Classify plane and three dimensional figures b. Interpret information from a simple graph c. Use models to represent mathematical concepts d. **Solve a routine problem** requiring multiple steps/decision points, or the application of multiple concepts e. Compare and/or contrast figures or statements f. Construct 2-dimensional patterns for 3-dimensional models, such as cylinders and cones g. Provide justifications for steps in a solution process h. Extend a pattern i. Retrieve information from a table, graph, or figure and use it solve a problem requiring multiple steps j. Translate between tables	a) Interpret information from a complex graph b) Explain thinking when more than one response is possible c) Make and/or justify conjectures d) Use evidence to develop logical arguments for a concept e) Use concepts to solve non-routine problems f) Perform procedure with multiple steps and multiple decision points g) Generalize a pattern h) Describe, compare, and contrast solution methods i) Formulate a mathematical model for a complex situation j) Provide mathematical justifications k) Solve a multiple- step problem and provide support with a mathematical explanation that justifies the answer	a) Relate mathematical concepts to other content areas b) Relate mathematical concepts to real-world applications in new situations c) Apply a mathematical model to illuminate a problem, situation d) Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results e) Design a mathematical model to inform and solve a practical or abstract situation f) Develop generalizations of the results obtained and the strategies used and apply them to new

Webb's Depth of Knowledge

DOK Level 1
(Recall)

Verbs: arrange, calculate, define, draw, identify, list, label, illustrate, match, memorize, recognize, tell, ...

Focus: on specific facts, definitions, details, or procedures

Note: there's one correct answer, and a combination of Level 1s does not make it a Level 2

DOK Level 2
(Skill / Concept)

Verbs: categorize, cause/effect, classify, compare, distinguish, estimate, graph, interpret, modify, predict, relate, show, summarize, ...

Focus: on applying skills and concepts ◆ explaining how or why

Note: there's one correct answer

DOK Level 3
(Strategic Thinking)

Verbs: assess, cite evidence, compare, conclude, construct, critique, develop logical argument, differentiate, formulate, hypothesize, investigate, revise, ...

Focus: on reasoning and planning in order to respond ◆ complex and abstract thinking required ◆ defending reasoning or conclusions

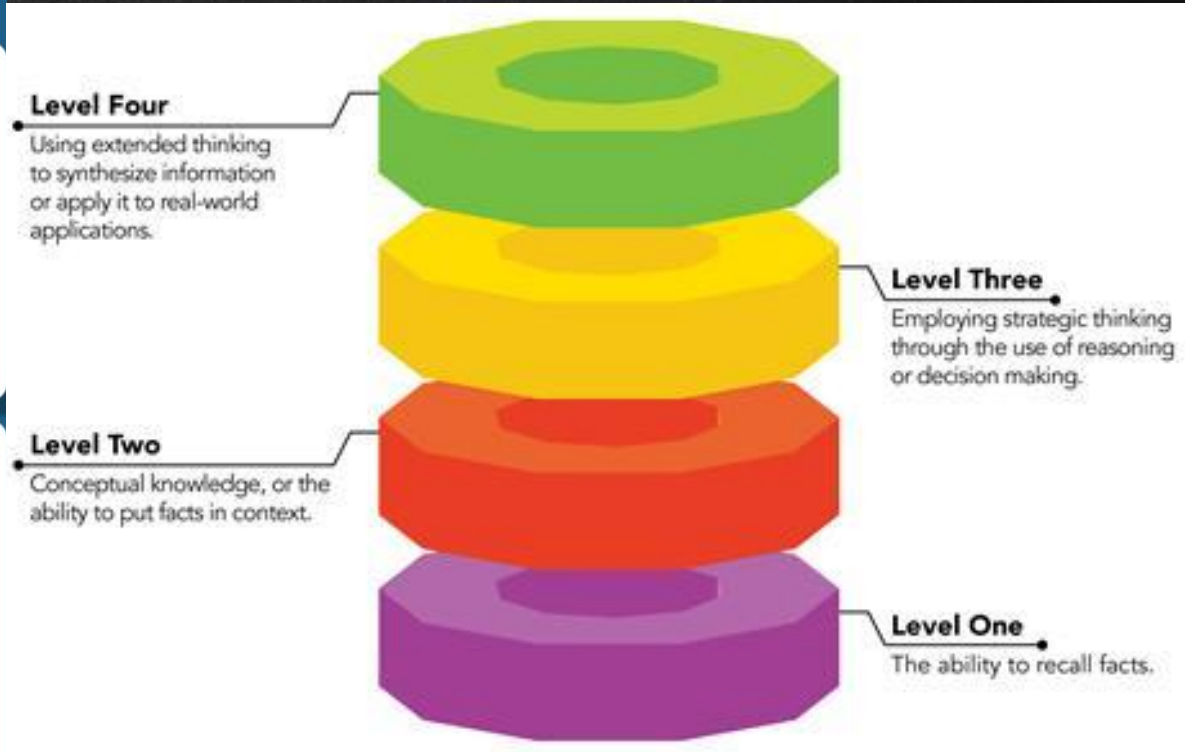
Note: multiple answers or approaches

DOK Level 4
(Extended Thinking)

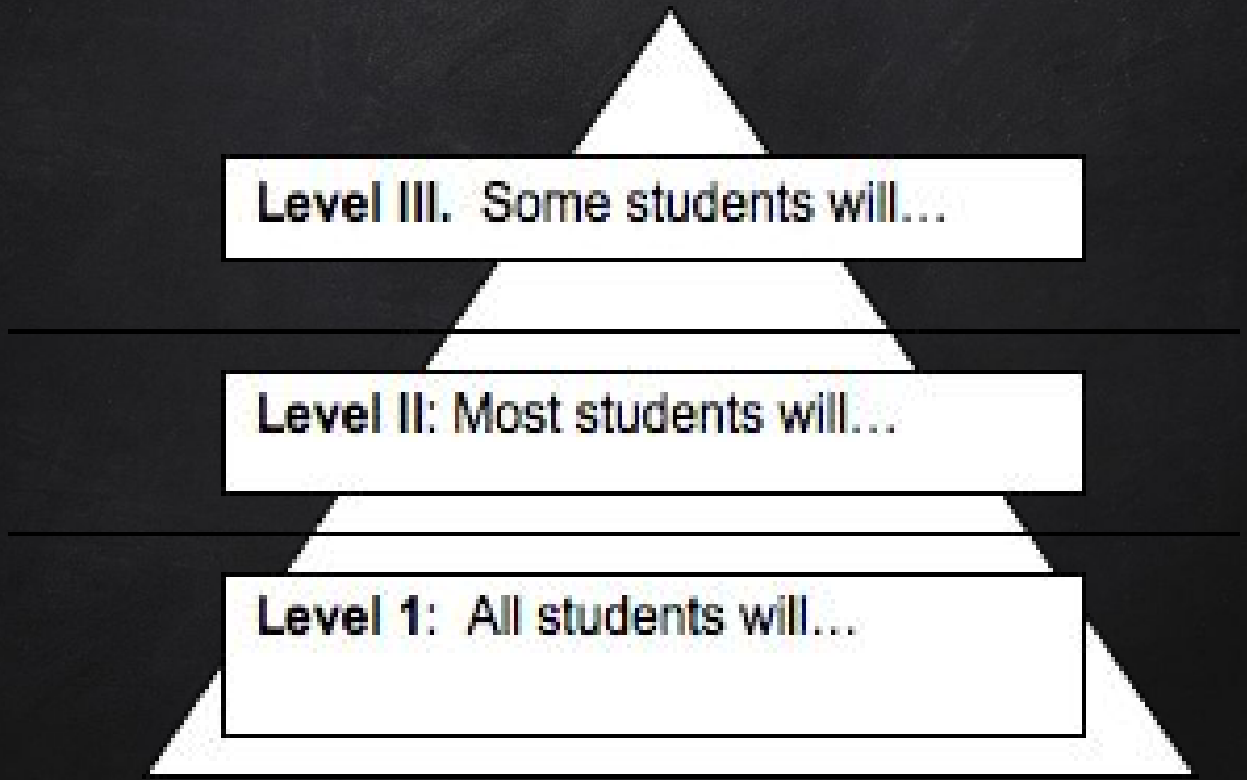
Verbs: apply concepts, analyze, connect, create, critique, design, prove, ...

Focus: on complex reasoning, planning, and thinking ◆ make real-world applications in new situations

Note: has multiple answers or approaches ◆ often requires extended periods of time with multiple steps



Essential Learning



Module/Chapter/Unit Lesson Design Steps

3. Create common formative assessments for each Learning Target
   - Identify/write questions that directly assess each level of mastery.
   - If the levels of mastery have been properly developed, this is a lot easier to accomplish!
   - Often, while writing the assessments, you will want to go back and modify your Learning Targets. This is an iterative process.

Module/Chapter/Unit Lesson Design Steps

4. Re-examine the curriculum and modify as needed
   - Identify the parts of your curriculum that address each Learning Target and the levels of mastery.
   - If there is something missing, write or identify resources to supplement
   - Determine where and how to incorporate key instructional strategies (number talks, think-pair-shares, etc.)
   - Decide when and how academic language will be developed

Time to Review Examples

Examples of Work

Example: Find the area of this figure

Learning Target:

I can find the area of rectangles, and unfamiliar shapes that can be broken into rectangles.

Level 1:

I can describe what "one square unit" means and can draw a square unit for a given unit. I can determine the area of a rectangle by counting the number of square units that completely fill the rectangle.

Learning Target:

I can find the area of rectangles, and unfamiliar shapes that can be broken into rectangles.

Level 2:

I can determine the area of a rectangle by drawing a sketch and determining the number of square units (without counting).

Learning Target:

I can find the area of rectangles, and unfamiliar shapes that can be broken into rectangles.

Level 3:

I can find missing side lengths and areas by adding and subtracting known parts.

Learning Target:

I can find the area of rectangles, and unfamiliar shapes that can be broken into rectangles.

Level 4:

I can find the area of an unfamiliar shape by breaking it into known parts. Depending on the given information, I can either find an exact area or an appropriate estimate.

Example: Understanding Equations

Learning Target

I understand the meaning of equations, equal signs, and solutions. I can write equivalent equations.

Level 1:

I can differentiate between an **expression** and an **equation**, and between **simplifying** and **solving**. I can explain that the equal sign means *"is equivalent to"*, not *"what's the answer?"*.

$3 + 5 = \_\_\_$ $3 + \_\_\_ = 2 + 6$

I can differentiate between an **expression** and an **equation**, and between **simplifying** and **solving**. I can explain that the equal sign means *"is equivalent to"*, not *"what's the answer?"*.

1. Which of the following problems **cannot be solved**? Explain your reasoning. Which **can** be solved? What is the solution?

A: $x+2=6$ **B:** $2x-6$

Problem _____ **cannot** be solved because _____

_____

Problem _____ **can** be solved. It's solution is _____. I know that this is correct because _____

2. Fill in the blank with 3 different expressions that make the equation true.

$19+5=$ _____

a) _____ b) _____ c) _____

Example: Understanding Equations

Learning Target

I understand the meaning of equations, equal signs, and solutions. I can write equivalent equations.

Level 2:

I can determine whether a given value is a solution to an equation; I can determine if an equation has one, zero, or infinitely many solutions.

$12 = x + 8$

$x + y = 10$

$3(x + 2) = 3x + 2$

I can determine whether a given value is a solution to an equation; I can determine if an equation has one, zero, or infinitely many solutions.

3. Is $x=3$ a solution to the equation $4x+5=20$? Why or why not?

$x=3$ _____ a solution to $4x+5=20$ because _____

_____

_____

4. How many solutions does each equation have? Explain your reasoning.

a) $5x+10=5(x+2)$ This equation has _____ solution(s). I can tell because

_____

b) $3x+4x+4=7x+3$ This equation has _____ solution(s). I can tell because

_____

Example: Understanding Equations

Learning Target

I understand the meaning of equations, equal signs, and solutions. I can write equivalent equations.

Level 3:

Given a simple equation (like x = 2), I can create an equivalent equation with at least 3 operations, and can confirm that it is equivalent to the original.

$$x = 2 \xrightarrow{+5} x + 5 = 7 \xrightarrow{\cdot 2} 2(x + 5) = 14$$

Given a simple equation (like x = 2), I can create an equivalent equation with at least 3 operations, and can confirm that it is equivalent to the original.

5. Construct an equation, with 3 different operations, whose solution is $x = 3$. Show each step of the construction.

Example: Understanding Equations

Learning Target

I understand the meaning of equations, equal signs, and solutions. I can write equivalent equations.

Level 4:

I can evaluate whether a series of equations are equivalent and justify my reasoning.

I can evaluate whether a series of equations are equivalent and justify my reasoning.

6. Alex attempted to construct an equation from $x = 15$. Here is what he wrote:

$x = 15$ (*original equation*)

$+10$

$x + 10 = 25$ (*equation* 1)

$\div 5$

$x + 2 = 5$ (*equation* 2)

$\bullet 4$

$4(x + 2) = 20$ (*equation* 3)

a) Which is the first equation in the chain that is incorrect? _____

b) Show that the equation you identified in part (a) is not equivalent to $x = 15$.

c) Show how to fix Alex's mistake. What should his final equation look like?

Group Sessions

(Engage NY Module Planning) 3rd, 4th, and 5th: April

Grade 3 Example

(CPM Chapter Planning) 6th: Dan