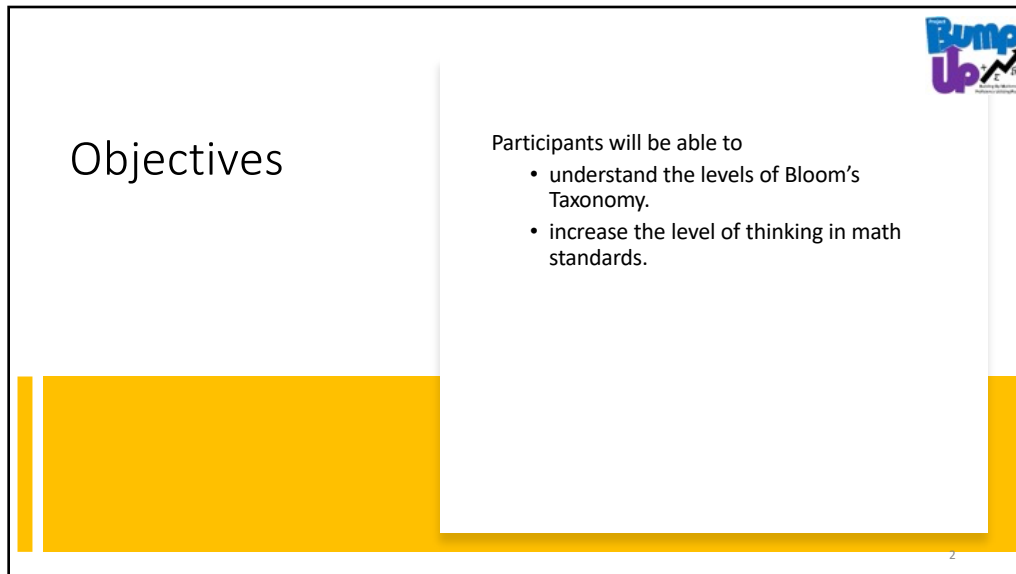


Increasing Cognitive Complexity:
Bloom's Taxonomy

1

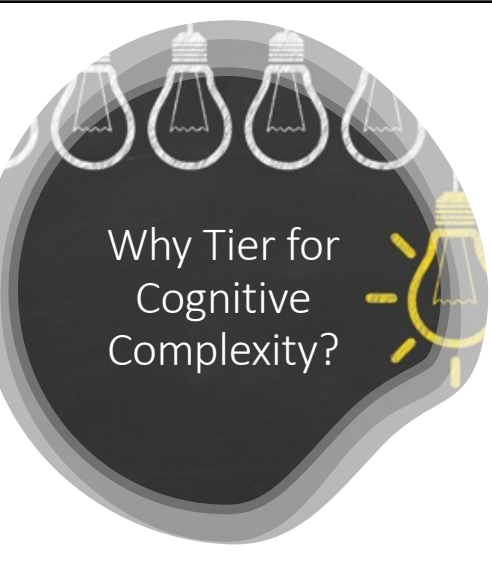


Objectives

Participants will be able to

- understand the levels of Bloom's Taxonomy.
- increase the level of thinking in math standards.

2



Why Tier for Cognitive Complexity?

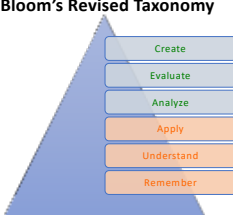
- Critical Thinking as a 21st Century Tool
- Increasing thinking level and/or complexity as a means of manageable, meaningful differentiation

3


3

A Range of Approaches (Francis, 2017)


Bloom's Revised Taxonomy



Biggs and Collis's SOLO Taxonomy (Structure of the Observed Learning Outcome)



Webb's Depth of Knowledge



Marzano's New Taxonomy of Educational Objectives

The Three Systems and Knowledge			
Self-System			
Beliefs About the Importance of Knowledge	Beliefs about Efficacy	Emotions Associated with Knowledge	
Metacognitive System			
Specifying Learning Goals	Monitoring the Execution of Knowledge	Monitoring Clarity	Monitoring Accuracy
Cognitive System			
Knowledge Retrieval	Comprehension	Analysis	Knowledge Utilization
Recall	Synthesize	Planning	Choosing Meaning
Execution	Representation	Classifying	Problem Solving
		Comparing	Experimental Inquiry
		Speculating	Investigation
		Self-Checking	
Knowledge Domain			
Information	Mental Procedures	Physical Procedures	

<https://www.intel.com/content/dam/www/program/education/us/en/documents/project-design/skills/marzano-taxonomy.pdf>
<https://www.johnbiggs.com.au/academic/solo-taxonomy>
<https://www.synergiseducation.com/blooms-taxonomy-and-webbs-depth-of-knowledge/>

4

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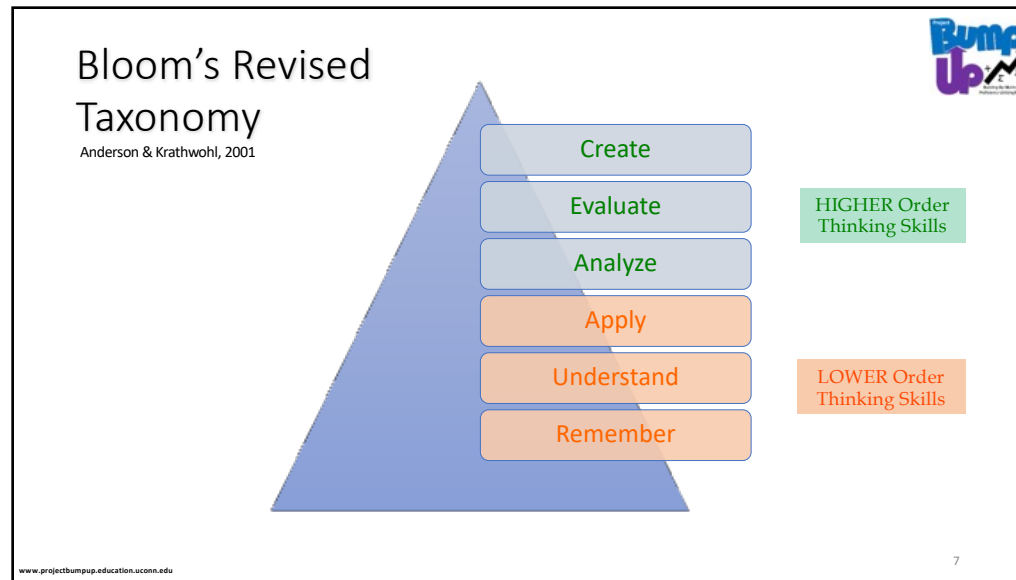
Marzano's New Taxonomy of Educational Objectives

<https://www.intel.com/content/dam/www/program/education/us/en/documents/project-design/skills/marzano-taxonomy.pdf>
<https://www.johnbiggs.com.au/academic/solo-taxonomy>
<https://www.synergiseducation.com/blooms-taxonomy-and-webbs-depth-of-knowledge/>

5

Bloom's Revised Taxonomy

6



7

Bloom's Taxonomy as Easy as Pie

- Clarity of how the Taxonomy levels build
- Visual to aid in understanding
- Analogy to something that almost everyone can relate to*

*Bloom's Taxonomy – As Easy as Riding a Bike

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8

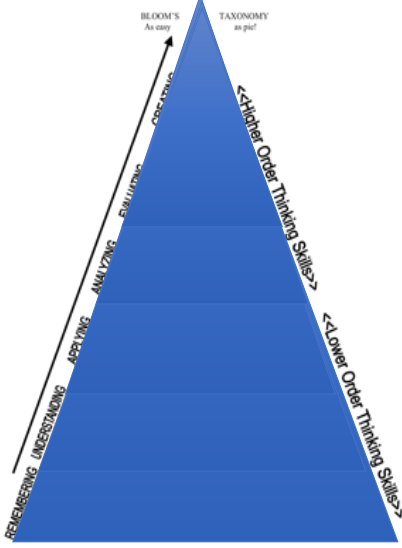
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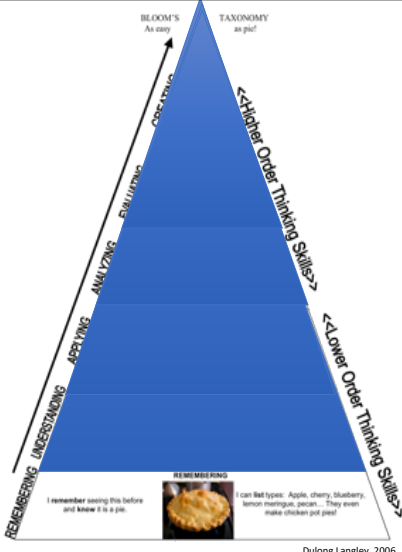
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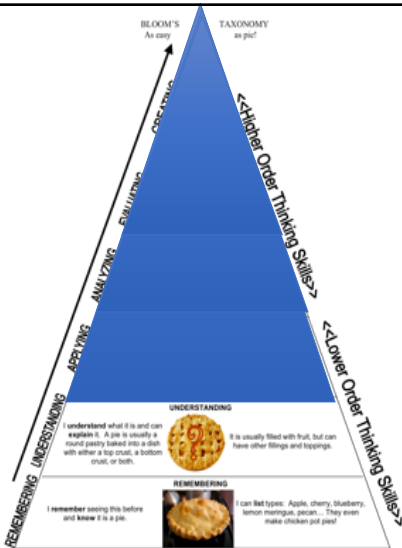
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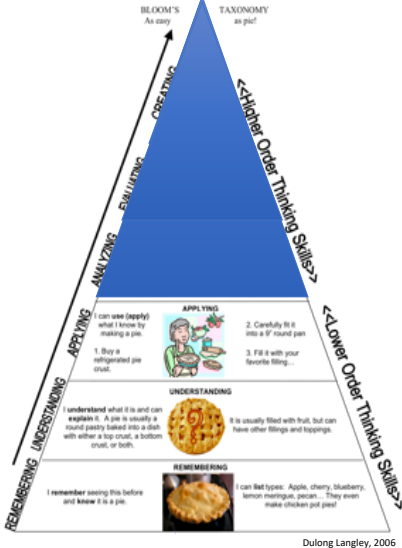
11

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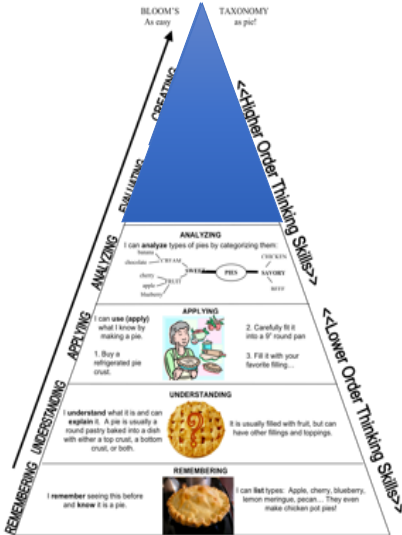
12

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The diagram is a pyramid with six levels. From top to bottom:

- CREATING** (Higher Order Thinking Skills): 'BLOOM'S TAXONOMY As easy as pie?'
- EVALUATING** (Higher Order Thinking Skills): 'I can evaluate types of pies by categorizing them: cream, apple, nut, chicken, pumpkin, pecan, cherry, blueberry, lemon meringue, peach... They even make chicken pot pie!'
- ANALYZING** (Higher Order Thinking Skills): 'I can analyze types of pies by categorizing them: cream, apple, nut, chicken, pumpkin, pecan, cherry, blueberry, lemon meringue, peach... They even make chicken pot pie!'
- APPLYING** (Lower Order Thinking Skills): 'I can use (apply) what I know by making a pie. 1. Buy a refrigerated pie crust. 2. Carefully fill it into a 9" round pan. 3. Fill it with your favorite filling.'
- UNDERSTANDING** (Lower Order Thinking Skills): 'I understand what it is and can explain it. A pie is usually a round pastry baked into a dish with either a top crust, a bottom crust, or both. It is usually filled with fruit, but can have other fillings and toppings.'
- REMEMBERING** (Lower Order Thinking Skills): 'I remember seeing this before and know it is a pie. I can list types: Apple, cherry, blueberry, lemon meringue, pecan... They even make chicken pot pie!'

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Dulong Langley, 2006


13

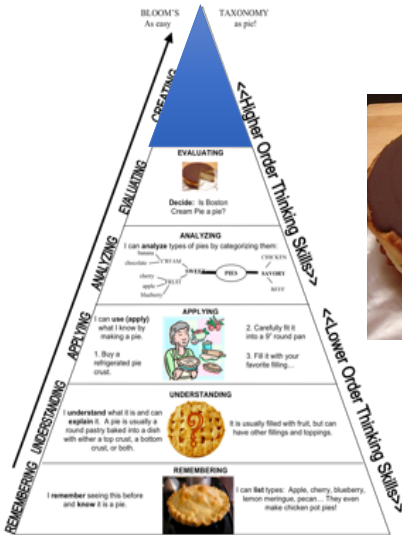
13

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The diagram is a pyramid with six levels. From top to bottom:

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- EVALUATING** (Higher Order Thinking Skills): 'I can evaluate types of pies by categorizing them: cream, apple, nut, chicken, pumpkin, pecan, cherry, blueberry, lemon meringue, peach... They even make chicken pot pie!'. Example: 'Decide: Is Boston Cream Pie a pie?'
- ANALYZING** (Higher Order Thinking Skills): 'I can analyze types of pies by categorizing them: cream, apple, nut, chicken, pumpkin, pecan, cherry, blueberry, lemon meringue, peach... They even make chicken pot pie!'
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Boston Cream Pie (Choate, 2007)

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Dulong Langley, 2006

14

14

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Dulong Langley, 2006

15



Boston Cream Pie (Choate, 2007)

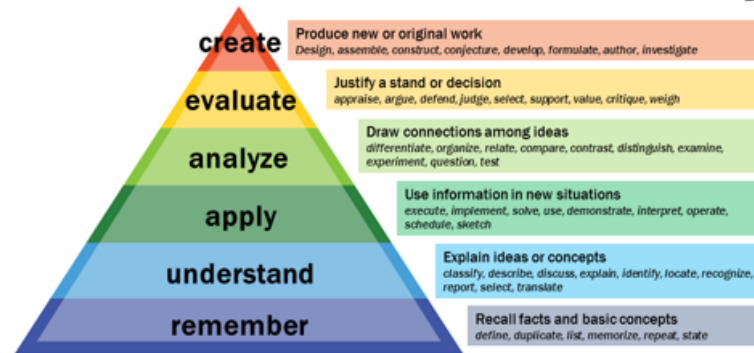
Multiple Points of Entry to Bloom's Levels

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Verbs – That's what's happening.

Bloom's Taxonomy



Vanderbilt University Center for Teaching

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Overlap

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	<ul style="list-style-type: none"> Choose Define Find Know Label List Match Narrate Obey Recall Relate Select Show Spell Tell What When Where Which Who Why 	<ul style="list-style-type: none"> Classify Compare Contrast Demonstrate Explain Extend Illustrate Interpret Justify Relate Rephrase Outline Relate Rephrase Summarize Translate 	<ul style="list-style-type: none"> Apply Build Choose Construct Design Experiment with Identify Interview Make use of Model Organize Plan Sketch Solve Utilize 	<ul style="list-style-type: none"> Analyze Assume Categorize Classify Compare Conclude Conclude Contrast Discover Divide Distinguish Divide Examine Function Infer Infer Infer List Make Relationships Simplify Summarize Take part in Test for Theme 	<ul style="list-style-type: none"> Agree Assume Assess Choose Compare Conclude Criteria Critique Decide Defend Deliberate Determine Dispute Evaluate Estimate Evaluate Explain Importance Influence Interpret Judge Justify Measure Opinion Perceive Practice Prove Rate Recommend Rule on Select Support Value 	<ul style="list-style-type: none"> Adapt Build Change Choose Combine Compile Construct Create Delete Design Develop Discuss Elaborate Estimate Formulate Imagine Improve Invent Make up Maximize Maximize Modify Original Plan Propose Solution Solve Support Test Theory

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Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing: A bridge to 21st-century learning. Boston, MA: Allyn and Bacon.

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Thank you!
