

# TEACH MATHEMATICAL PRACTICES THROUGH NON-ROUTINE PROBLEMS

**Carl Oliver**

City-As-School High School - MFA New York

**PREPARING**  
**CHOOSING**  
**FACILITATING**  
**WRAPPING UP**

**NON-ROUTINE  
PROBLEMS**

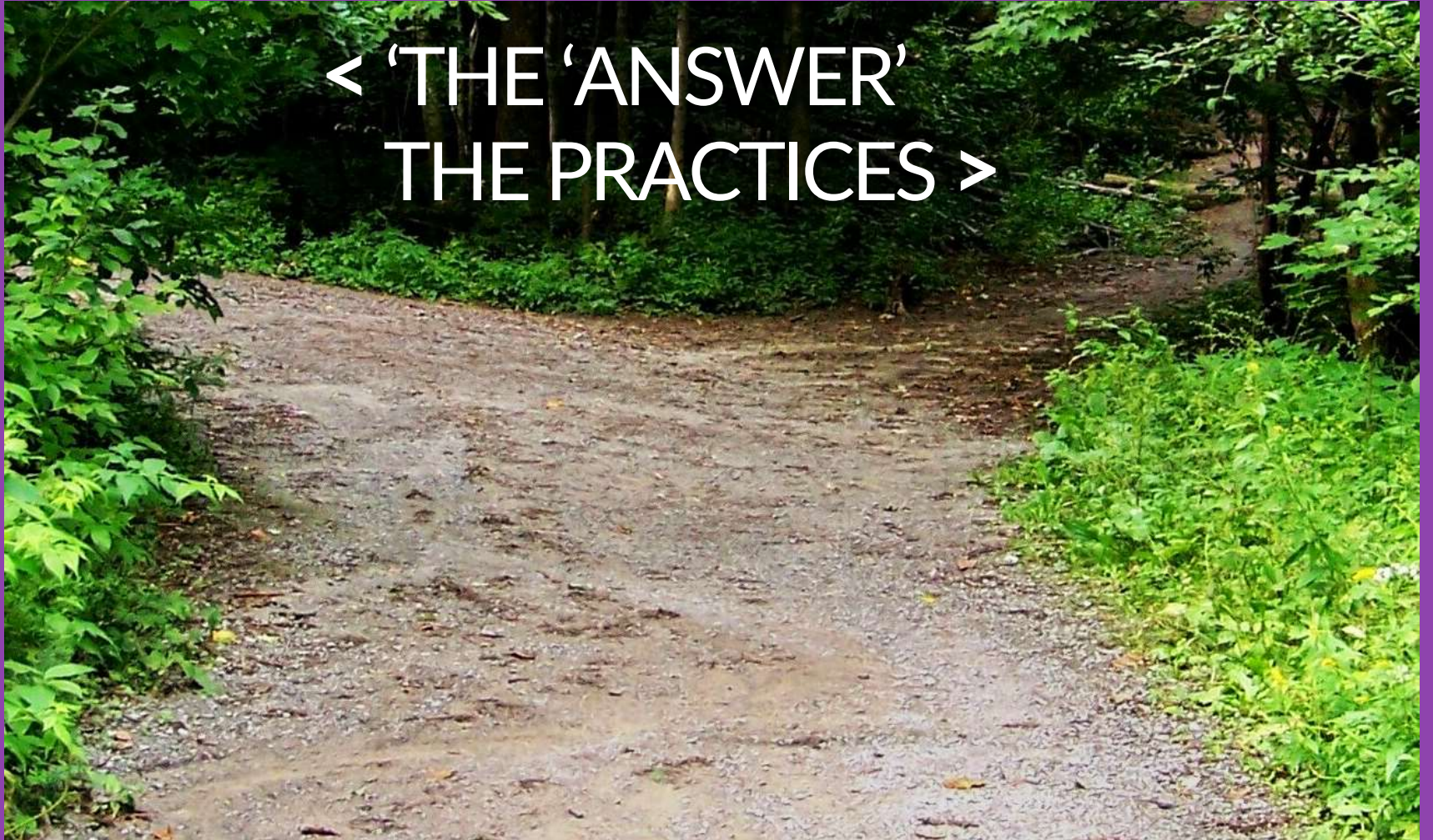
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# PREPARING TO USE PROBLEMS

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# PREPARING

< 'THE 'ANSWER'  
THE PRACTICES >



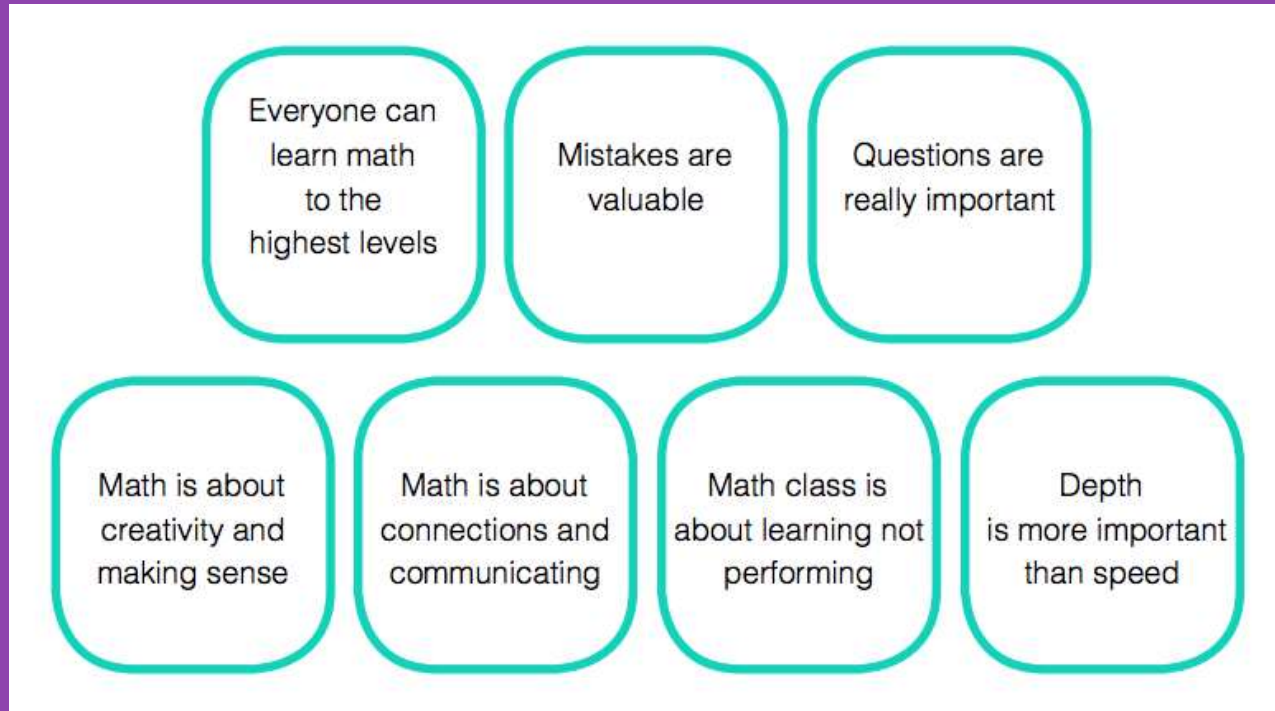
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# PREPARING



Space to explore  
mathematical ideas

# PREPARING



[youcubed.org/positive-classroom-norms/](https://youcubed.org/positive-classroom-norms/)

## Norms to explore mathematical ideas

# PREPARING

- The 'answer' isn't the answer
- Focus on mathematical practices
- Space to explore math ideas
- Norms to explore math ideas

# CHOOSING THE PROBLEM



Will kids 'get' the situation?

CHOOSING

# CHOOSING

Does it have a Mathematical goal?

The Missing Dollar Riddle  
\$ \$ \$ \$  
---solved at Just Riddles and More..!

	5	3	2		7			8
6		1	5					2
2			9	1	3		5	
7	1	4	6	9	2			
	2						6	
			4	5	1	2	9	7
	6		3	2	5			9
1					6	3		4
8			1		9	6	7	

It should be about more than making them think

# CHOOSING

- Does it 'fit' in unit?

## IRON CHEF



Preparation for  
main course



Provide the  
finishing touch

# CHOOSING

- Is it under/over-scaffolded?
- Multiple approaches?

# CHOOSING

- Will kids 'get' the situation?
- Have a Mathematical goal?
- Does it 'fit' in unit?
- Is it under/over-scaffolded?
- Multiple approaches?



# FACILITATING THE PROBLEM



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- Does the class understand?

## Two for you...

Gangster Rocky owes his friend Patsy some money.  
He begins paying off patsy and begins as follows:

One for  you, and one for  me

Two for  you, and one, two  for me

Three for  you, and one, two, three  for me

Suddenly Bugs Bunny jumps in and takes the rest of Rocky's money.  
Rocky isn't sure how much money he had to begin with, but he expected Patsy to only take home  $\frac{1}{5}$  of it. How much money did Rocky start with?

[denissheeran.com/math-activities/](http://denissheeran.com/math-activities/)

# CHOOSING



- Will kids 'get' the situation?
- Have a Mathematical goal?
- Does it 'fit' in unit?
- Is it under/over-scaffolded?
- Multiple approaches?







- Does the class understand?

## Two for you...

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# FACILITATING

- Notice / Wonder
- KWL - Know / Want to know / Hope to learn
- Know / Need to Know

# FACILITATING

- Pace for fairness
- Set and enforce norms



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# FACILITATING

- Does the class understand?
- Pace for fairness
- Set and enforce norms

# WRAPPING UP THE PROBLEM

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- Showcase student thinking

## Select Sequence Connect

- Archive for later

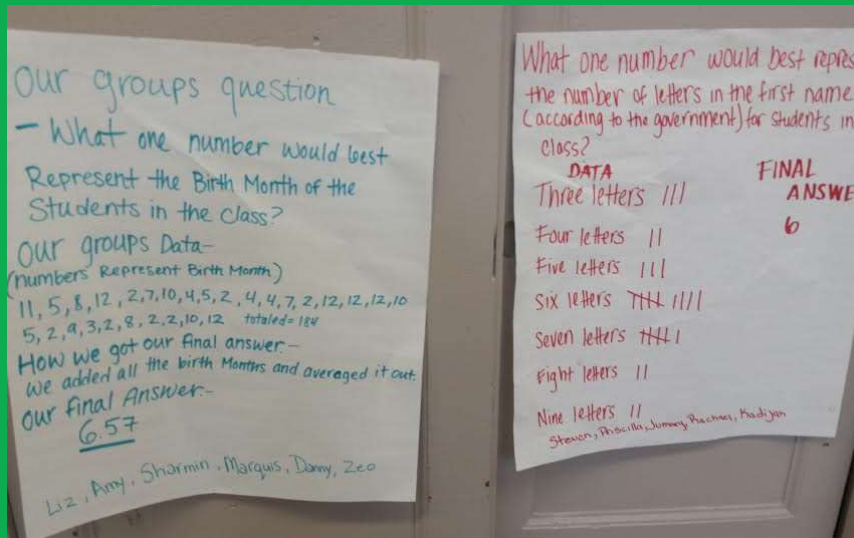


Chart Paper/Bulletin Boards

**Reflection questions** | Name \_\_\_\_\_ Date \_\_\_\_\_

1. Imagine you have 4 buildings, how many different roads need to be built so all the buildings can be connected.  
Building A \_\_\_\_\_ Building B \_\_\_\_\_  
Building C \_\_\_\_\_ Building D \_\_\_\_\_
2. If you are going to visit all four buildings, how many ways are there to visit four?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. Why are questions 1 and 2 different? Why do they produce such different numbers?  
\_\_\_\_\_  
\_\_\_\_\_

Reflection Assignments

- Assess use of practices





# WRAPPING UP

- Showcase student thinking
- Enforce connections
- Archive for later
- Assess use of practices

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