Not Just Fun and Games:
An Intentional Approach for Choosing Math Workstation Tasks

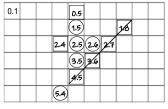**DO THIS** ✔   **NOT THAT** ✖

Donna Boucher
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Let's Play

0.1			0.5			
			1.5			1.6
		2.4	2.5	2.6	2.7	
			3.5	3.6		
			4.5			
		5.4				

- Take turns filling in spaces on the blank chart (assume the number 0.1 in the top left square)
- VARIATIONS: Your "hundred" chart can start at any century (1, 101, 201, etc.) or other decimals (0.01, 1.1, etc.)!
- Four-in-a-row wins a point and play continues

Session Goals

- Understand the relationship between the content and process standards
- Recognize math workstation tasks as an extension to your teaching
- Learn how to intentionally plan math workstation tasks
- Gain strategies for incorporating accountability and assessment into workstation tasks

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"The data in this report represents the current understanding of human resources leaders—primarily of large employers with operations in multiple geographic locations—of the factors informing their planning, hiring, training and investment decisions at present and through to the report's 2022 time horizon."

next exit
SEISMIC ACTIVITY

Comparing skills demand, 2018 vs. 2022, top ten

Today, 2018	Trending, 2022
Analytical thinking and innovation	Analytical thinking and innovation
Complex problem-solving	Active learning and learning strategies
Critical thinking and analysis	Creativity, originality and initiative
Active learning and learning strategies	Technology design and programming
Creativity, originality and initiative	Critical thinking and analysis
Attention to detail, trustworthiness	Complex problem-solving
Emotional intelligence	Leadership and social influence
Reasoning, problem-solving and ideation	Emotional intelligence
Leadership and social influence	Reasoning, problem-solving and ideation
Coordination and time management	Systems analysis and evaluation

Source: Future of Jobs Survey 2018, World Economic Forum.

Talk about it!

"Educators will need to make significant instructional shifts to help students reach standards that emphasize not only application of mathematical procedures, but also deep understanding, problem solving, critical thinking, and communication."

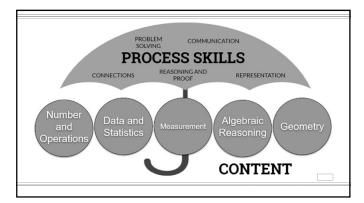Nellie Mae Education Foundation/American Institutes for Research

The NCTM Process Standards

"The Process Standards—

1. Problem Solving
2. Reasoning and Proof
3. Communication
4. Connections
5. Representation

Principles and Standards for School Mathematics, NCTM, 2000

—highlight ways of acquiring and using content knowledge."

How do you plan for a lesson?

- What are the content standards?
- How will you incorporate process standards?
- What will students know, understand, and be able to do?
- How will you assess?
- What materials/representations will you use?

Talk about it!

Additional considerations

- Depth of knowledge
- Engagement
- Opportunities for communication
- Productive struggle

Talk about it!

Structures for Math Instruction

Teacher-led whole group instruction	Mini-lesson			
Independent practice	Small-group instruction	Math workstations	Small-group instruction	Math workstations
"What to do when I'm done" activities				

What are the planning implications?

Talk about it!

Small Group Instruction

Math Workshop

Workstation tasks are an extension of your teaching and require intentional planning!

Accountability and assessment

DO THIS ✓

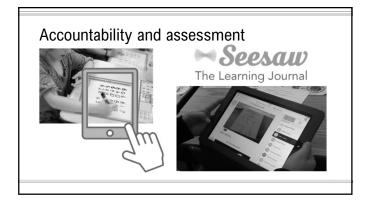- Have students bring their Math Journal to every workstation or use digital tools for recording student work and thinking
- Spot check for quantity and quality

NOT THAT ✗

- Use all laminated recording sheets that are wiped clean when the task is completed
- Grade each and every task

Accountability and assessment

Player 1

Player 2

6 x 5 = 30
7 x 3 = 21
30 > 21

Accountability and assessment

Content standards

DO THIS ✓

- Workstations are standards-based
- Students are practicing skills in workstations that they are already confident with
- Skills are spiraled throughout the year

NOT THAT ✗

- Workstations are chosen haphazardly, because they are fun or engaging
- Students are working on the same skills in workstations as they are in small group instruction
- Skills are not spiraled throughout the year

Process standards

DO THIS ✓
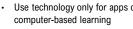
- Choose a mathematical focus for each workstation
- Choose games that involve strategy
- Use technology to create, not just consume

NOT THAT ✗

- Pull games and tasks randomly off the shelf
- Rely on worksheets or low-level drill and kill
- Use technology only for apps or computer-based learning

G **ames for Mathematicians:** Math games used to maintain previously mastered mathematical concepts and skills and promote computational fluency
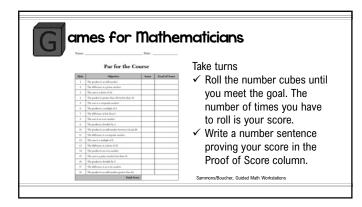
U **sing What We Know:** Problem solving or challenge activities to draw upon mathematical understanding and skills
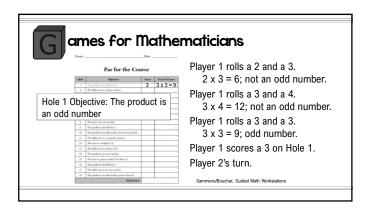
I **ndependent Math Work:** Materials used to teach previously mastered content incorporated into workstation tasks

D **eveloping Fluency:** Tasks that help students develop number sense and mental math skills

E **xpressing Mathematical Ideas:** Mathematical vocabulary and communication are the focus

From *Guided Math Workshop*, Sammons and Boucher

Games for Mathematicians

Par for the Course

Name: _____ Date: _____

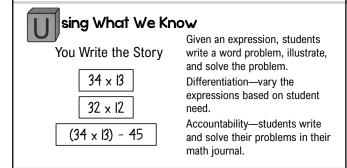| Hole	Objective	Score	Proof of Score
1	The product is an odd number.		
2	The difference is a prime number.		
3	The sum is a factor of 24.		
4	The product is greater than 20 but less than 30.		
5	The sum is a composite number.		
6	The product is a multiple of 5.		
7	The difference is less than 5.		
8	The sum is an even number.		
9	The product is divisible by 6.		
10	The product is an odd number between 12 and 20.		
11	The difference is a composite number.		
12	The sum is a multiple of 3.		
13	The difference is a factor of 36.		
14	The product is an even number.		
15	The sum is a prime number less than 10.		
16	The product is divisible by 5.		
17	The difference is an even number.		
18	The product is an odd number greater than 24.		
	Total Score		

Sammons/Boucher, Guided Math Workstations

Take turns
✓ Roll the number cubes until you meet the goal. The number of times you have to roll is your score.
✓ Write a number sentence proving your score in the Proof of Score column.

Games for Mathematicians

Par for the Course

Name: _____ Date: _____

Hole	Objective	Score	Proof of Score
1	The product is an odd number.	3	3 x 3 = 9
2	The difference is a prime number.		

Hole 1 Objective: The product is an odd number

	The sum is an even number.		
9	The product is divisible by 6.		
10	The product is an odd number between 12 and 20.		
11	The difference is a composite number.		
12	The sum is a multiple of 3.		
13	The difference is a factor of 36.		
14	The product is an even number.		
15	The sum is a prime number less than 10.		
16	The product is divisible by 5.		
17	The difference is an even number.		
18	The product is an odd number greater than 24.		
	Total Score		

Sammons/Boucher, Guided Math Workstations

Player 1 rolls a 2 and a 3.
  $2 \times 3 = 6$; not an odd number.
Player 1 rolls a 3 and a 4.
  $3 \times 4 = 12$; not an odd number.
Player 1 rolls a 3 and a 3.
  $3 \times 3 = 9$; odd number.
Player 1 scores a 3 on Hole 1.
Player 2's turn.

Using What We Know

You Write the Story

34×13

32×12

$(34 \times 13) - 45$

Given an expression, students write a word problem, illustrate, and solve the problem.

Differentiation—vary the expressions based on student need.

Accountability—students write and solve their problems in their math journal.
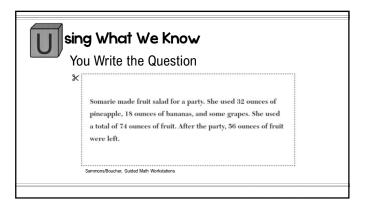
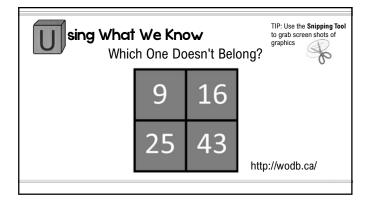## U sing What We Know

The answer is…

$$\frac{1}{4}$$

Given an answer, students write and illustrate a word problem that will result in that solution.

Differentiation—self-differentiating.

Accountability—students write and illustrate their problems in their math journal.

U sing What We Know

You Write the Question

Somarie made fruit salad for a party. She used 32 ounces of pineapple, 18 ounces of bananas, and some grapes. She used a total of 74 ounces of fruit. After the party, 56 ounces of fruit were left.

Sammons/Boucher, Guided Math Workstations

U sing What We Know

Which One Doesn't Belong?

TIP: Use the **Snipping Tool** to grab screen shots of graphics

| 9 | 16 |
| 25 | 43 |

http://wodb.ca/

I ndependent Math Work
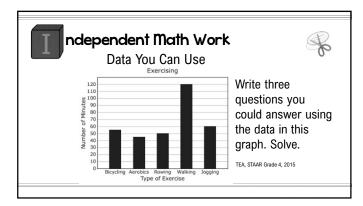
Do you agree?

Ella finished a bike race in 37.6 minutes. Miranda finished the race $9\frac{1}{10}$ minutes

sooner than Ella finished it. How many minutes did it take Miranda to finish the race?

F 32.5 minutes

G 46.7 minutes

H 28.59 minutes

J Not here

Paola and Marcus both solved this problem. Marcus says that G is the correct answer. Paola disagrees. She got 26.5, so she says the correct answer is J, *Not here.* Do you agree with Paola, Marcus, or neither of them? Justify your conclusion with words, numbers, and pictures.

TEA, STAAR Grade 5, 2018

I ndependent Math Work

Data You Can Use

Exercising

Write three questions you could answer using the data in this graph. Solve.

TEA, STAAR Grade 4, 2015

D eveloping Fluency

Multiplication Move 1

- Player 1 circles two factors, calculates the product, and marks a space with that number on the board.
- Player 2 moves *one* of the factors, calculates the product, and marks a space with that number on the board.
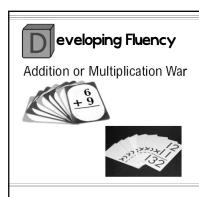- Play continues until a player gets 4 in a row.

Accountability—students could reflect on the strategy they used for choosing factors in their Math Journal.

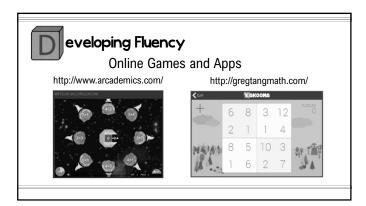| 64	20	8	54	18	28	8	36
12	40	24	81	20	25	15	35
48	16	6	30	10	42	63	24
10	49	20	56	32	21	12	63
56	28	42	14	72	18	45	54
16	6	36	12	49	32	10	40
72	21	16	81	15	64	21	45
14	25	30	24	48	6	35	18

2 ③ 4 5 ⑥ 7 8 9

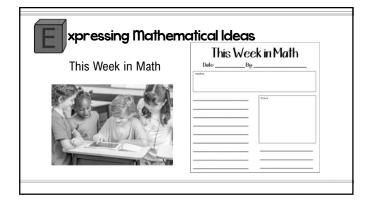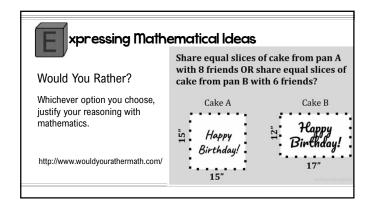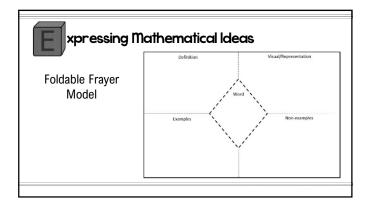## Developing Fluency

Addition or Multiplication War

- Deal cards evenly among players.
- Players each turn over a card and perform the calculation.
- The player with the greatest sum (or product) wins.
- Play continues until the cards have all been used. The player with the most cards wins.
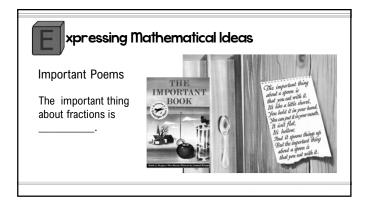
Accountability—students could record the inequality for each hand in their Math Journal.

Developing Fluency

Online Games and Apps

http://www.arcademics.com/   http://gregtangmath.com/

Expressing Mathematical Ideas

This Week in Math

Expressing Mathematical Ideas

Would You Rather?

Whichever option you choose, justify your reasoning with mathematics.

http://www.wouldyourathermath.com/

Share equal slices of cake from pan A with 8 friends OR share equal slices of cake from pan B with 6 friends?

Cake A

15"

Happy Birthday!

15"

Cake B

12"

Happy Birthday!

17"

Expressing Mathematical Ideas

Foldable Frayer Model

Definition

Visual/Representation

Word

Examples

Non-examples

Expressing Mathematical Ideas

Important Poems

The important thing about fractions is _____.

THE IMPORTANT BOOK

The important thing about a spoon is that you eat with it. It's like a little shovel, You hold it in your hand, You can put it in your mouth, It isn't flat, It's hollow, And it spoons things up. But the important thing about a spoon is that you eat with it.

Planning for intentional workstation tasks

Workstation Planning Form

Learning Standard	Learning Goal
List the standard and student expectation	*What understandings will students take away from this task?*

Workstation Title:

Description:

Reasoning, Problem Solving, and Productive Struggle
How does this task provide students the opportunity to grapple with mathematical ideas and relationships?

Evidence of Student Thinking
What will students say, do, or produce that will provide evidence of their understanding?

Mathematical Representations
What representations will students use or create to further develop their understanding of this concept?

Differentiation
How will you differentiate this task to meet the needs of students both below and above level?

Based on NCTM's Effective Mathematics Teaching Practices   MathCoachsCorner.com

Name: _____ Date: _____

Par for the Course

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10	The product is an odd number between 12 and 20.		
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12	The sum is a multiple of 2.		
13	The difference is a factor of 36.		
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From *Guided Math Workstations 3-5,* Boucher/Sammons

64	20	8	54	18	28	8	36
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48	16	6	30	10	42	63	24
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56	28	42	14	72	18	45	54
16	6	36	12	49	32	10	40
72	21	27	81	15	64	21	45
14	25	30	24	48	6	35	27

2 3 4 5 6 7 8 9

❶ Player 1 circles two factors (you can also circle the same factor twice for a square fact), calculates the product, and marks a space showing the product on the board with an O ❷ Player 2 changes ONE factor, finds the product, and marks an X on a space showing that product on the board ❸ Play continues with each player changing only ONE factor ❹ The first player to get 4 in a row wins.

This Week in Math

Date: _____ By: _____

Headline

Picture

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Workstation Planning Form

Learning Standard *List the standard and student expectation.*	Learning Goal *What understandings will students take away from this task?*
Workstation Title: **Description:**	Reasoning, Problem Solving, and Productive Struggle *How does this task provide students the opportunity to grapple with mathematical ideas and relationships?*
	Evidence of Student Thinking *What will students say, do, or produce that will provide evidence of their understanding?*
	Mathematical Representations *What representations will students use or create to further develop their understanding of this concept?*
Materials:	Differentiation *How will you differentiate this task to meet the needs of students both below and above level?*