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Ten Plus One:

Enhancing Depth and Complexity of Math Tasks

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$35 - 18$

$3\frac{1}{3} - 1\frac{5}{6}$

Simplify $\frac{18}{21}$

Name the shape.

12 X 10

Find the mean and median: 31, 27, 32, 65, 29

Measure the angle

35% of 120

Seventy-four is ____ tens and ____ ones

Goals

- *Learn* strategies for creating deep math tasks.
- *Apply* strategies for creating deep math tasks.
- *Anticipate* students' thinking.
- *Envision* classroom implementation.
- *Discuss* additional resources.

Mathematical Depth

Less depth

What do I *do*?

What are the *steps*?

How can I *remember*?

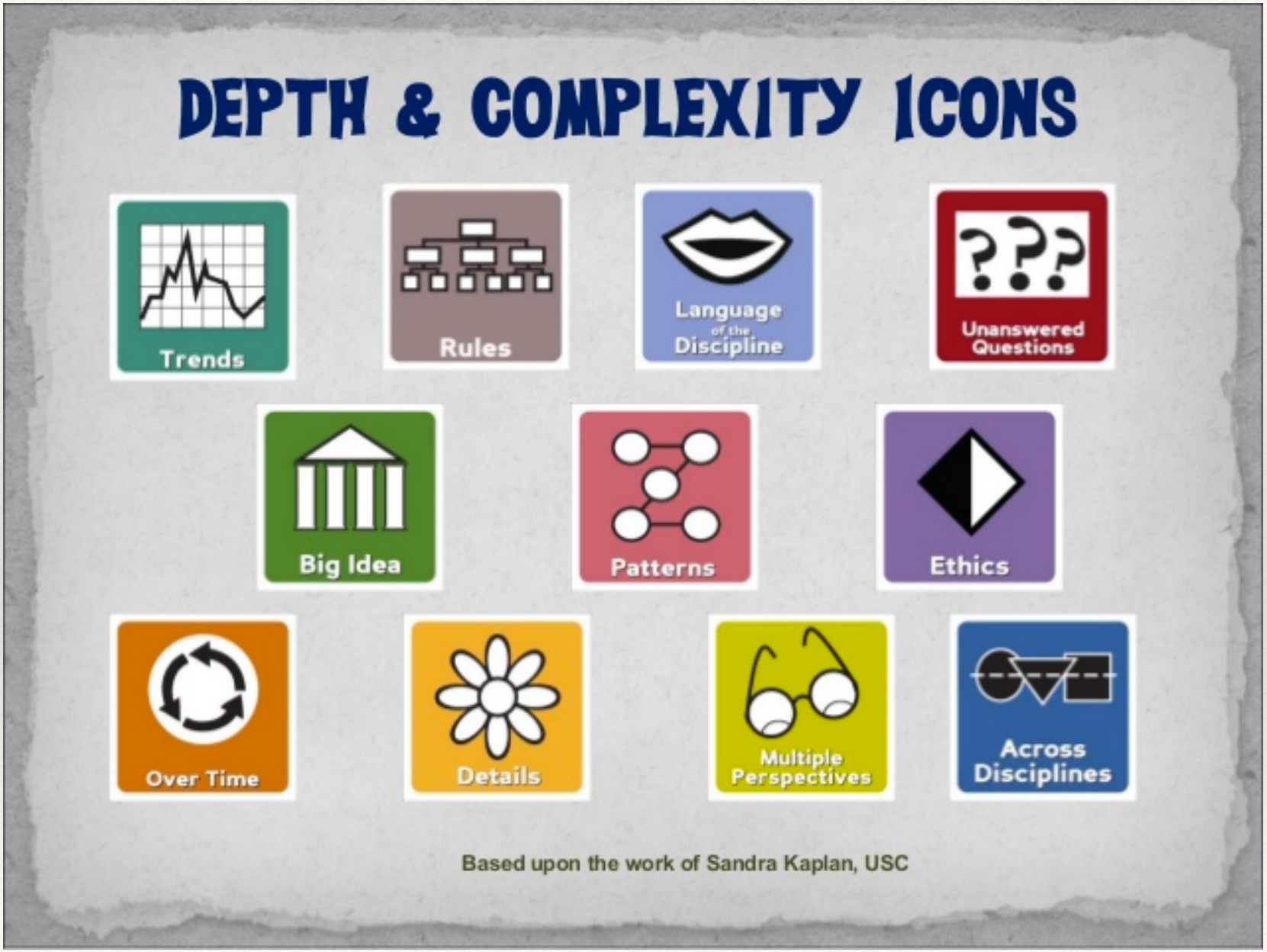
More Depth

What do I *think*?

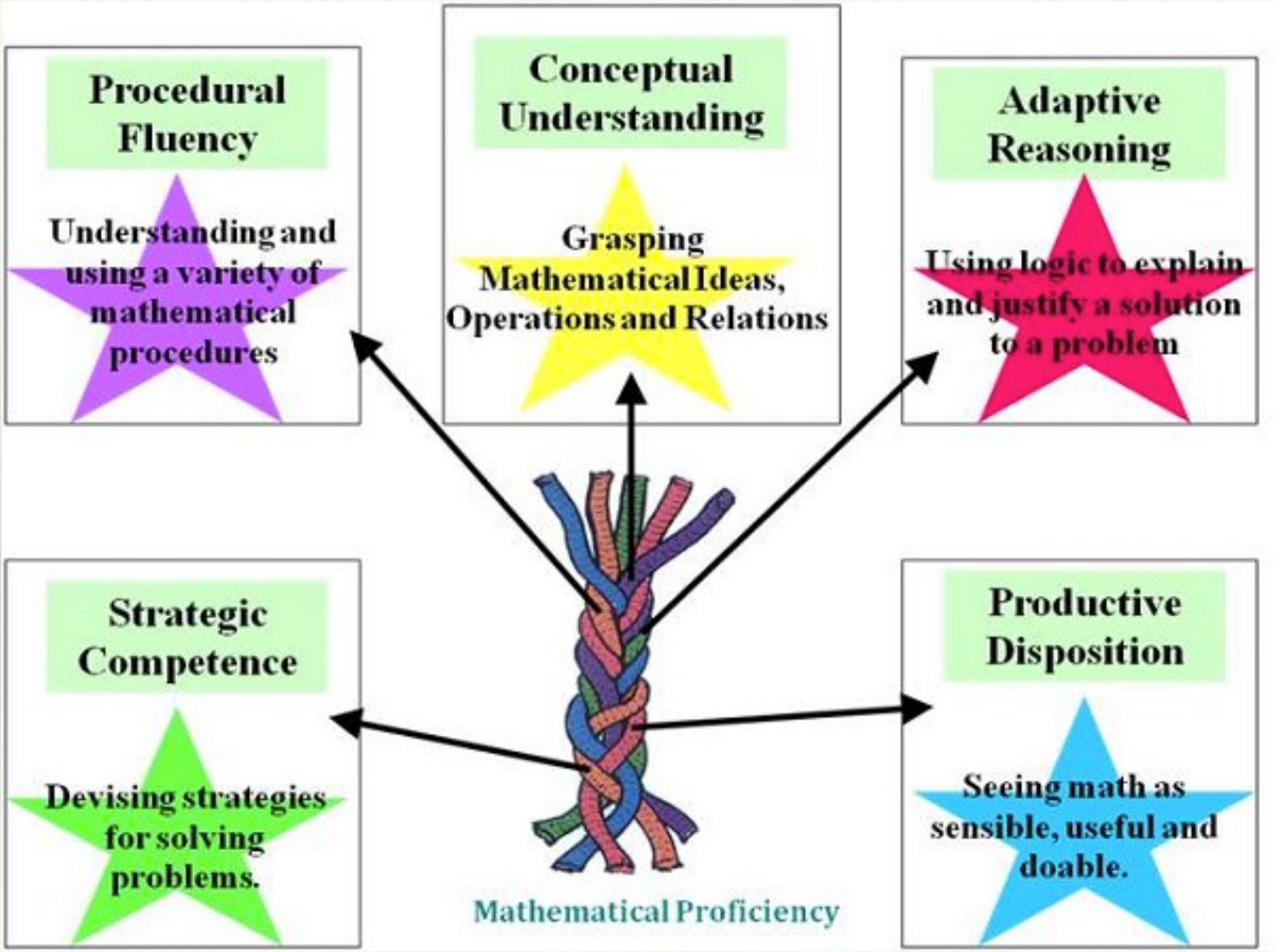
What does it *mean*?

How does it *connect*?

Kaplan's Icons



Math Proficiency Strands



Kilpatrick, J., Swafford, J., Findell, B. (Ed.). (2001). Adding it up: helping children learn mathematics. Washington, DC: National Academy Press.

NCTM Process Standards

- Problem Solving
  - Develop, apply, and verify your own strategies to answer questions.
- Reasoning and Proof
  - Make and test predictions. Analyze and extend patterns. Justify conclusions.
- Communication
  - Organize, record, and present mathematical ideas clearly (orally and in writing).
- Connections
  - Recognize relationships among mathematical ideas and between math and other disciplines.
- Representations
  - Model math concepts with words, graphs, tables, symbols, pictures, manipulatives, etc.

adapted from *Principles and Standards for School Mathematics*. Reston, Va.: NCTM, 2000.

Connecting Kaplan to Best Practices in Math

Conceptual Understanding	**Big Idea**, Patterns, Trends, Different Perspectives
Procedural Fluency	**Rules**, Ethics, Different Perspectives
Adaptive Reasoning	**Patterns** and **Details**, Trends, Different Perspectives
Strategic Competence	**Unanswered Questions**, Different Perspectives, Ethics
Mathematical Communication	**Language of the Discipline**, Rules, Different Perspectives
Connections	**Across the Disciplines**, Different Perspectives, Patterns
Representations	**Different Perspectives**, Language of the Discipline

The **Ten Plus One** Process

1. **Identify** a math task.
2. **Choose** a *Ten Plus One* strategy.
3. **Apply** the strategy to enhance the task.
4. **Anticipate** students' thinking.

A Ten Plus One Template

1. Identify a math task.	4. Anticipate students' thinking.
2. Choose a *Ten Plus One* strategy.	
3. Apply the strategy to enhance the task.	

Ten Strategies
for Creating Deep Math Tasks

1. Write a story.
2. Draw a picture.
3. Explain why.
4. Find another way.
5. Compare and contrast.
6. Start with the answer.
7. Remove information.
8. Solve to learn.
9. Build a pattern.
10. Ask "What if…?"

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One Strategy

for Creating Complex Math Tasks

Use *more…*

digits, numbers, shapes, parts, variety, steps, ideas,

information, definitions, categories, relationships, etc.

Caution: The purpose is not just messy computation.

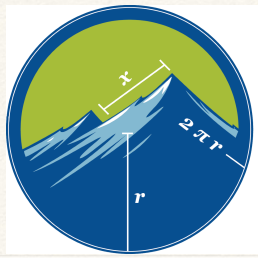
Creating Tasks

Combine strategies.	*Mix and match.*
Skip strategies.	*If a strategy doesn't work, let it go.*
Be flexible.	*Let the strategies inspire **your** creativity!*
Focus on concepts.	*Build on ideas underlying the task.*
Take the long view.	*Improve your tasks over time.*

Using the Tasks

Step back.	*Let your students do the thinking.*
Allow collaboration.	*Help students learn from each other.*
Expect explanations.	*Deep and complex ideas are worth expressing!*
Learn as you go.	*Refine tasks using your students' ideas!*
Save work samples.	*Use student work for exemplars and assessments.*

Thank you!



MATH 5280
challenging math
for adventurous learners

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