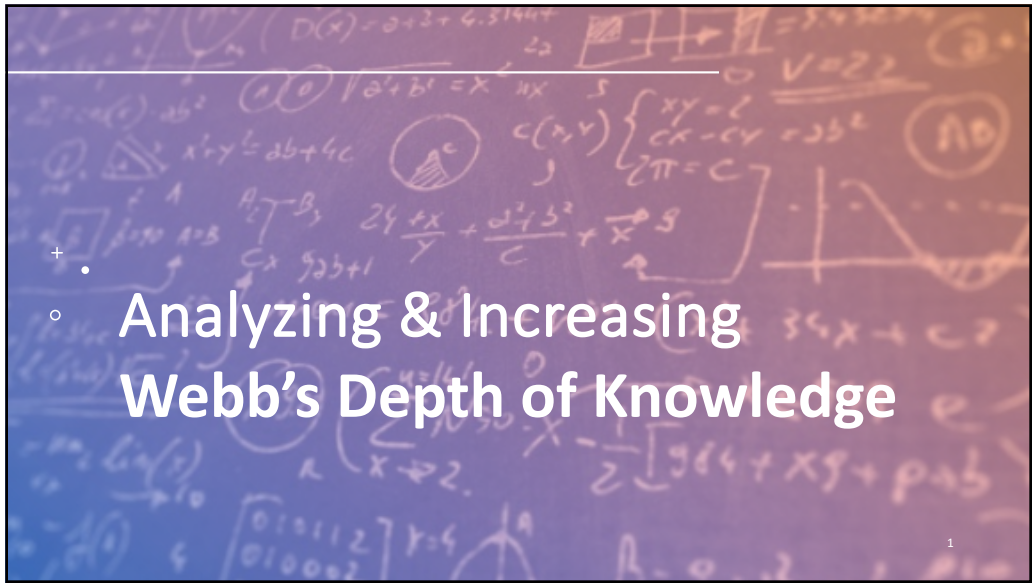


1

Objectives

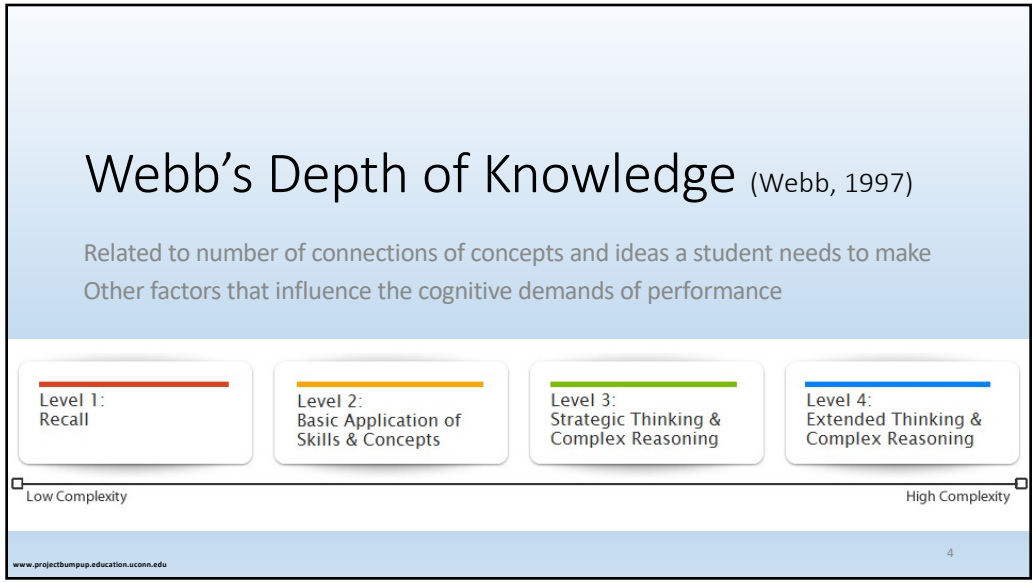
- Analyze existing DOK levels
- Increase DOK levels
- Resources
  - Francis' DOK Charts
  - Kaplinsky's Gr. 4 & 5 Matrices
  - Hess' Cognitive Rigor Matrix
  - Project BUMP UP's 3-Step Leveling Up

2

2


Overview of
Webb's DOK
3

3


Webb's Depth of Knowledge (Webb, 1997)
Related to number of connections of concepts and ideas a student needs to make
Other factors that influence the cognitive demands of performance
Level 1:
Recall
Level 2:
Basic Application of
Skills & Concepts
Level 3:
Strategic Thinking &
Complex Reasoning
Level 4:
Extended Thinking &
Complex Reasoning
Low Complexity
High Complexity
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4

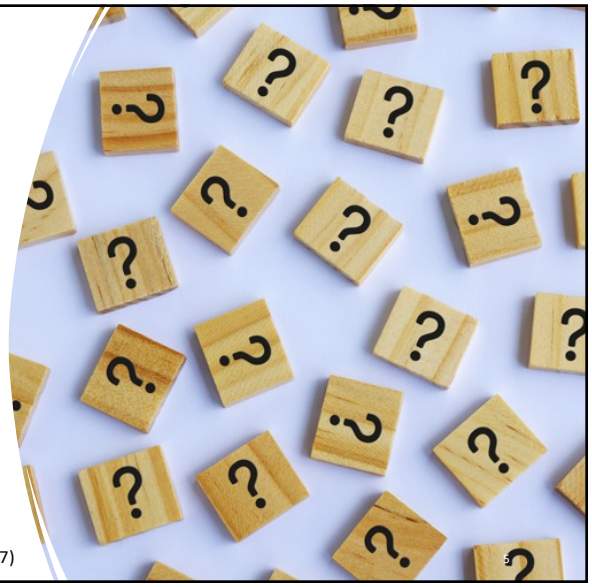
4

Context: What are students expected to do?

Are students expected to

- Acquire knowledge (**DOK-1**)?
- Apply knowledge (**DOK-2**)?
- Analyze knowledge (**DOK-3**)?
- Augment knowledge (**DOK-4**)?

(Francis, 2017)



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DOK at a Glance

One correct answer?

- DOK 1 – Know it (can find it) or not
- DOK 2
  - More than one concept
  - If/then; cause/effect

More than one correct answer requiring evidence?

- DOK 3 –
  - Interpret
  - Supporting evidence
  - Reasoning (how and why)
- DOK 4
  - DOK 3
  - Additional sources
  - Initiate and complete project

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(Hess, n.d.)

6

6

By complexity, not difficulty

- Difficulty varies by
  - Student
  - Over time

- Complexity
  - Related to content/context more than verb
  - More complex reasoning

(Kaplinsky, 2015)

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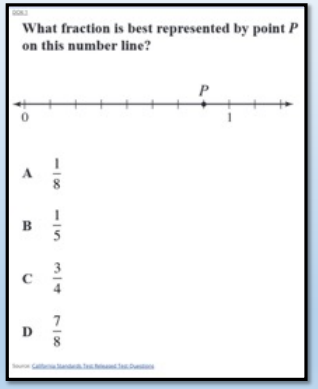
7

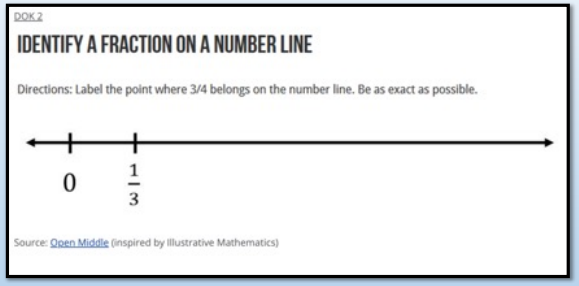
Turn & Talk: Why 1, 2, 3?

1



(Kaplinsky, 2014)

2



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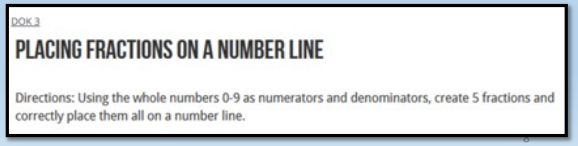

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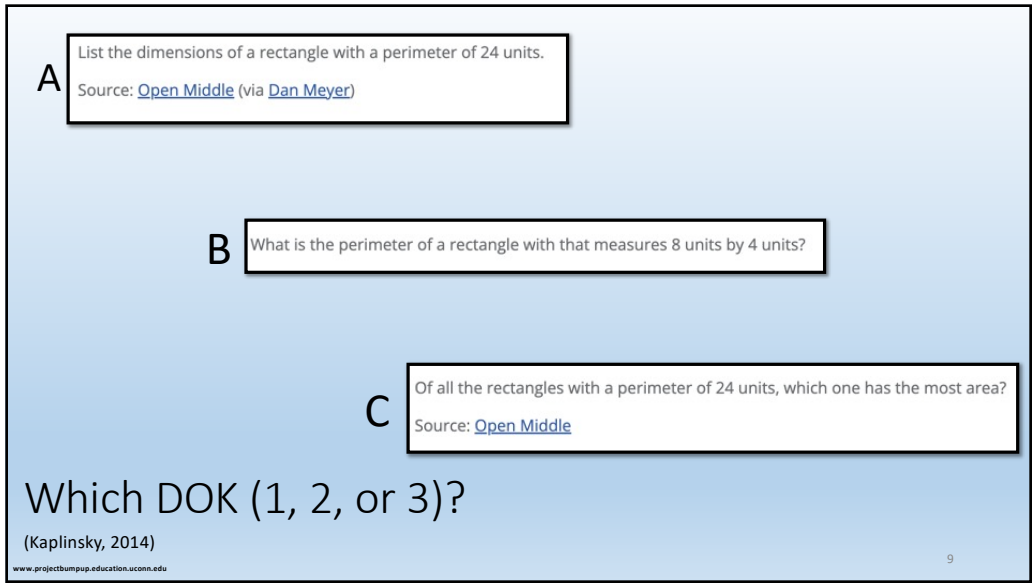
A
List the dimensions of a rectangle with a perimeter of 24 units.
Source: Open Middle (via Dan Meyer)
B
What is the perimeter of a rectangle with that measures 8 units by 4 units?
C
Of all the rectangles with a perimeter of 24 units, which one has the most area?
Source: Open Middle
Which DOK (1, 2, or 3)?
(Kaplinsky, 2014)
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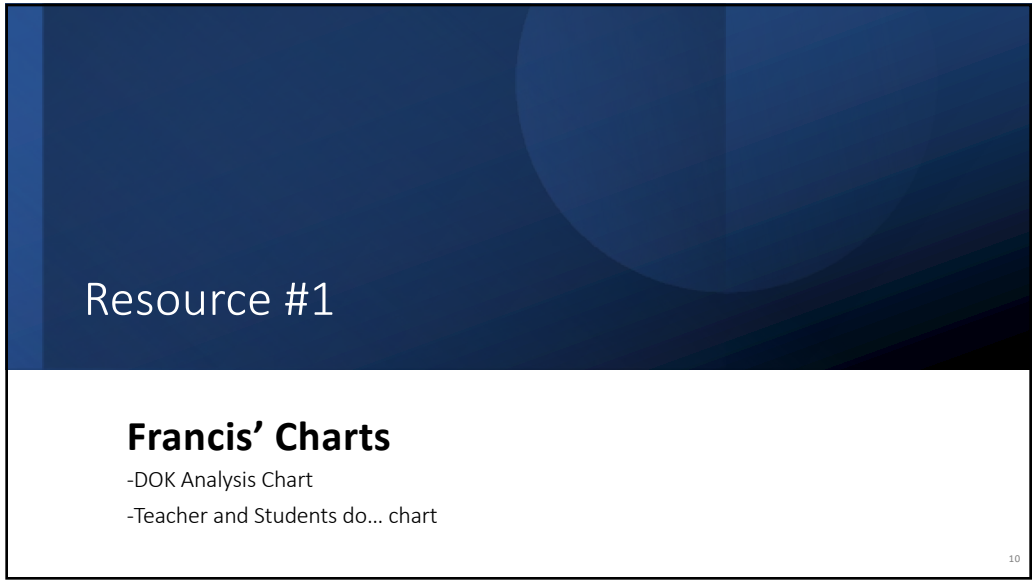
9


Resource #1
Francis' Charts
-DOK Analysis Chart
-Teacher and Students do… chart
10

10

Francis' DOK Analysis Chart (2022)					
What is the DOK level?	What is the cognitive demand?	What is the demand of the task students must complete?	What is the demand of the mental processing students must perform?	What is the demand of the response students must provide?	What is the demand of the goal and expectation for students?
DOK 1 (recall)	Low	• Just the facts • Just do it	• Recall information • Recall how to	• Answer correctly	Answer it
DOK 2 (skill or concept)	Moderate	• Show and share or summarize • Comprehend and communicate • Specify and explain • Give examples and non-examples	• Apply knowledge, concepts, or skills • Use information and basic reasoning	• Establish and explain with examples	Use it to explain it
DOK 3 (strategic thinking)	High	• Delve deeply • Inquire and investigate • Critical thinking • Problem solving • Creative thinking • Defend, justify, or refute with evidence • Connect, confirm, conclude, consider or critique	• Think strategically • Use complex reasoning supported by evidence	• Examine and explain with evidence	Use it to prove it
DOK 4 (extended thinking)	Extensive	• Go deep within a subject area • Go among texts and topics • Go across the curriculum • Go beyond the curriculum	• Use extended reasoning supported by expertise • Think extensively	• Explore and explain with examples and evidence (over an extended period)	Go for it

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Francis' DOK: Teacher and student do . . . (Abridged from Francis, 2022)							
DOK 1		DOK 2		DOK 3		DOK 4	
Teacher	Student	Teacher	Student	Teacher	Student	Teacher	Student
Directs and leads	Listens and observes	Assigns and Guides	Participates actively	Moderates and monitors	Engages deeply	Initiates, evaluates, and critiques learning	Proposes, plans, and presents
Shows/tells specific information and procedures	Memorizes specific information and procedures	Observes and oversees student performance	Shows, shares, summarizes	Presents complex goal/task with criteria	Uses deep knowledge/skills to achieve criteria	Prompts extensive thinking across diverse contexts and unique situations	Thinks extensively how to use knowledge to respond to real-world scenario
Provides details, facts, or specifics	Recalls details, facts, or specifics	Prompts demonstration/ communication to answer questions, do tasks, analyze in one context	Demonstrates/ communicates to answer questions, do tasks, analyze ideas in one context	Provides different contexts for demonstrating learning	Examines/explains with evidence in different contexts	Provides opportunities for connecting/ transferring knowledge across the curriculum, beyond the classroom, or unique ways	Explores/ explains with examples and evidence to connect/ transfer knowledge across the curriculum, beyond the classroom, or unique ways
Provides directions, instructions, steps	Follows directions, instructions, steps	Asks question to check for conceptual/ procedural understanding	Asks questions to develop conceptual/ procedural understanding or clarify	Engages strategic/complex reasoning with evidence	Thinks strategically/uses complex reasoning with evidence to justify	Encourages students to develop learning, experiences, innate gifts into personal expertise	Develops learning, life experience, and innate gifts into personal expertise
Asks questions to assess knowledge and check understanding	Asks questions to develop background knowledge and basic understanding	Assesses/evaluates responses, results, reasoning	Establish/explain responses, results, or reasoning with examples	Asks questions to stimulate deeper thinking/reasoning	Asks questions to delve deeper/consider alternatives, predict	Assigns authentic, intricate, and time-consuming tasks requiring in-depth research	Completes authentic, intricate, and time-consuming tasks that involve in-depth research
Speaks for most of the experience	Speaks when called on or asks a question			Assesses/evaluates for correctness, clarity, credibility of evidence/reasoning	Uses evidence/reasoning correctly, clearly, credibly		

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Resource #2

Hess' Cognitive Rigor Matrix

-Bloom's x Webb's organizational matrix

-Math examples

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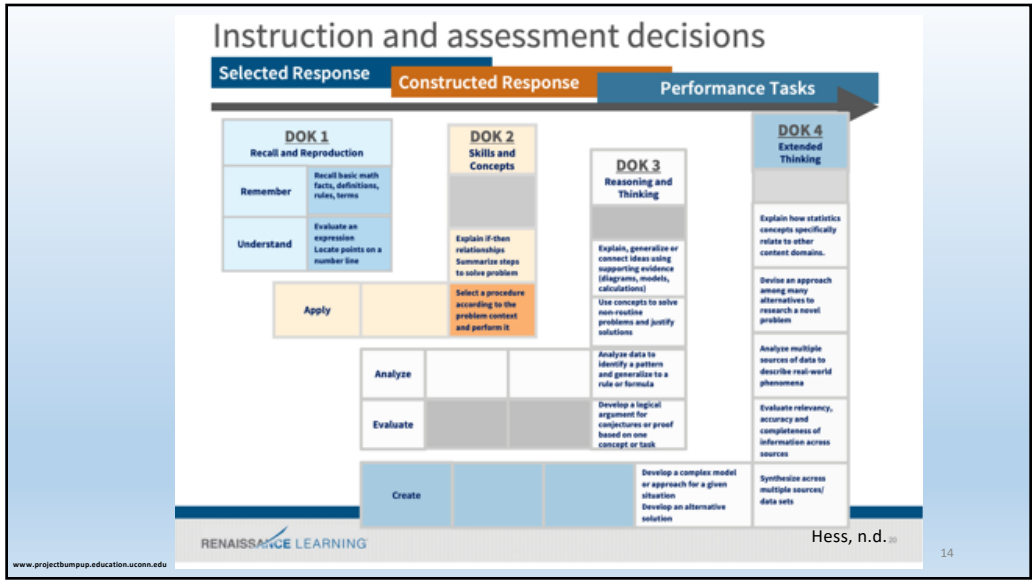

Hess, n.d.

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Hess
Cognitive Rigor Matrix
(Bloom's x Webb's)

Math Content Standards & Math Practices

Depth + Thinking	Level 1 Recall & Reproduction	Level 2 Skills & Concepts (routine applications)	Level 3 Strategic Thinking (support with data, equations, models, etc.)	Level 4 Extended Thinking (across domains)
Remember	Know math facts, terms			
Understand	Attend to precision Evaluate expressions, plot point	Model with mathematics Estimate, predict, observe, explain relationships	Construct viable arguments Geometry proof	Integrate concepts across domains
Apply	Calculate, measure, make conversions	Make sense of routine problems	Make sense of non-routine problems	Design & conduct a project
Analyze	Identify a pattern Locate information in table	Use tools strategically Classify, organize data, extend a pattern	Reason abstractly Generalize a pattern	Analyze multiple sources of evidence
Evaluate			Critique the reasoning of others	
Create				Design a complex model

RENAISSANCE LEARNING

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Depth + Thinking	Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking/ Reasoning	Level 4 Extended Thinking
Remember	What is slope?			
Understand	Read, write, and represent these fractions	Explain how you solved this problem. Make and explain your estimate	Construct an argument to show equivalence using area, set, and linear models	
Apply	Convert this fraction to a decimal Add these fractions	Use these data to graph your solution	Conduct the investigation, interpret results, and support conclusions with data	
Analyze	What kind of graph or model is this? Which data point shows ____?	Which graph shows how the data would be displayed?	Interpret what was happening in the event? Justify your interpretation using what you know about slope.	
Evaluate	Which team is the best? (opinion without supporting evidence)		How would you rank these ___? Justify your rankings using data that supports your criteria.	Some say the NFL settlement for player brain injury is not adequate. Evaluate both sides using data to determine the validity of this claim.
Create		Create a card game using fractions. Create scenario explained by a data display.		

Hess, n.d.

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The CR Matrix Lesson Plan Template

Hess, n.d.

Depth + thinking	Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking-Reasoning	Level 4 Extended Thinking
Remember				
Understand				
Apply				
Analyze				
Evaluate				
Create				

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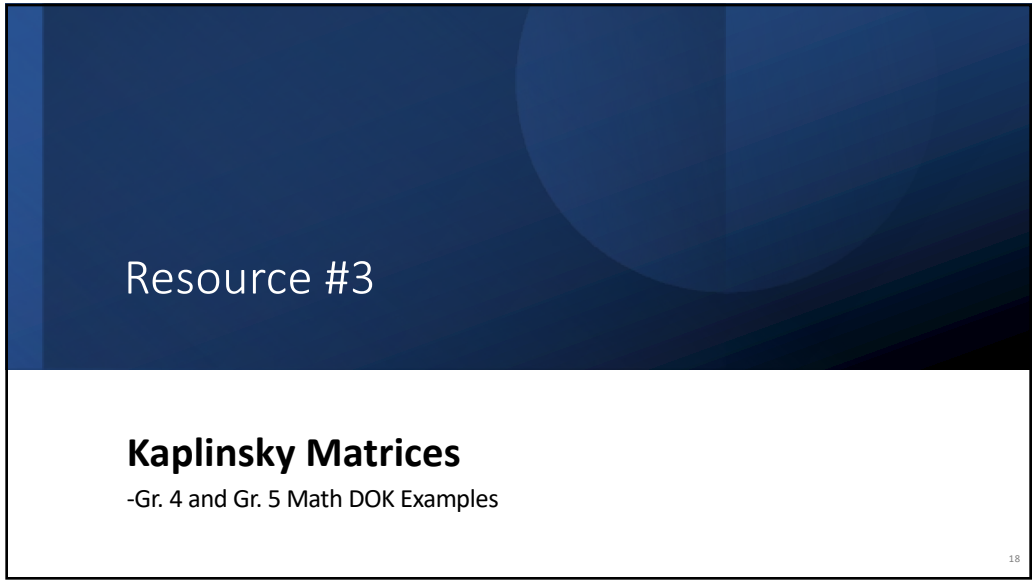

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Depth of Knowledge Matrix – Fifth Grade Math

Topic	Evaluating Expressions	Rounding Decimals	Multi-Digit Multiplication	Multiplying Decimals
CCSS Stand.	• 5.OA.1	• 5. NBT.4	• 5.NBT.5	• 5.NBT.7
DOK 1 Example	Evaluate the expression. $56 \div (8-1)$	Round the decimal to the nearest tenth. 7.163	Find the product. 37×45	Solve. $3.4 \times 2.5 =$
DOK 2 Example	Using the digits 0 through 9, at most one time each, place a digit in each box to create two true statements: one where the value on each side of the equal sign is greater than 30 and one where it's less than 30. You may reuse all the digits for each equation. □□ ÷ (□ − □) = □ + □ × □	Using the digits 0 to 9 at most one time each, place a digit in each box to create two different decimals that are equivalent when rounded to the nearest tenth. □.□□□ □.□□□	Using the digits 0 to 9 at most one time each, place a digit in each box to create a true equation. □□ × □□ = □□□	Using the digits 1 to 9 at most one time each, fill in the boxes to make a true number sentence. □.□ × 3.2 = □.□
DOK 3 Example	Using the digits 0 through 9, at most one time each, place a digit in each box to create the greatest possible value. □□ ÷ (□ − □) = □ + □ × □	Using the digits 0 to 9 at most one time each, place a digit in each box to create two different decimals that are equivalent when rounded to the nearest tenth and have the least possible value. □.□□□ □.□□□	Using the digits 0 to 9 at most one time each, place a digit in each box to create a true equation with the greatest possible product. □□ × □□ = □□□	Using the digits 1 to 9 at most one time each, fill in the boxes so that the product is as close to 50 as possible. □.□ × □.□ =

Robert Kaplinsky | More free DOK 2 & 3 problems available at openmiddle.com | © 2019 Robert Kaplinsky, robertkaplinsky.com

Version 1.4

Kaplinsky's Gr. 4 and 5 Math Matrices

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Resource #4

Project BUMP UP's Leveling Up DOK

3-Step Approach

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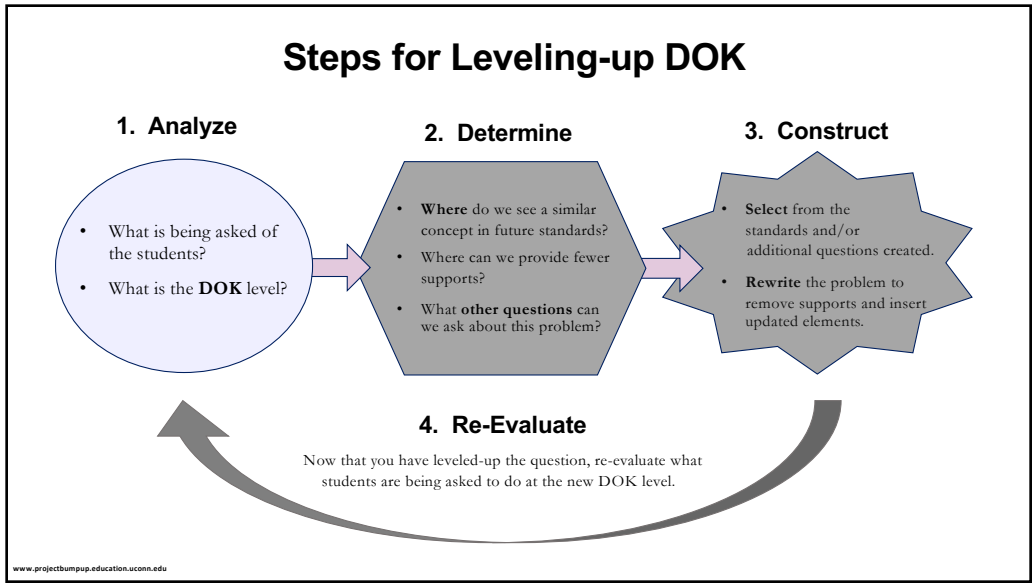
Steps for Leveling-up DOK
1. Analyze
What is being asked of the students?
What is the DOK level?
2. Determine
Where do we see a similar concept in future standards?
Where can we provide fewer supports?
What other questions can we ask about this problem?
3. Construct
Select from the standards and/or additional questions created.
Rewrite the problem to remove supports and insert updated elements.
4. Re-Evaluate
Now that you have leveled-up the question, re-evaluate what students are being asked to do at the new DOK level.
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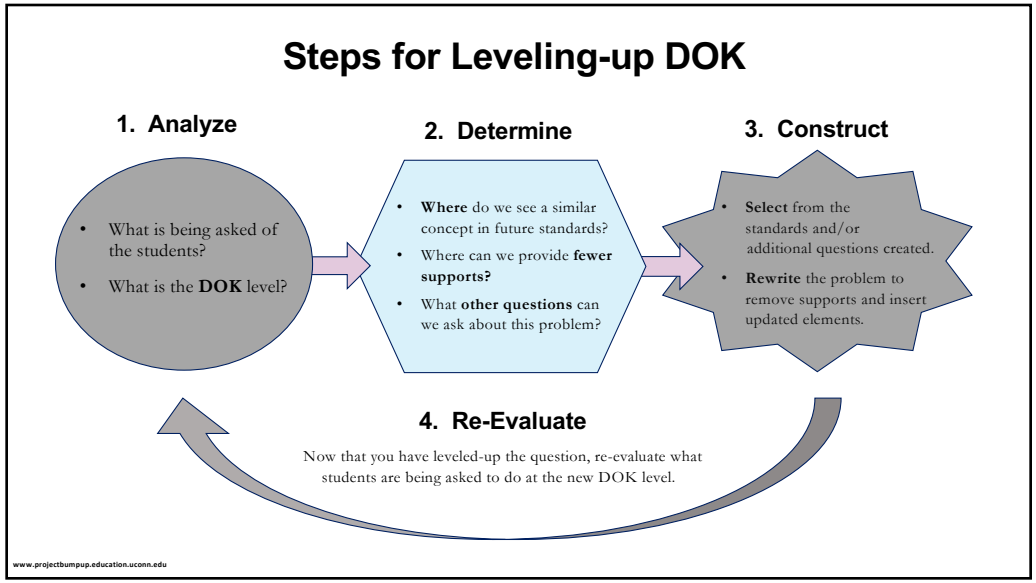
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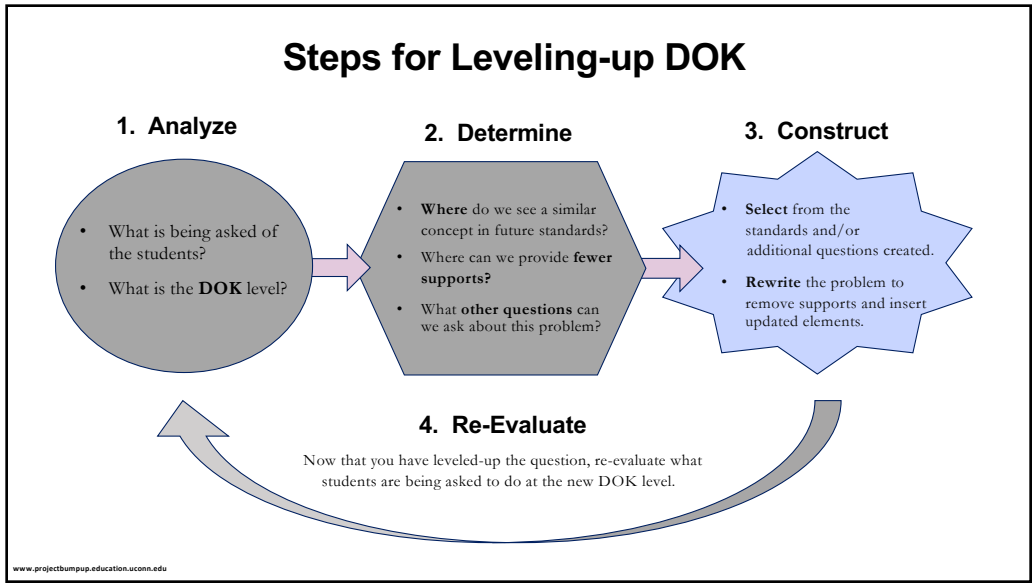
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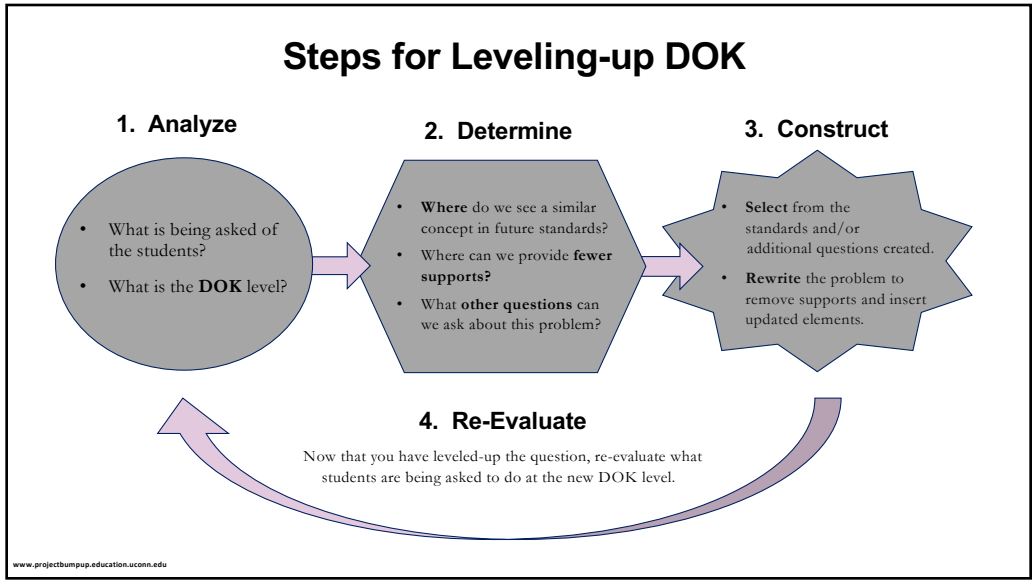
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1. Analyze
What is being asked of the students?
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What other questions can we ask about this problem?
3. Construct
Select from the standards and/or additional questions created.
Rewrite the problem to remove supports and insert updated elements.
4. Re-Evaluate
Now that you have leveled-up the question, re-evaluate what students are being asked to do at the new DOK level.
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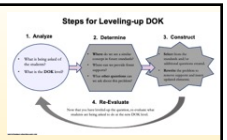
Currently, what is this **question asking** the student to do?



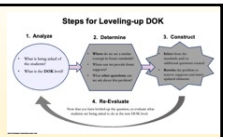
- Compare fractions

Myra read 45 pages of her 100-page book. Her sister read ½ of a 10-page book. Who read a greater fraction of her book, Myra or her sister? Show your work.

Hint: One fraction has a denominator of 100. The other fraction has a denominator of 10.

25

Currently, what is the **DOK** of this problem?



- DOK 2: Converting the fractions to those with similar denominators and then comparing the two fractions.

Myra read 45 pages of her 100-page book. Her sister read ½ of a 10-page book. Who read a greater fraction of her book, Myra or her sister? Show your work.

Hint: One fraction has a denominator of 100. The other fraction has a denominator of 10.

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Looking Ahead: When will we see a similar concept like this in the future?

- Mixed fractions
- Conversions to decimals

Myra read 45 pages of her 100-page book. Her sister read ½ of a 10-page book. Who read a greater fraction of her book, Myra or her sister? Show your work.
Hint: One fraction has a denominator of 100. The other fraction has a denominator of 10.

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Where can we **provide fewer supports** for students?

- Eliminate the hint

Myra read 45 pages of her 100-page book. Her sister read ½ of a 10-page book. Who read a greater fraction of her book, Myra or her sister? Show your work.
~~***Hint: One fraction has a denominator of 100. The other fraction has a denominator of 10.***~~

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What **other questions can we ask** about this problem?

- Show two ways to answer the question, "Who read the greater fraction of her book, Myra or her sister?"
- How many pages would one sister have to read to equal th fraction the other sister read?
- Justify which sister read a greater portion of her book with evidence.
- Change the numbers for more complexity (e.g., 73 pages out of 192-page book and 1/8 of a 212-page book.

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How can we implement these questions? (Building the new problem)

New Problem

Myra read 73 pages of her 192-page book. Her sister read 1/8 of a 212-page book.

- Who read a greater fraction of her book, Myra or her sister? Provide evidence for your answer.

The sister who read less wants to catch up and read the same fraction as the other sister.

- How many more pages would the sister need to read to catch up? Explain your answer in two ways.

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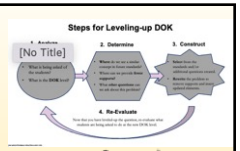
Now, what is this **question asking** the student to do?



(This should be the same as the original question/task.)

- Compare fractions

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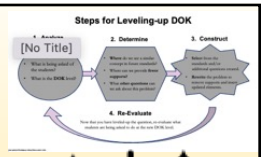
Now, what is the **DOK** of this problem?



(DOK should increase & look at Bloom's Taxonomy)

- DOK 3
  - **Explain** their thinking
  - **Another way** to approach the problem
  - **Compare** answers
  - **Analyze** their responses.

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Thank you!