

1. Create five different expressions that equal 16, 17, 18, 19.

- Your expressions have to start with the number 1.
- You can only multiply by 2 and add 5.
- Grouping symbols are allowed

**2. Numbers 10, 15, and 20 are impossible to create. Why do you think that is?
Provide supporting evidence.**

Create an expression that equals each number 1-20 using only the summation of consecutive integers.	Task Card
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Create an expression that equals each number 21-30 using only the summation of consecutive integers.	Extension 1
What are the next four numbers that are impossible to create using the summation of consecutive integers?	Extension 2
Create an expression that equals 63 using only the summation of three consecutive integers.	Extension 3
Create an expression that equals 42 using only the summation of four consecutive integers.	Extension 4
The number 15 can be represented by three different summations. What is the next number that can be written by three different sums? What about four different sums?	Extension 5

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21

+

|

+

+

|

+

+

+

+

22

+

+

+

23

+

24

25

Odd Numbers

31

67

Multiples of 3

57

105

Important Things to Know

Four Number Sums

26

42

Practice Problems	Category

Hints	
Quick Nudge (1)	Which numbers can you present as two consecutive sums?
Quick Nudge (2)	If you have done the two digit sums, try the 3 digits next.
Quick Nudge (3)	When looking for patterns, the numbers created from 3 consecutive integers are a multiple of what number?
Stronger Push (1)	Try $1+2\dots$ what does that equal? Then $2+3\dots$ $3+4\dots$
Stronger Push (2)	18 can be represented as a 3 and 4 number sum.
Strategic Assist (1)	$1+2=3$, $2+3=5$, $3+4=7$, try to continue the pattern.
Strategic Assist (2)	10 is created by $1+2+3+4$. 20 is also 4 numbers.

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1  2  3 $1 + 2$ 4  5 $2 + 3$ 6 $1 + 2 + 3$ 7 $3 + 4$ 8  9 $4 + 5 / 2 + 3 + 4$ 10 $1 + 2 + 3 + 4$	11 $5 + 6$ 12 $3 + 4 + 5$ 13 $6 + 7$ 14 $2 + 3 + 4 + 5$ 15 $7 + 8 / 4 + 5 + 6 / 1 + 2 + 3 + 4 + 5$ 16  17 $8 + 9$ 18 $5 + 6 + 7 / 3 + 4 + 5 + 6$ 19 $9 + 10$ 20 $2 + 3 + 4 + 5 + 6$
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10 1 + 2 + 3 + 4	20 2 + 3 + 4 + 5 + 6
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21 10 + 11 / 6 + 7 + 8 / 1 + 2 + 3 + 4 + 5 + 6 22 4 + 5 + 6 + 7 23 11 + 12 24 7 + 8 + 9 25 12 + 13 / 3 + 4 + 5 + 6 + 7	26 5 + 6 + 7 + 8 27 13 + 14 / 8 + 9 + 10 / 2 + 3 + 4 + 5 + 6 + 7 28 1 + 2 + 3 + 4 + 5 + 6 + 7 29 14 + 15 30 9 + 10 + 11 / 6 + 7 + 8 + 9 / 4 + 5 + 6 + 7 + 8
32, 64, 128, 256	63 ÷ 3 = 21 20 + 21 + 22 = 63
10 = 1 + 2 + 3 + 4 (1) 14 = 2 + 3 + 4 + 5 (2) ... 42 = 9 + 10 + 11 + 12 (9)	21 10 + 11 6 + 7 + 8 1 + 2 + 3 + 4 + 5 + 6

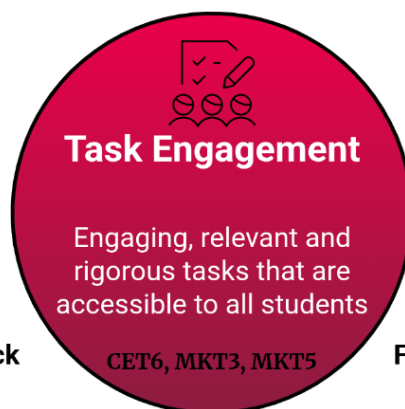
High Leverage Math & Business Instructional Cycle



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Informal and
Formal Feedback

Powerful Task Diagnosis Sheet - Adapted from *Powerful Task Design (Antonetti & Stice, 2018)*

Starting Point: “A task is only as powerful as the question underneath it.” (PTD, p. 109); Analyze the question/teaching consideration at the task’s core.

- ☐ Closed with a single right answer and/or approach → How and how soon will students apply the right answer/approach to a new or novel situation?
- ☐ Closed but with a “Choice” of a few right answers and/or approaches. → How can I make this question more open-ended or have a range of possible answers?
- ☐ Open with a broad range of possible answers and/or approaches. → How will I ensure students’ varied original ideas align with accepted meaning?

Criteria 1 - Engaging Qualities: Will the task capture students’ attention and curiosity? Will they find the task meaningful and worth doing because it connects to their lives, interests, or a real audience or purpose?

Criteria 2 - Academic Strategies: Humans use a small set of strategies to construct unique and new ideas about content. Which of these strategies will students use?

Criteria 3 - Cognitive Demand: In what ways will students demonstrate their thinking as individuals (perhaps as a result of collaboration)? Note - Rigorous thinking occurs at [Bloom’s](#) Level 3 (analyze) and up.

True Engaging Qualities (Relevance/Purpose)

- ☐ Develop and Defend My Own Original Ideas
- ☐ Agree and/or Disagree with Others and Explain Why
- ☐ Connect my Ideas to those of Others
- ☐ See/Hear Others Connect My Ideas
- ☐ Present to an Important Audience I Care About
- ☐ Create a Product with Proof of Concept
- ☐ Find and/or Create a Real Example(s)

High-Leverage Academic Strategies

- ☐ Find Similarities and Differences
- ☐ Compare and Contrast by Trait
- ☐ Develop a System of Classification/Organization
- ☐ Create a Metaphor or Analogy about Content
- ☐ Summarize or Note-Make
- ☐ Create a New Representation or Model (often nonlinguistic)
- ☐ Generate and Test an Original Hypothesis
- ☐ Identify and Extend Patterns

Levels of Thinking Across the Rigor Divide

- ☐ Infer with Support/Evidence
- ☐ Find or Compare Patterns
- ☐ Find Use for/Cause of Patterns
- ☐ Augment/Interrupt Patterns
- ☐ Make Connections When Doing Procedures
- ☐ Argue, Defend, or Justify
- ☐ Make Sense Of..
- ☐ Extend Thinking to a New Scenario

***** The Rigor Divide *****

Non-Truly Engaging Qualities (“Glitter”)

- ☐ Take Turns Talking
- ☐ Present to a Partner(s)/The Class
- ☐ Recall/Restate in a Fun or Novel Way
- ☐ Listen and Repeat
- ☐ Produce w/o Connections to Concept(s)
- ☐ Find and Repeat Real/Known Examples

Low-Leverage Academic Strategies

- ☐ List facts about...
- ☐ Copy from One Place to Another
- ☐ Restate
- ☐ Place Accepted Meaning in Another Form
- ☐ Restate a “Known” or Accepted Pattern

Low Level or “Shallow” Thinking

- ☐ Recall/Find an Example Of...
- ☐ Name the Steps
- ☐ Repeat Facts/Truth/Accepted Meaning
- ☐ Memorize
- ☐ Follow the Steps/Procedure
- ☐ Restate Accepted Meaning in Other Form



FARMINGTON PUBLIC SCHOOLS

14 MONTEITH DRIVE, FARMINGTON, CT 06032

Powerful Task Peer Review Protocol

(A structured process for groups of three or more)

Purpose: To support educators in analyzing and improving tasks using the three domains of Powerful Task Design (Cognitive Demand, Academic Strategies, and Engaging Qualities). This protocol is meant to be used in conjunction with the [PTD Task Diagnosis Sheet](#).

Time: 35 minutes total (Adjustable based on group size and depth of artifact review)

Roles:

- Presenter: Brings a task and frames a need or question
- Consultants: Peers analyzing the task
- Facilitator (optional): Ensures protocol integrity

Step 1: Presenter Shares a Task & Frames Wondering (5 minutes)

Presenter:

- Provides context: grade level, content area, standard(s), and where in the learning arc the task sits
- Shares the task artifact (prompt/handout/rubric/instructions)
- Frames a focus question such as:
 - “How can I raise the level of cognitive demand?”
 - “Where might I strengthen opportunities for student-created meaning?”
 - “How can I shift this from ‘glitter’ to true engagement?”

Consultants:

- Listen closely with a PTD lens
- Silently scan the artifact
- Make notes

Step 2: Clarifying Questions (5 minutes)

Consultants:

- Ask short-answer, factual questions; strictly objective; eliciting only facts
 - i.e. “How long do students have to complete this?”
 - i.e. “Is the product shared with anyone beyond the teacher?”
 - i.e. “What is the learning objective?”
- No suggestions or interpretations disguised as questions.

The Presenter

- answers briefly and only what is asked

Step 3: Probing Questions (5 minutes)

Consultants:

- Ask thoughtful, open questions (no suggestions yet):
 - i.e. “What student thinking do you hope to make visible?”
 - i.e. “Where might students generate and defend original ideas?”
 - i.e. “Will students transfer learning to a new context?”

Presenter

- Responds to questions as analysis deepens.
- At the end of questions, presenter re-states the focus question.

Step 4: Mapping the Task (5 minutes)

Presenter and Consultants

- Individually, without discussion or collaboration, map the task to the diagnosis sheet by checking the boxes in each area that you believe best describe the task as it is currently presented.

Step 5: Group Analysis Without the Presenter (10 minutes)

Presenter:

- Listens **silently** and makes notes
- Do not interrupt/interject!

Consultants:

- Discuss task using the diagnosis sheet (*What did you/I check off?*) and focus prompts (from Powerful Task criteria):
 - **Activity or Task?**
 - *Is this an activity or a task? How do we know?*
 - *Where/when/how is every student required to think?*
 - *If not yet a task, how could it be made into one? Where might there be a moment(s) for guaranteed cognitive demand*
 - **Cognitive Demand**
 - *What is the “cognitive floor” of the task? What is the minimum level/type of thinking each student must do?*
 - *Through what type of thinking will students show they are learning?*
 - *How/where is each student given an opportunity to make meaning?*
 - **Academic Strategies**
 - *How are students being asked to construct meaning with content?*
 - *Which explicit academic strategies does the task center and ask students to use?*
 - *How will students know how they are being asked to think?*
 - **Engaging Qualities**
 - *How will the task promote/capture students’ attention and curiosity?*
 - *What makes the task meaningful and worth doing?*
 - *How does the task go beyond “glitter” and speak to authentic work?*
- Make Suggestions Based on Analysis (framed as possibilities)
 - i.e. *“The group wonders whether...”*
 - i.e. *“One idea the group had was...”*
 - i.e. *“One way to level up the task might be...”*

Step 7: Presenter Reflection (5 minutes)

Presenter:

- Shares new insights and learning
 - i.e. *Something I’m thinking about...*
- Comments on what resonated or feels actionable
 - i.e. *Something I think I can try...*
- Speaks to any revision ideas that are emerging
 - i.e. *Something I think I can repair...*
- Not a place for defense; only learning!

Building an AI Practice tool:

1. Select the Canvas tool and Gemini Pro
2. Attach documents and prompt the AI to create a practice tool.
 - a. I want you to make an online tool where students can practice problems from the consecutive integers task. I have attached the task, extensions, and note-making sheet for you to see the problems. I want to create an online practice that has mild, medium and spicy problems for students. I want students to start at the mild but have the choice to skip to the medium or spicy. If they get two right at the mild, then should move up and so on. Also the tool should have a variety of problems and should tell them if they are right or wrong and have a hint button if they get stuck or get something wrong.
3. Prompt the AI to write code in HTML and give additional prompts as needed
4. Copy and paste the code into a google site using the embed button