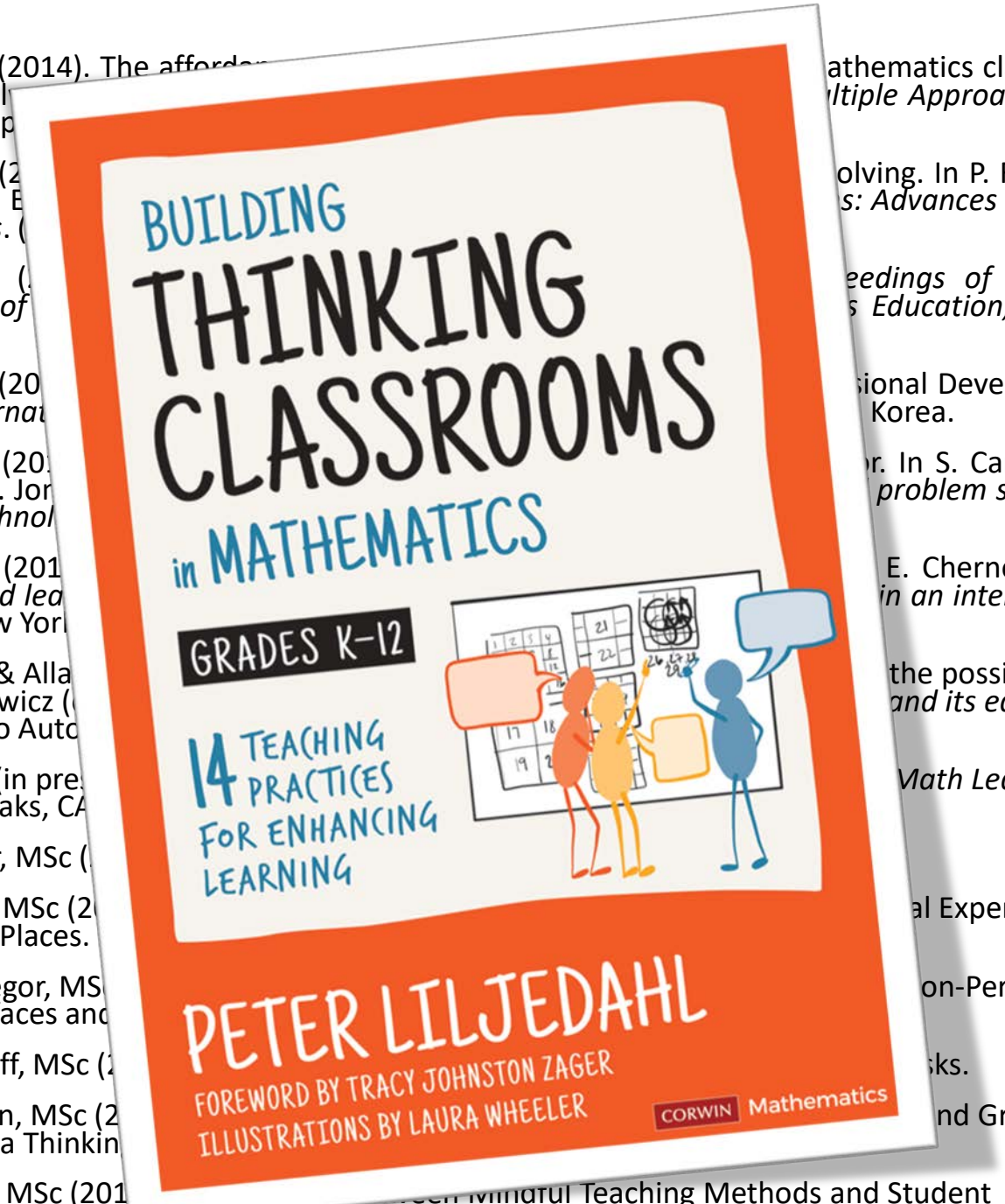
BUILDING THINKING CLASSROOMS

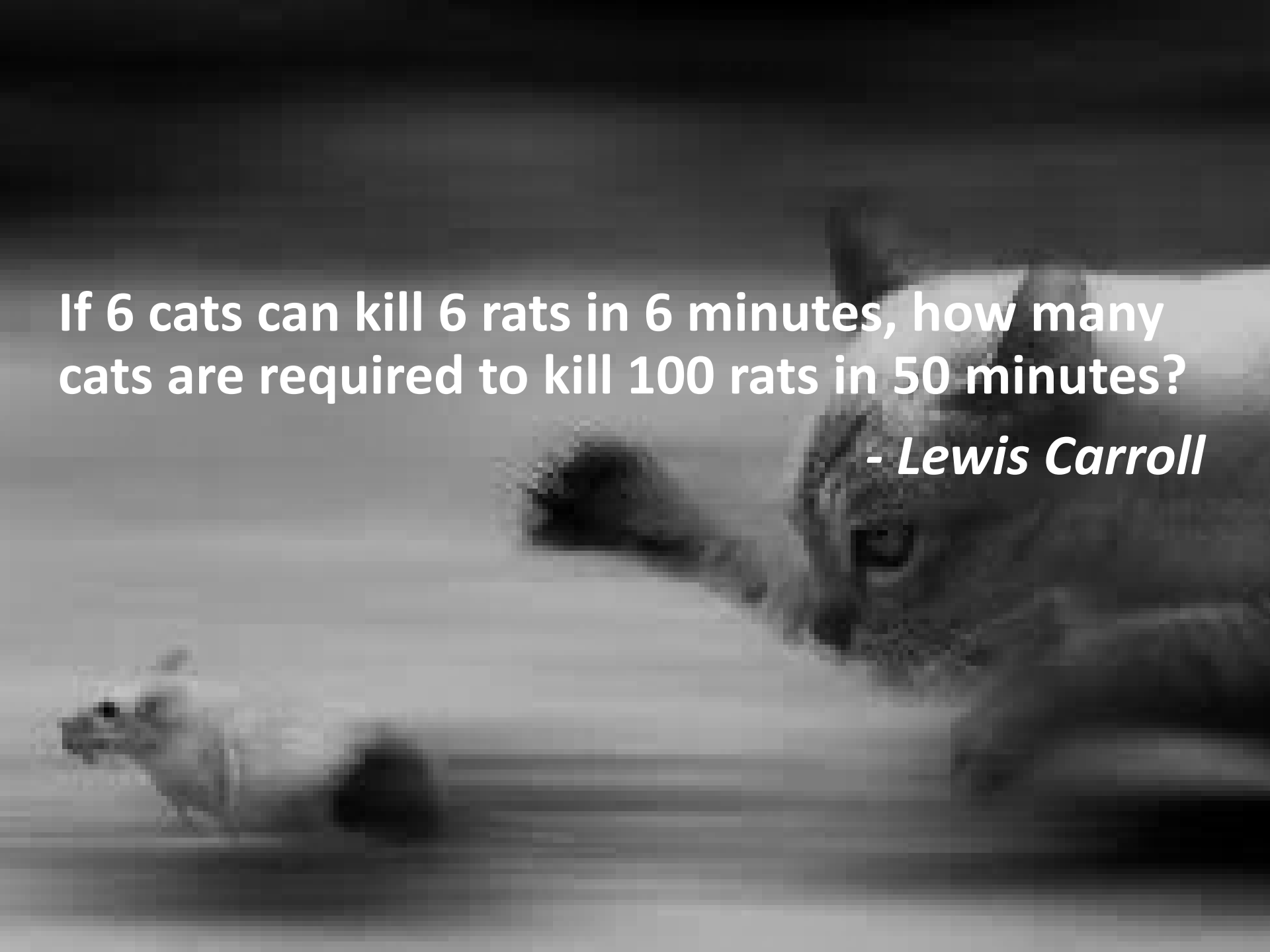
SFU SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

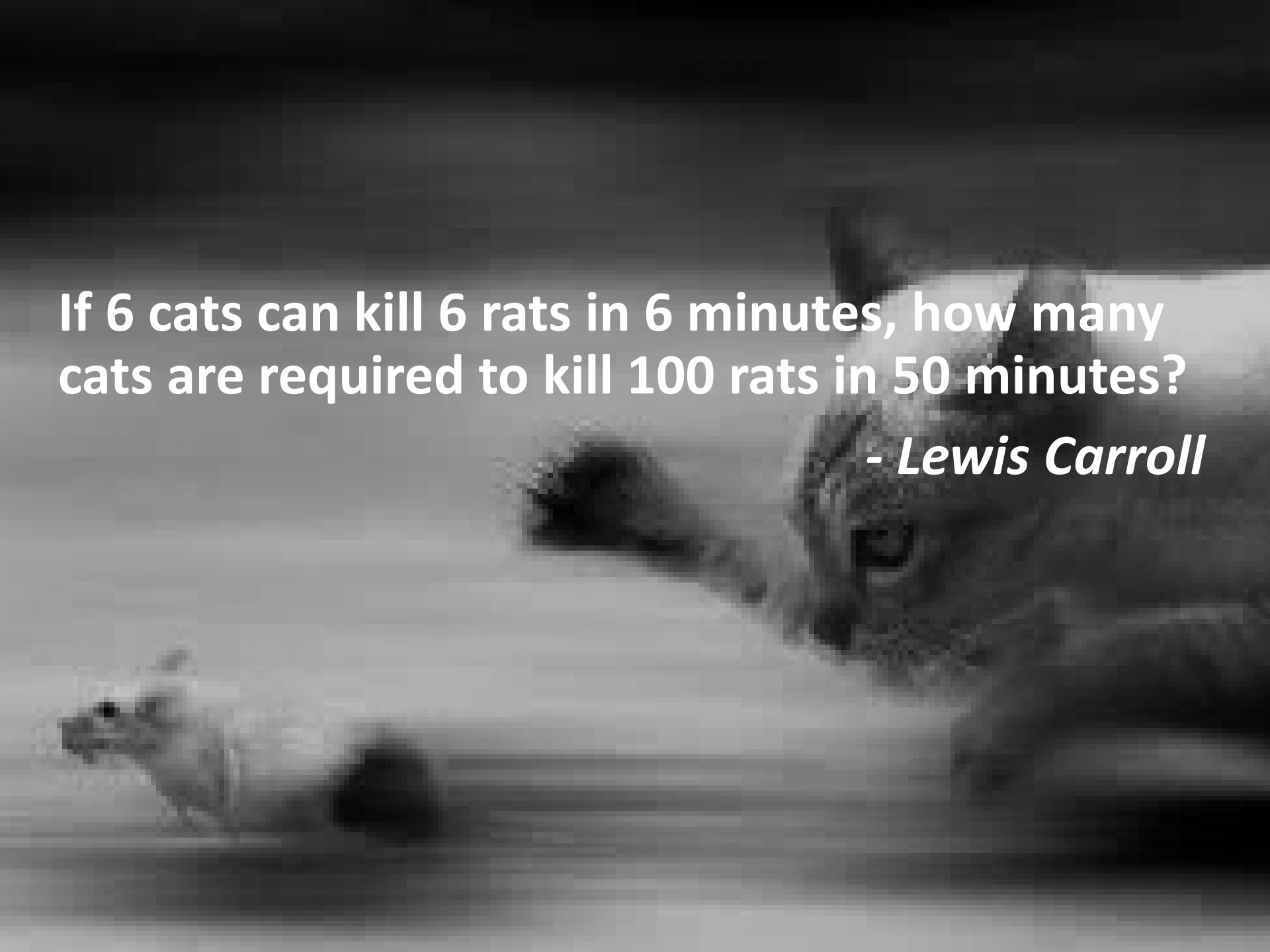
Peter Liljedahl
@pgliljedahl

- Liljedahl, P. (2014). The afford… athematics classroom. In Y. Li, E. Sil… ltiple Approaches and *Practices.* (pp…
- Liljedahl, P. (2… olving. In P. Felmer, J. Kilpatrick, & E… s: Advances and New *Perspectives*. (…
- Liljedahl, P. (… eedings of the 40th *Conference of* … s Education,* Szeged, Hungary.
- Liljedahl, P. (20… sional Development. *The 1st Internat…* Korea.
- Liljedahl, P. (20… r. In S. Carreira, N. Amado, & K. Jor… *problem solving: A focus on technol…*
- Liljedahl, P. (201… E. Chernoff (eds.) *Teaching and lea… in an international context*. New Yor…
- Liljedahl, P. & Alla… the possibility. In B. Pieronkiewicz (… *and its ed*ucation. Towarzystwo Autc…
- Liljedahl, P. (in pre… *Math Learning.* Thousand Oaks, CA…
- Mike Pruner, MSc (…
- Oana Chiru, MSc (2… al Experiences in Common Places.
- Chris McGregor, MS… on-Permanent Vertical Surfaces and…
- Maria Kerkoff, MSc (… sks.
- Beth Baldwin, MSc (2… nd Group Efficacies in a Thinkin…
- Nikki Mann, MSc (201… Mindful Teaching Methods and Student Perception of their Re… of Mathematical Knowledge



18 YEARS AGO …


If 6 cats can kill 6 rats in 6 minutes, how many cats are required to kill 100 rats in 50 minutes?
- Lewis Carroll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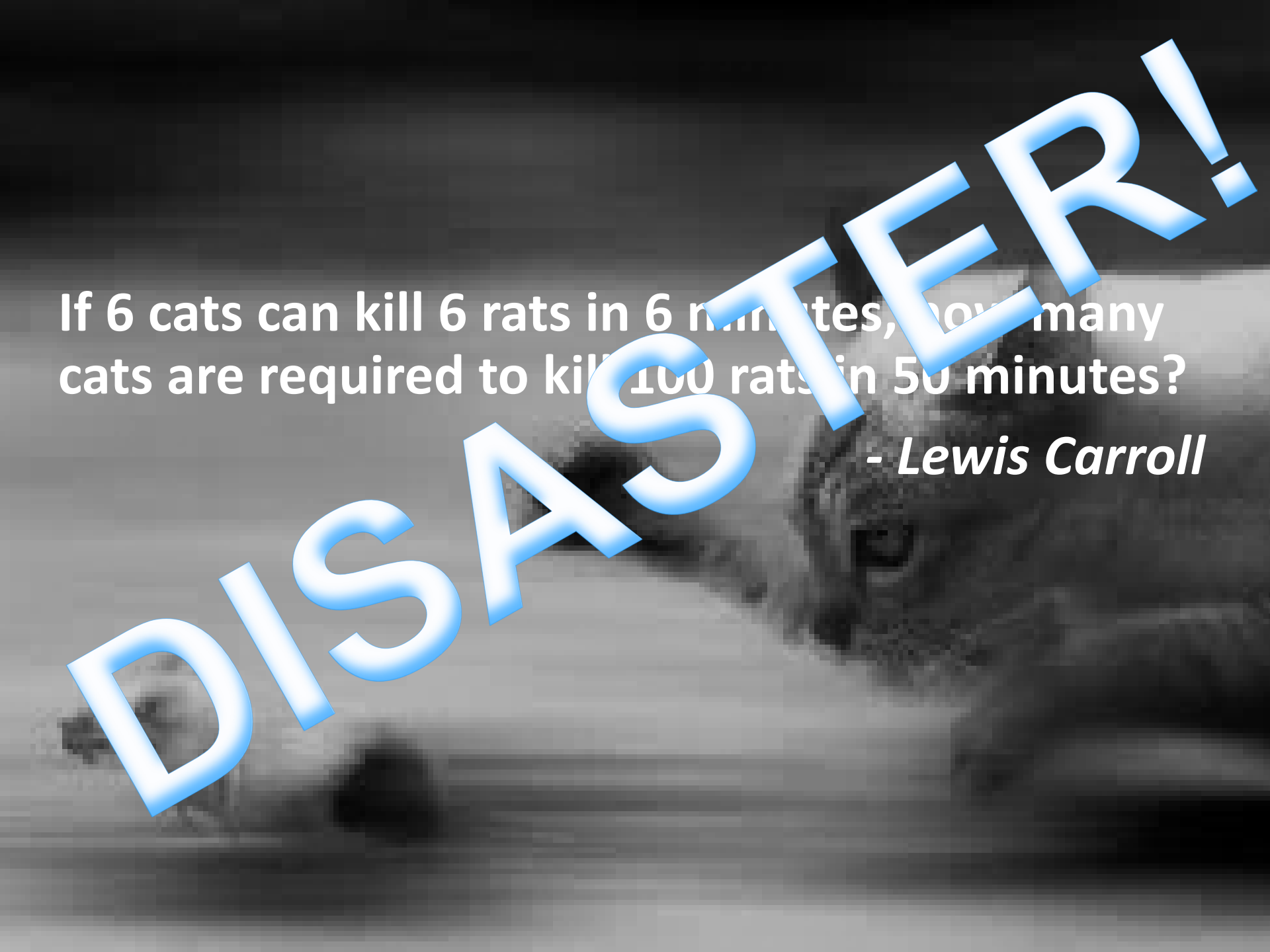
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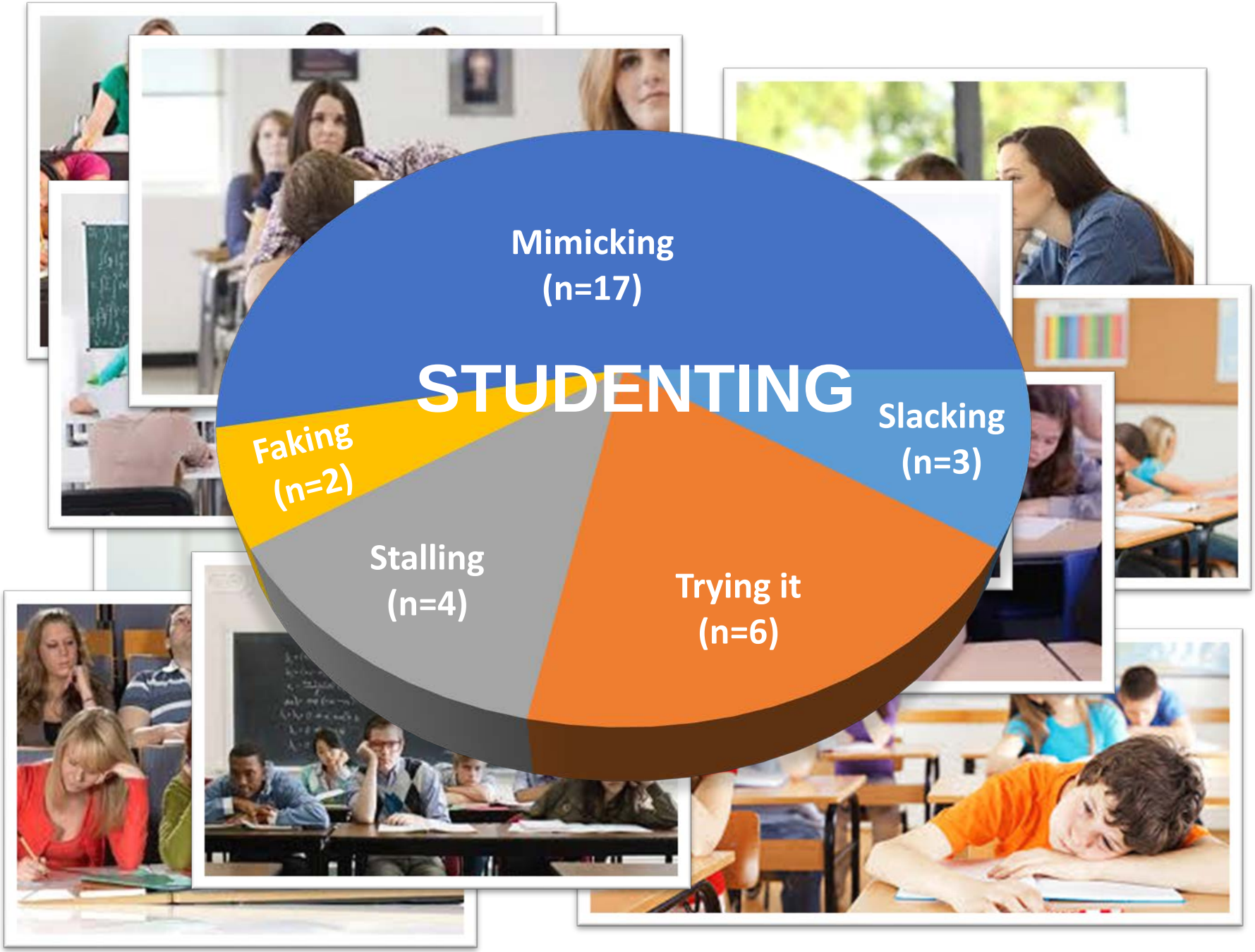
DISASTER!


STUDENTING
Mimicking
(n=17)
Slacking
(n=3)
Trying it
(n=6)
Stalling
(n=4)
Faking
(n=2)


wiseGEEK


INSTITUTIONAL NORMS


NON-NEGOTIATED NORMS


INSTITUTIONAL NORMS
STUDENTS NOT THINKING

400+ TEACHERS | 15 YEARS | 2 WEEK CYCLES

RENEGOTIATING THE NON-NEGOTIATED NORMS

400+ TEACHERS | 15 YEARS | 2 WEEK CYCLES

CLASSROOM PRACTICES

1	What are the types of tasks we use?	
2	How we form collaborative groups?	
3	Where students work?	
4	How we arrange the furniture in our classroom?	
5	How we answer questions?	
6	When, where, and how tasks are given?	
7	What homework looks like?	
8	How we foster student autonomy?	
9	How we use hints and extensions?	
10	How we consolidate a lesson?	
11	How we give notes?	
12	What we choose to evaluate?	
13	How we use formative assessment?	
14	How we grade?	

	CLASSROOM PRACTICES	*OPTIMAL* PRACTICES FOR THINKING
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14	How we grade?	

	CLASSROOM PRACTICES	*OPTIMAL* PRACTICES FOR THINKING
1	What are the types of tasks we use?	Use thinking tasks
2	How we form collaborative groups?	Form frequent visibly random groupings
3	Where students work?	Use vertical non-permanent surfaces
4	How we arrange the furniture in our classroom?	*Defront* the classroom
5	How we answer questions?	Only answer keep thinking questions
6	When, where, and how tasks are given?	Give tasks early, standing, and verbally
7	What homework looks like?	Give check your understanding questions
8	How we foster student autonomy?	Be intentionally less helpful
9	How we use hints and extensions?	Create and manage *flow*
10	How we consolidate a lesson?	Consolidate from the bottom
11	How we give notes?	Use meaningful notes
12	What we choose to evaluate?	Evaluate what you value
13	How we use formative assessment?	Communicate to students where they are and where they are going
14	How we grade?	Report out based on data (not points)

CLASSROOM PRACTICES	*OPTIMAL* PRACTICES FOR THINKING
1 What are the types of tasks we use?	
2 How we f	gs
3 W	
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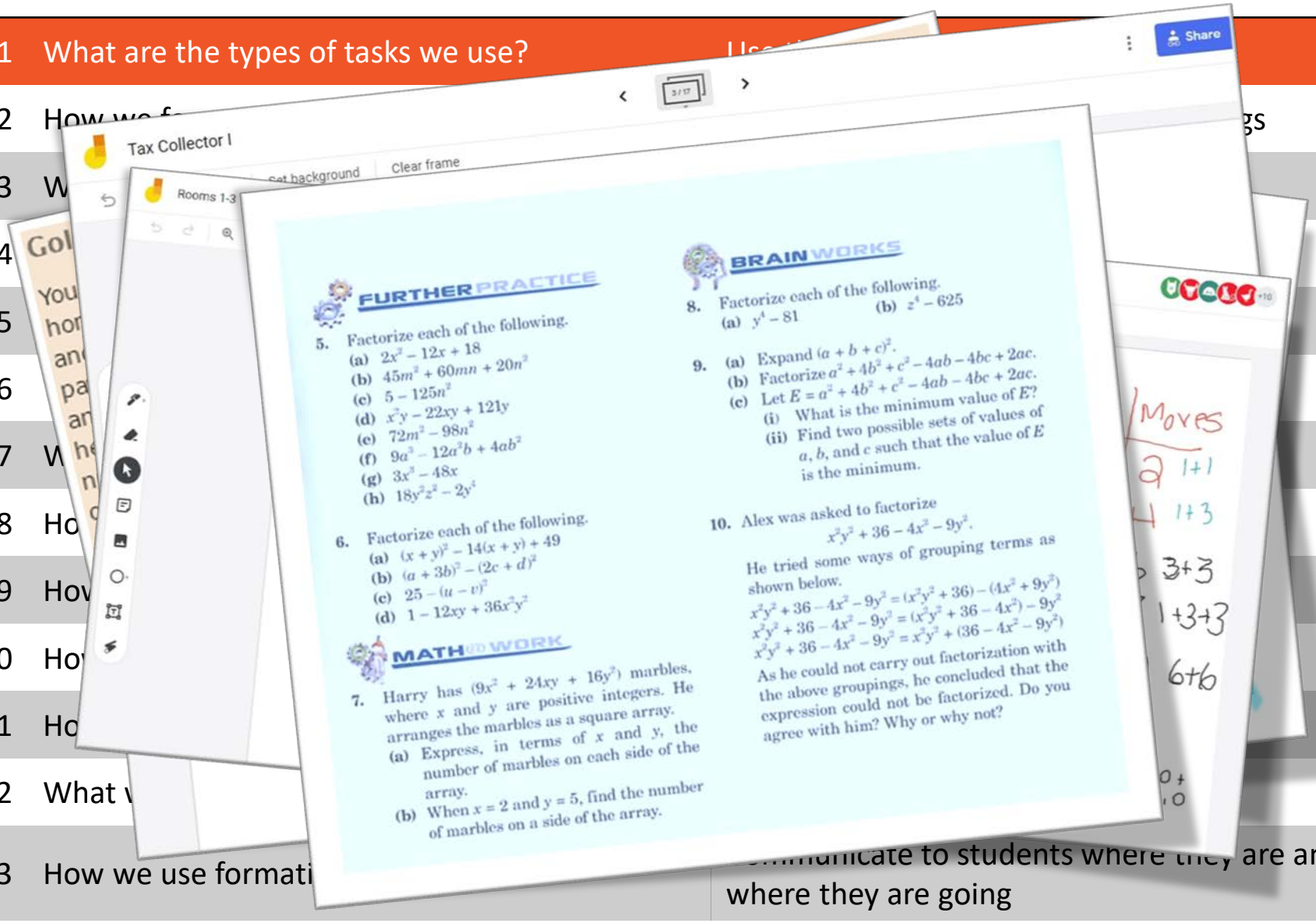
7 W	
8 Ho	
9 Hov	
10 Ho	
11 Ho	
12 What v	
13 How we use formati	municate to students where they are and where they are going
14 How we grade?	Report out based on data (not points)



	CLASSROO PRACTI	*OPTIMAL* PRACTICES FOR THINKING
1	What a	
2	How	
3		
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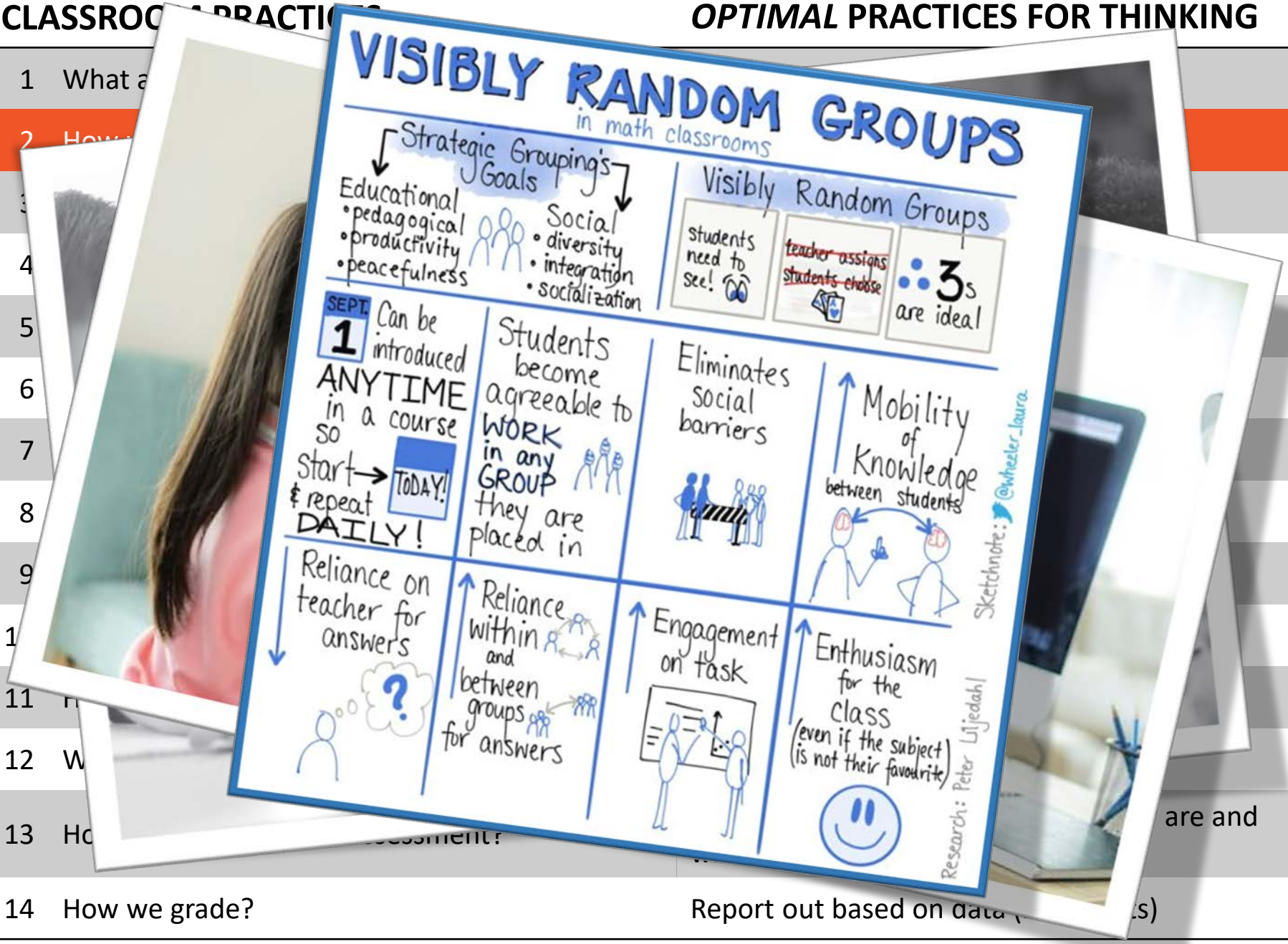
11	H	
12	W	
13	Ho ssment?	are and
14	How we grade?	Report out based on data (s)



CLASSROOM PRACTICES	*OPTIMAL* PRACTICES FOR THINKING
1	Use thinking tasks
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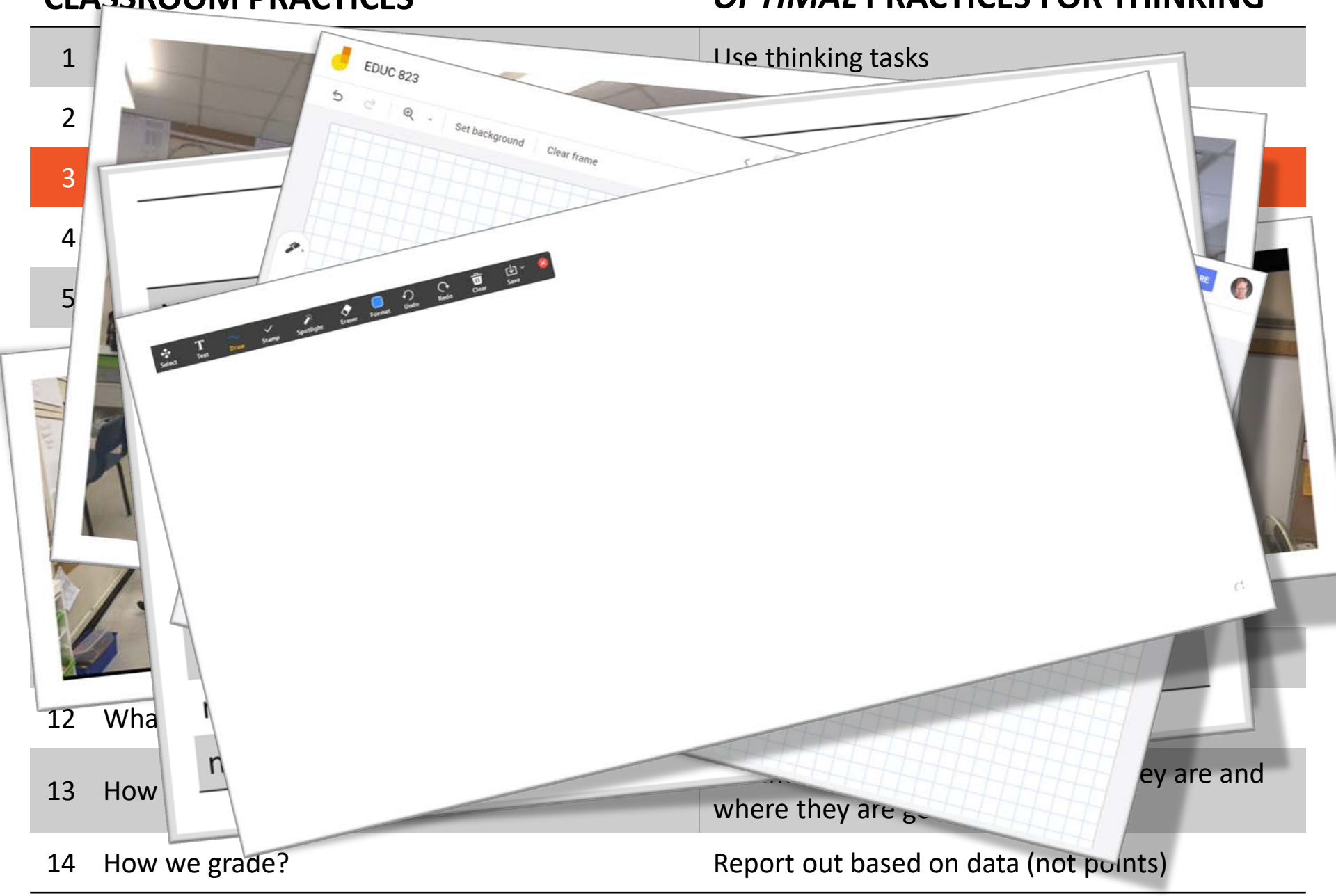
5	
12	Wha
13	How ey are and where they are g
14	How we grade? Report out based on data (not points)



CLASSR

OPTIMAL PRACTICES FOR THINKING

1 What

2 How v

3 Whe

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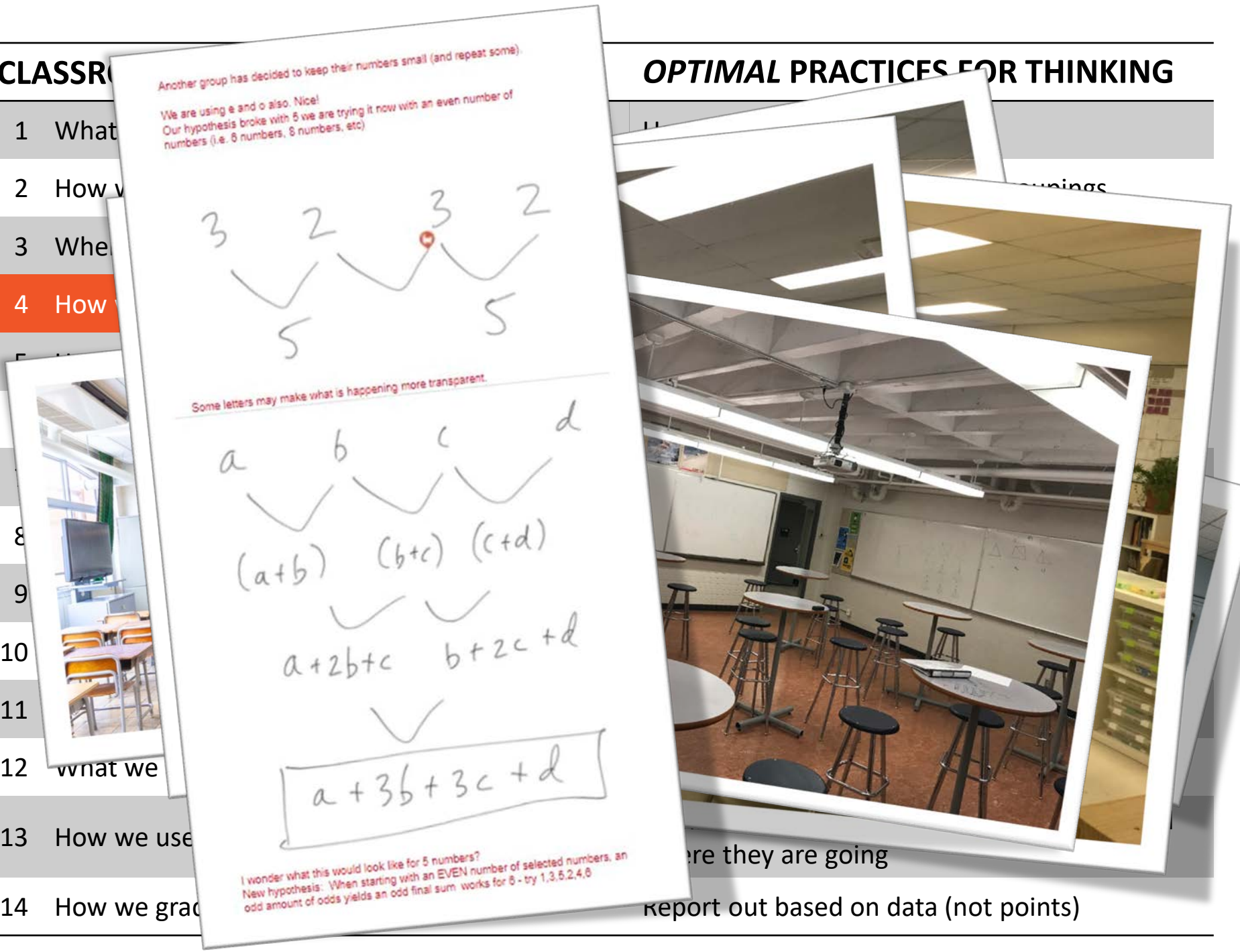
12 What we

13 How we use

14 How we grad

ere they are going

Report out based on data (not points)



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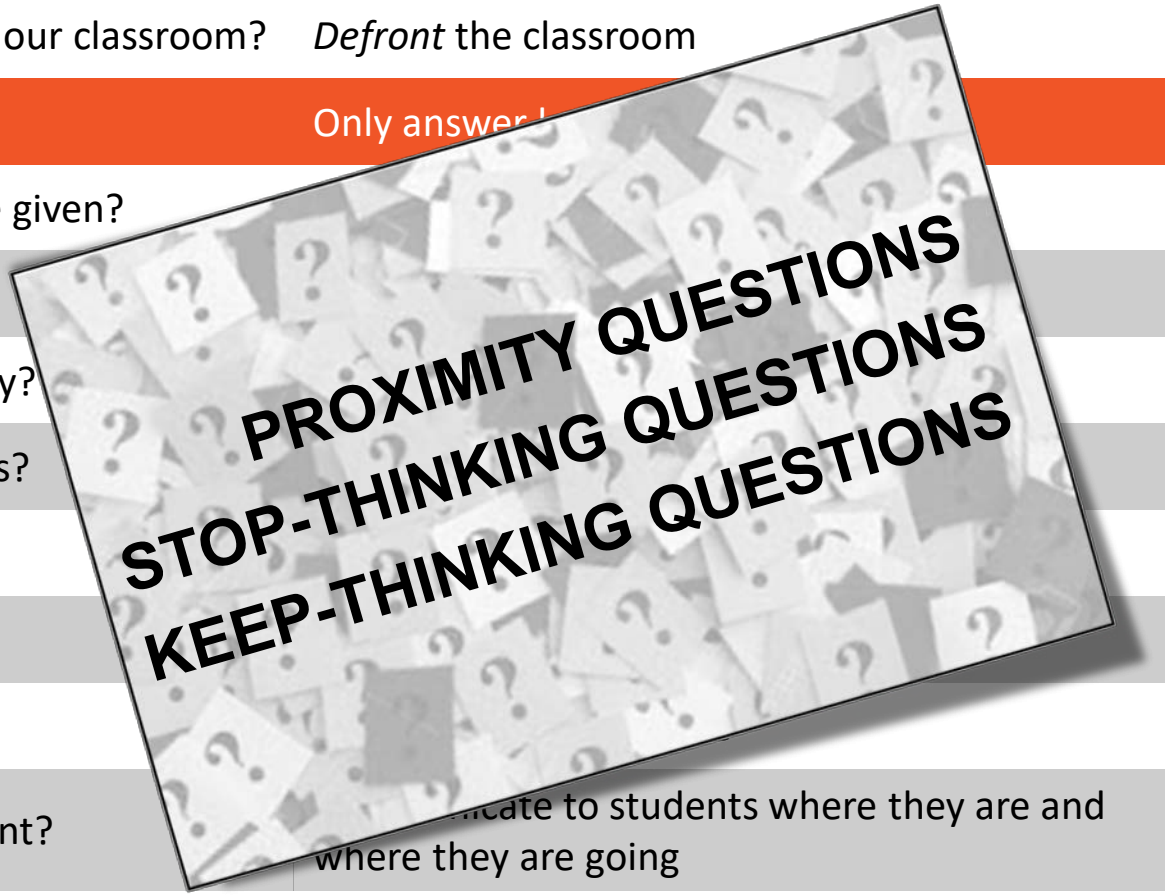

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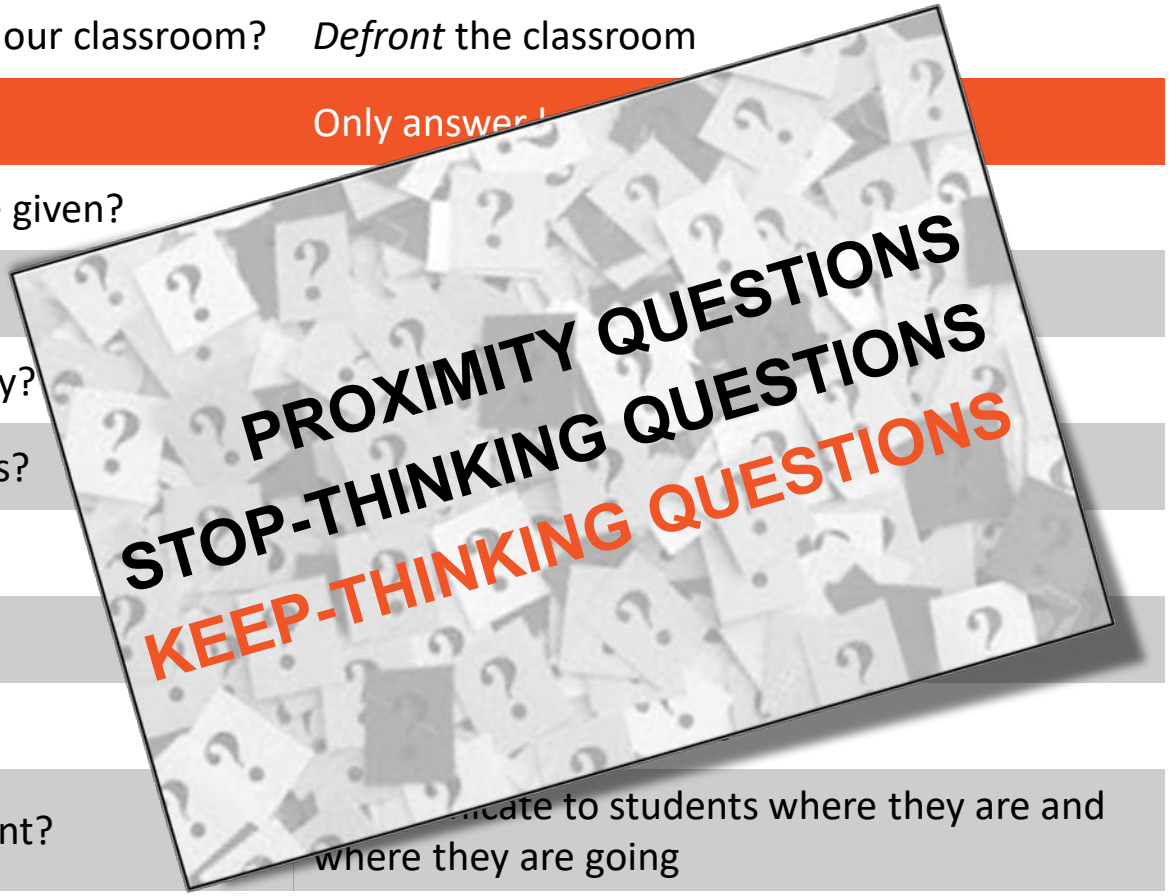

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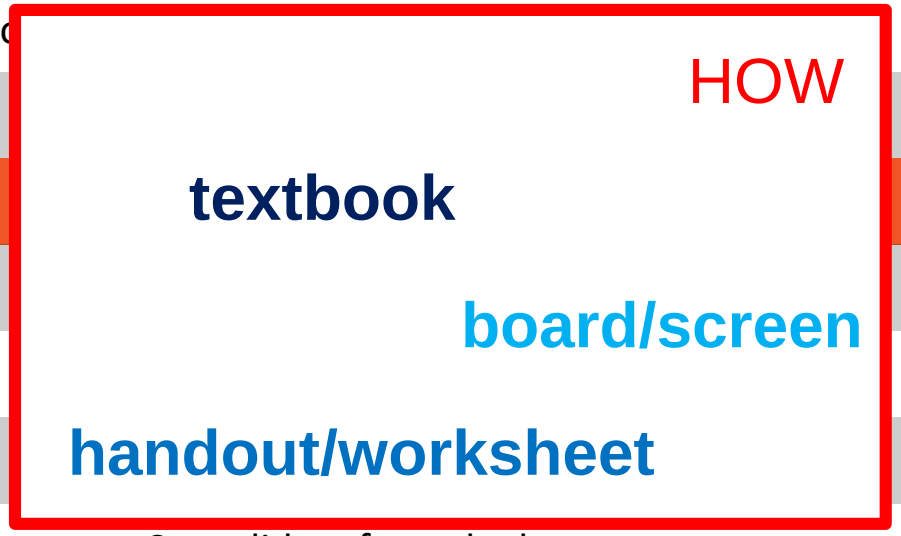

	CLASSROOM PRACTICES	*OPTIMAL* PRACTICES FOR THINKING
1	What are the types of tasks we use?	
2	How we	groupings
3	Where st	
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5	How we a	
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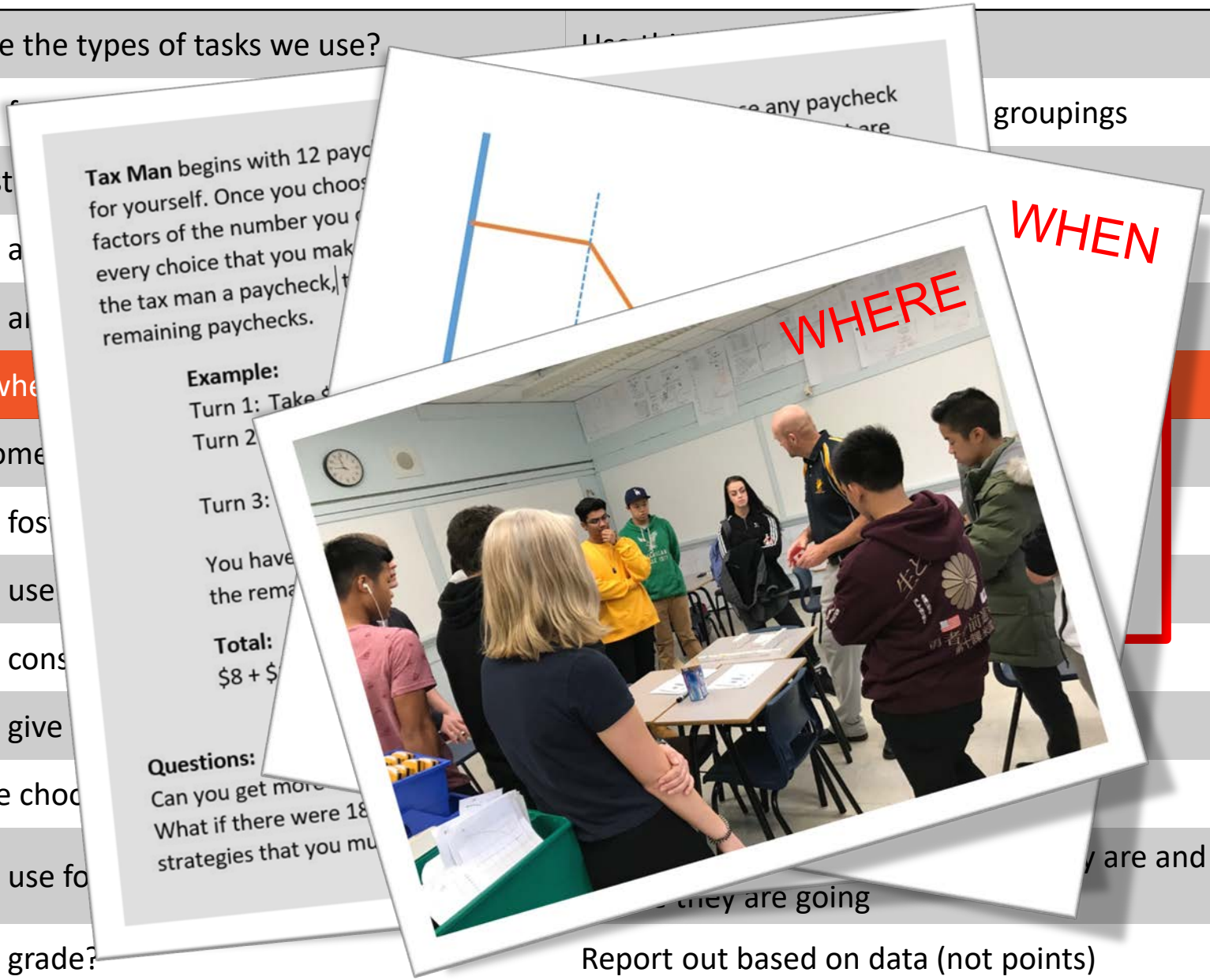
7	What home	
8	How we fos	
9	How we use	
10	How we cons	
11	How we give	
12	What we choo	
13	How we use fo	y are and
14	How we grade?	Report out based on data (not points)



	CLASSROOM PRACTICES	*OPTIMAL* PRACTICES FOR THINKING
1	What are the types of t	ks
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7	Wl	ns
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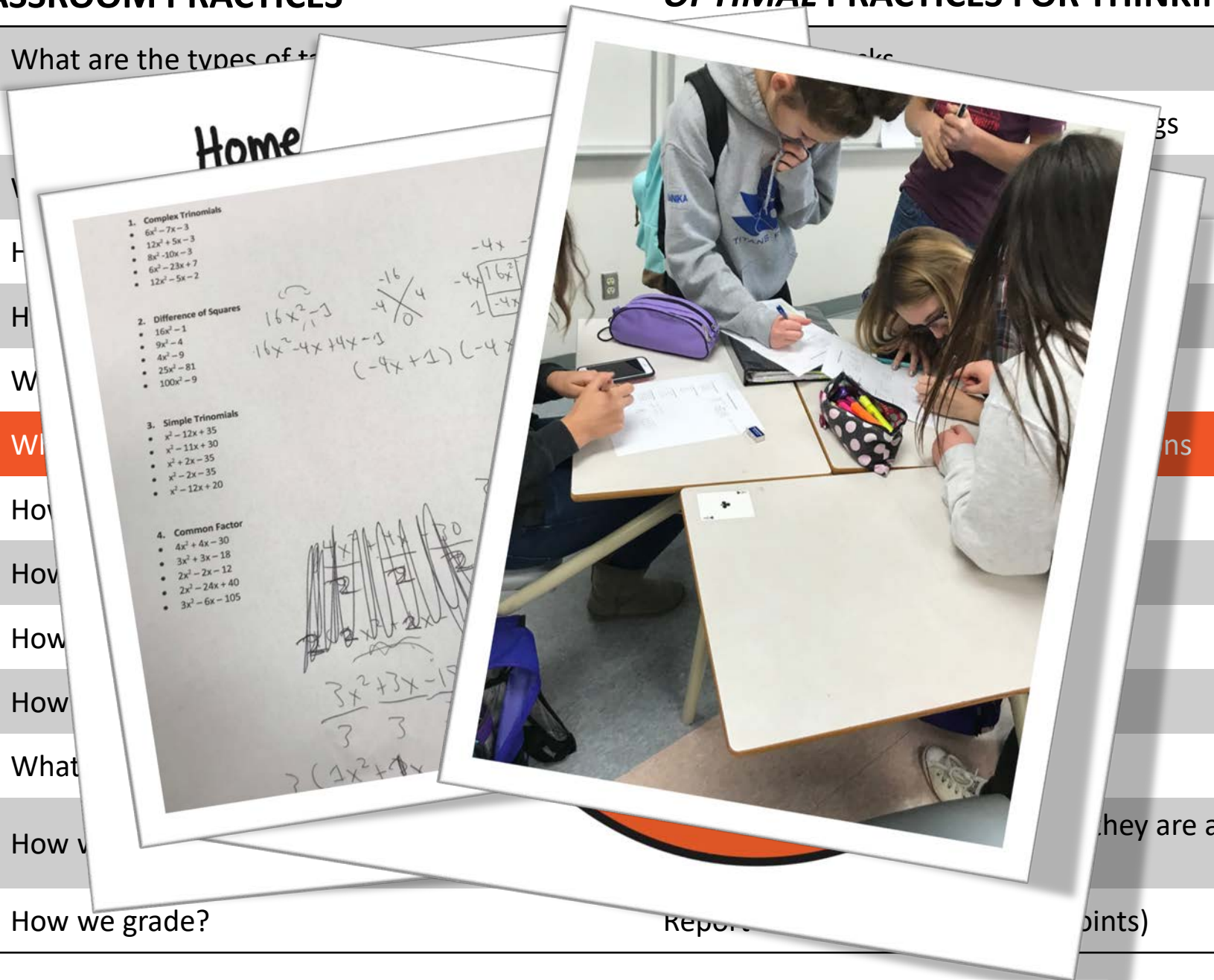
9	Hov	
10	How	
11	How	
12	What	
13	How v	hey are and
14	How we grade?	Repor oints)



CLASSROOM PRACTICES

OPTIMAL PRACTICES FOR THINKING

1 What are the types of tasks we use?

2 How we form

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13 How assessment?

14 How we grade?

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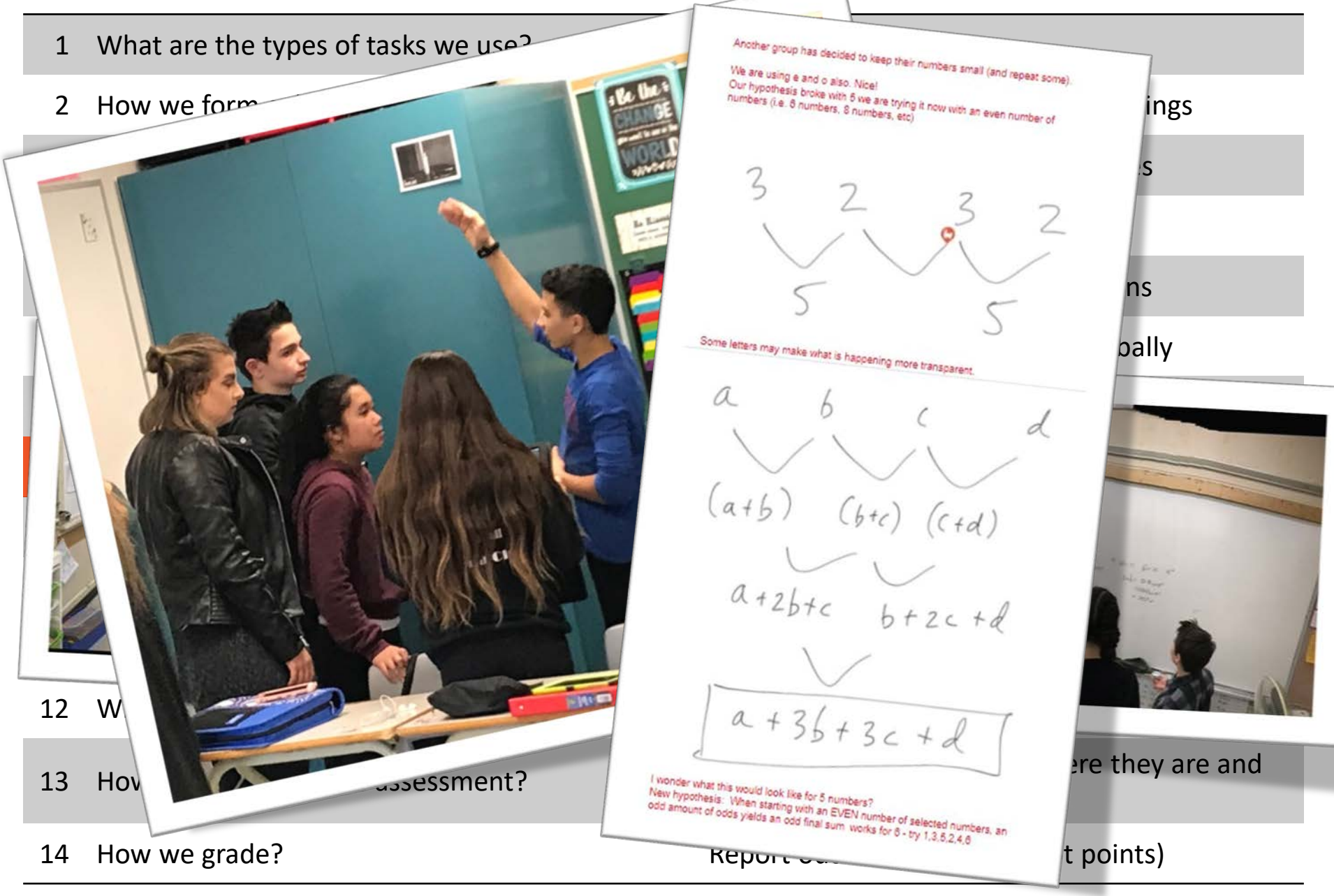

CLASSROOM PRACTICES

...ACTICES FOR THINKING

1	What are
2	
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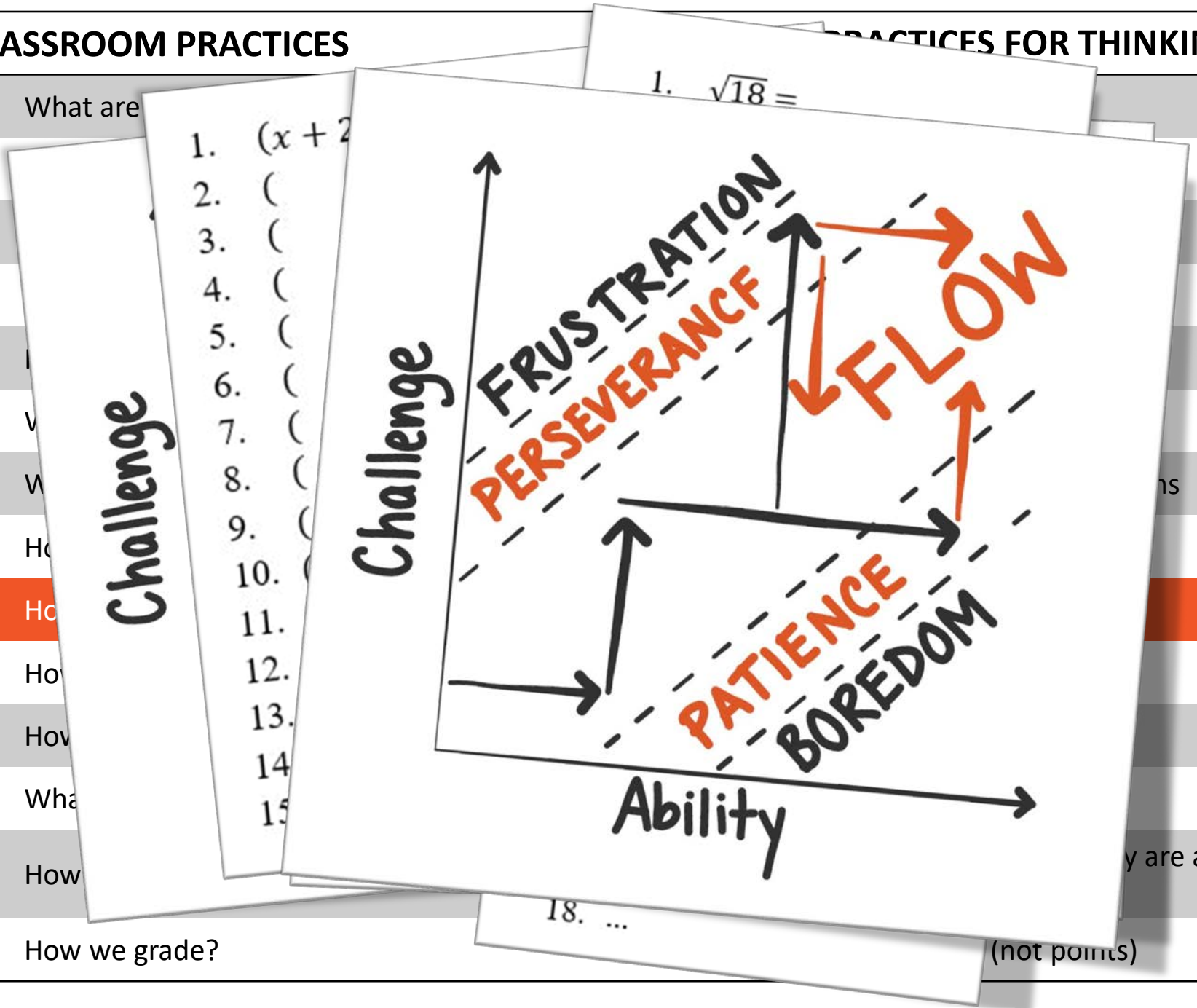
7	W
8	Hc
9	Hc
10	Hc
11	Hc
12	Wha
13	How
14	How we grade?



...y are and

(not points)

	CLASSROOM PRACTICES	*OPTIMAL* PRACTICES FOR THINKING
1	What are the types of tasks we use?	Use thinking tasks
2	How we form collabo	frequent
3	Where students	
4		
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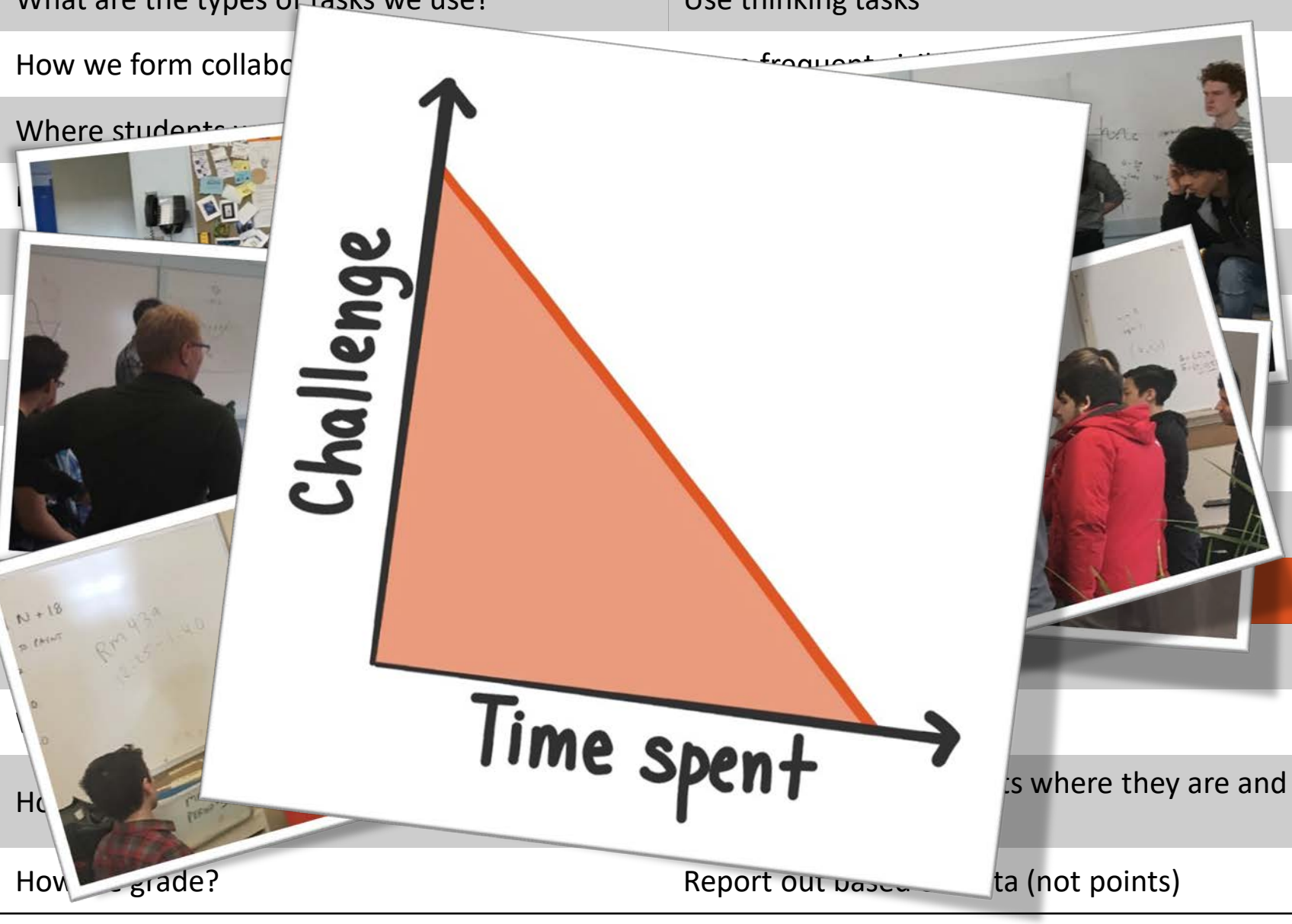
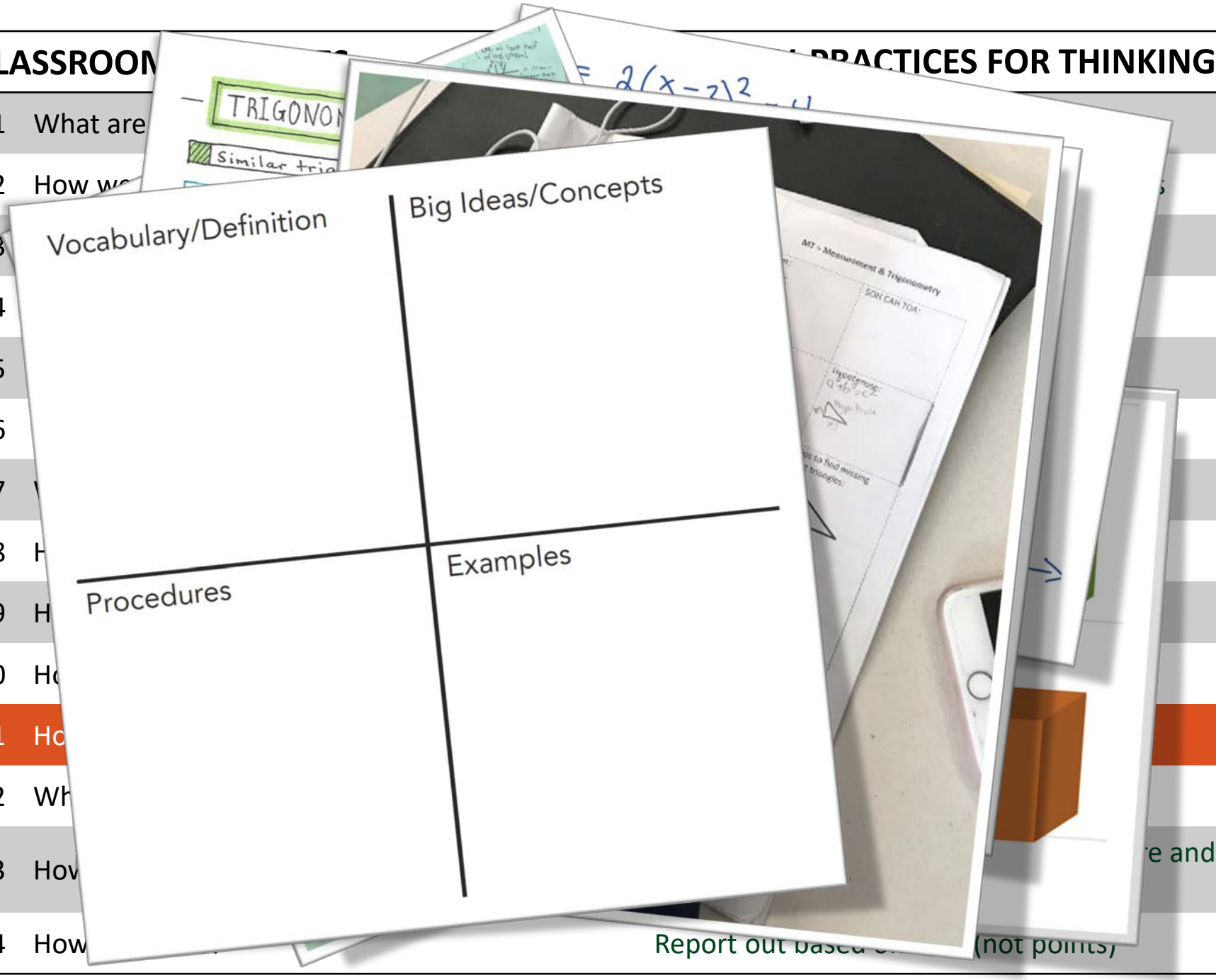
12		
13	Ho	ts where they are and
14	How grade?	Report out based ta (not points)




CLASSROOM
PRACTICES FOR THINKING
1 What are
2 How we
3
4
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7
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9
10
11
12
13
14
Vocabulary/Definition
Big Ideas/Concepts
Procedures
Examples
TRIGONO
Similar trio
MT - Measurement & Trigonometry
SOH CAH TOA
Hypotenuse
Report out based
(not points)

CLASSROOM PRACTICES

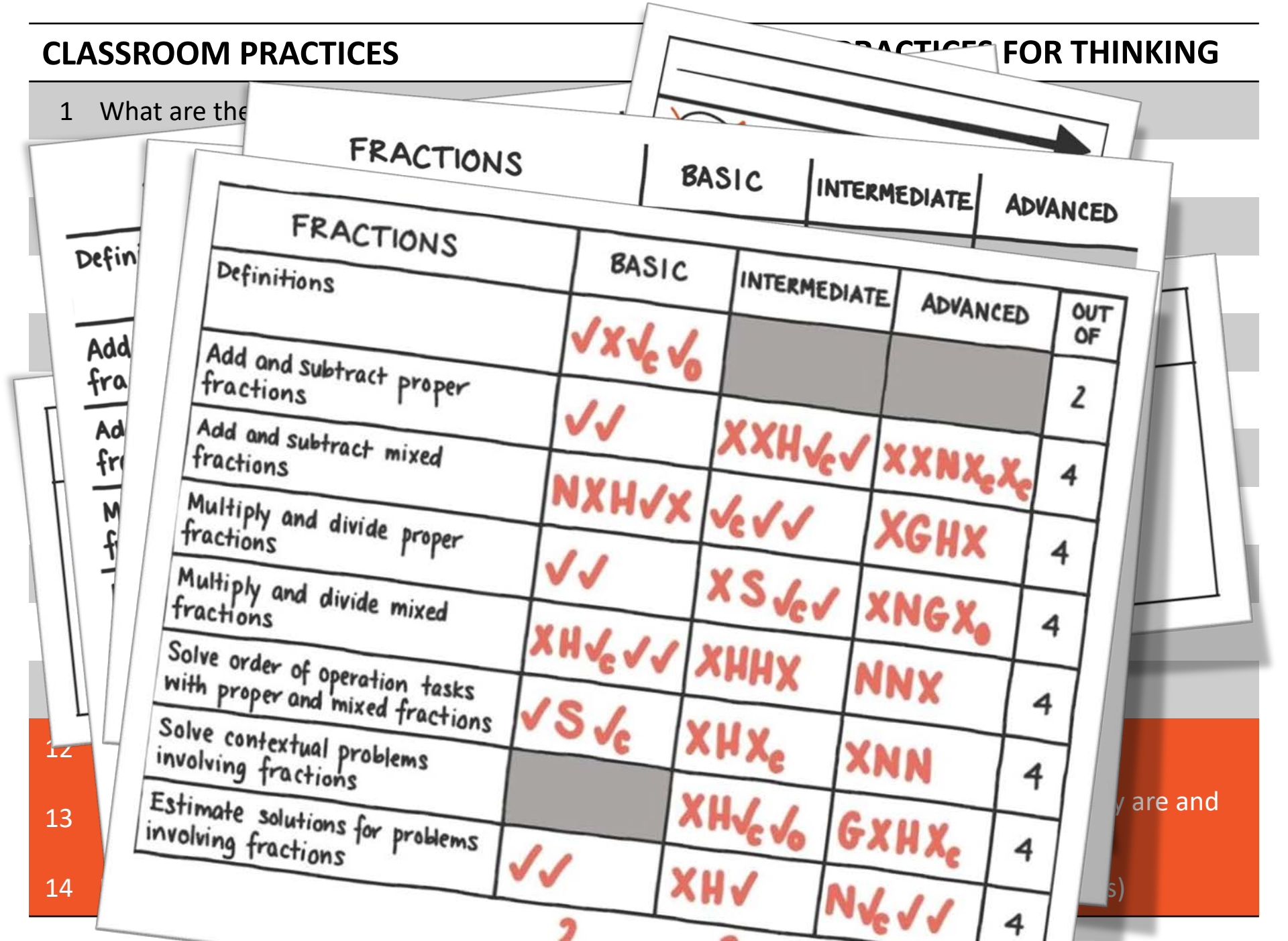
FOR THINKING

1 What are the

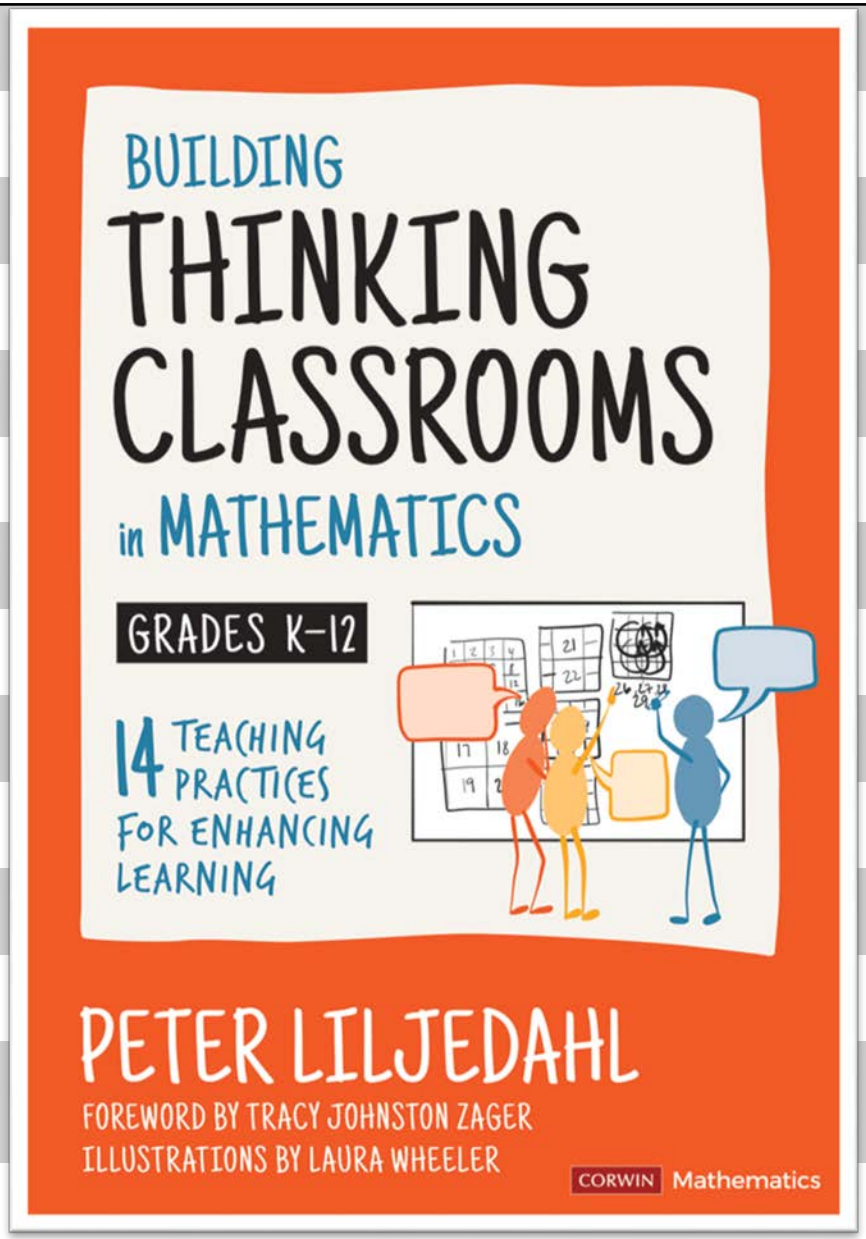
12

13

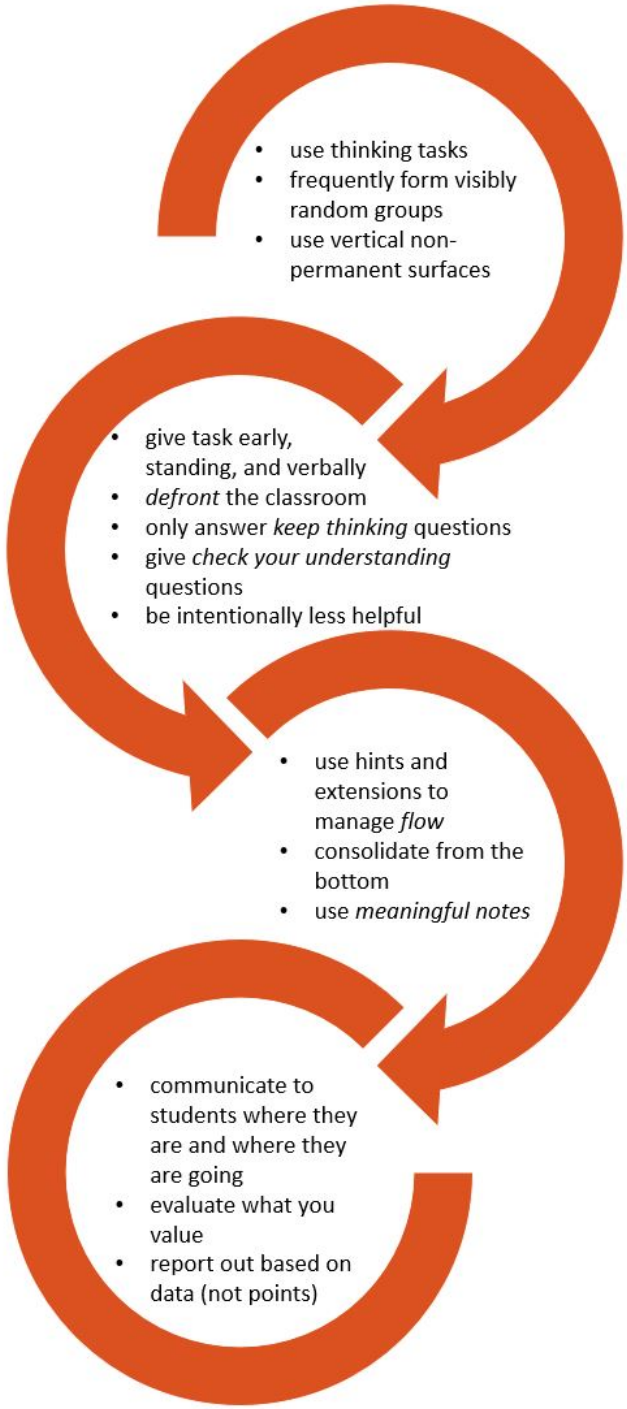
14



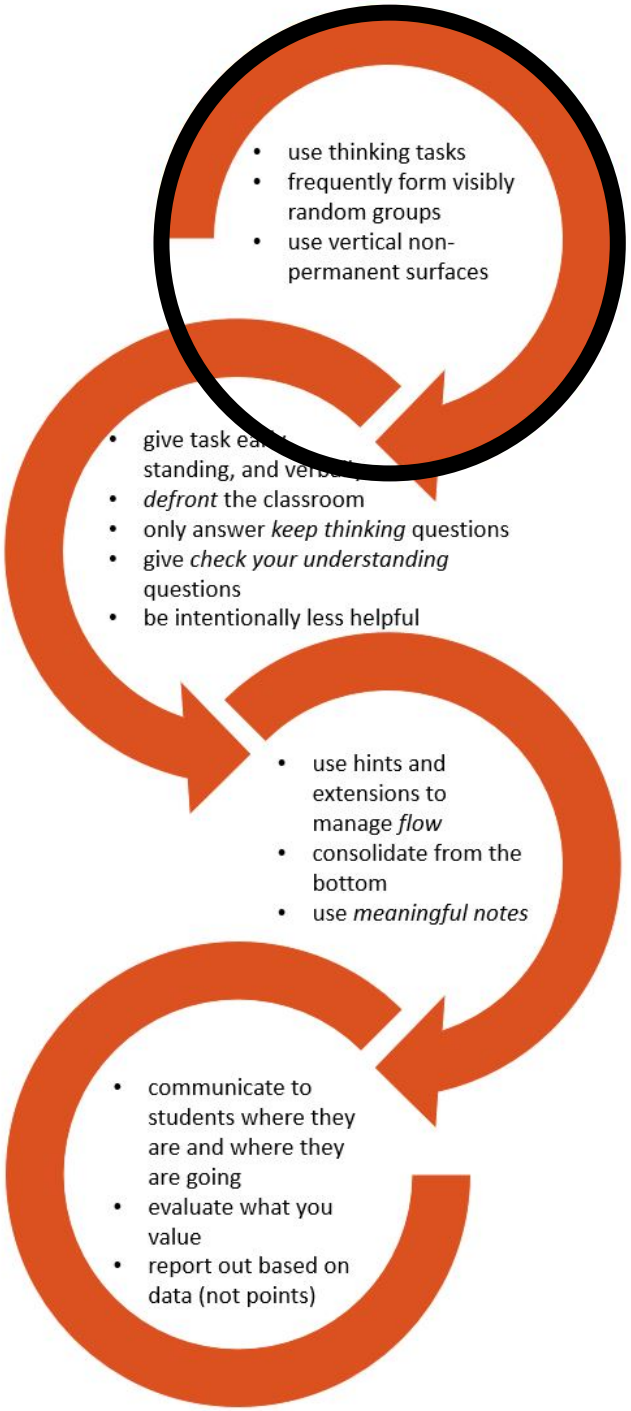
FRACTIONS	BASIC	INTERMEDIATE	ADVANCED	OUT OF
Definitions	✓ X ✓c ✓o			
Add and subtract proper fractions	✓ ✓	X X H ✓c ✓	X X N Xc Xc	2
Add and subtract mixed fractions	N X H ✓ X	✓c ✓ ✓	X G H X	4
Multiply and divide proper fractions	✓ ✓	X S ✓c ✓	X N G Xo	4
Multiply and divide mixed fractions	X H ✓c ✓ ✓	X H H X	N N X	4
Solve order of operation tasks with proper and mixed fractions	✓ S ✓c	X H Xc	X N N	4
Solve contextual problems involving fractions		X H ✓c ✓o	G X H Xc	4
Estimate solutions for problems involving fractions	✓ ✓	X H ✓	N ✓c ✓ ✓	4

CLASSROOM PRACTICES		*OPTIMAL* PRACTICES FOR THINKING
1		Use thinking tasks
2		Form frequent visibly random groupings
3		Use vertical non-permanent surfaces
4		*Defront* the classroom
5		Only answer keep thinking questions
6		Give tasks early, standing, and verbally
7		Give check your understanding questions
8		Be intentionally less helpful
9		Create and manage *flow*
10		Consolidate from the bottom
11		Use meaningful notes
12		Evaluate what you value
13		Communicate to students where they are and where they are going
14		Report out based on data (not points)

WHERE TO START?




• use thinking tasks
• frequently form visibly random groups
• use vertical non-permanent surfaces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• consolidate from the bottom
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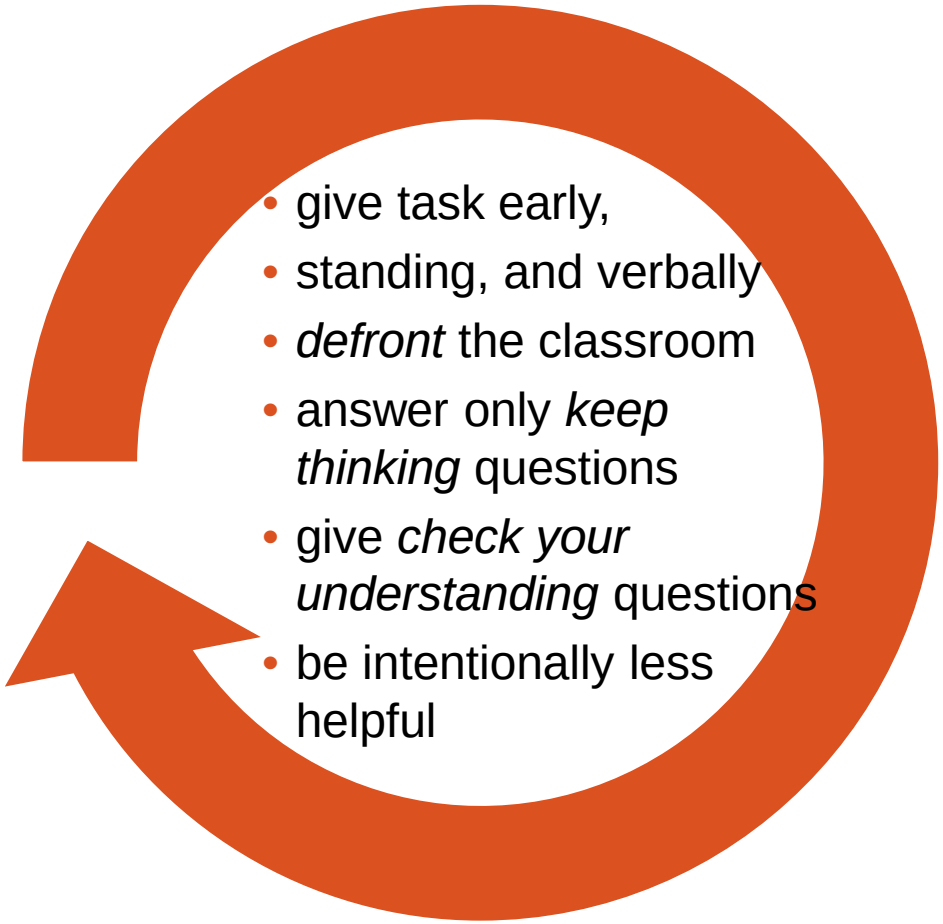
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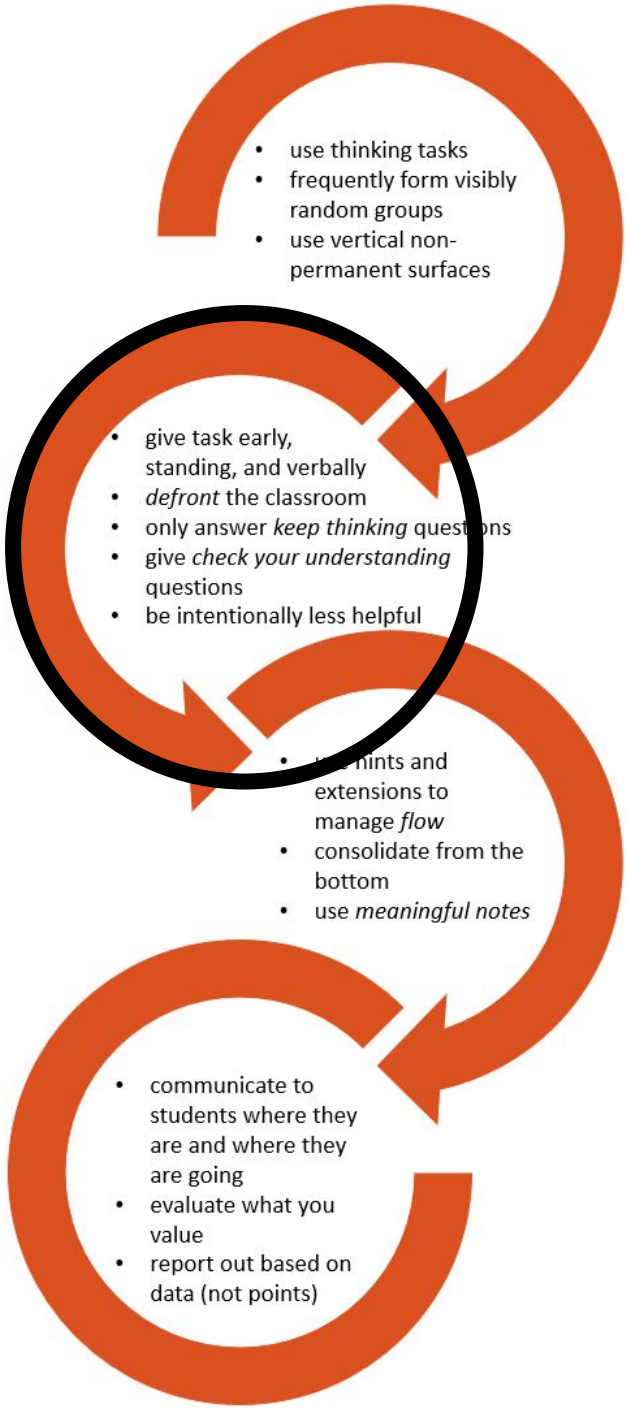
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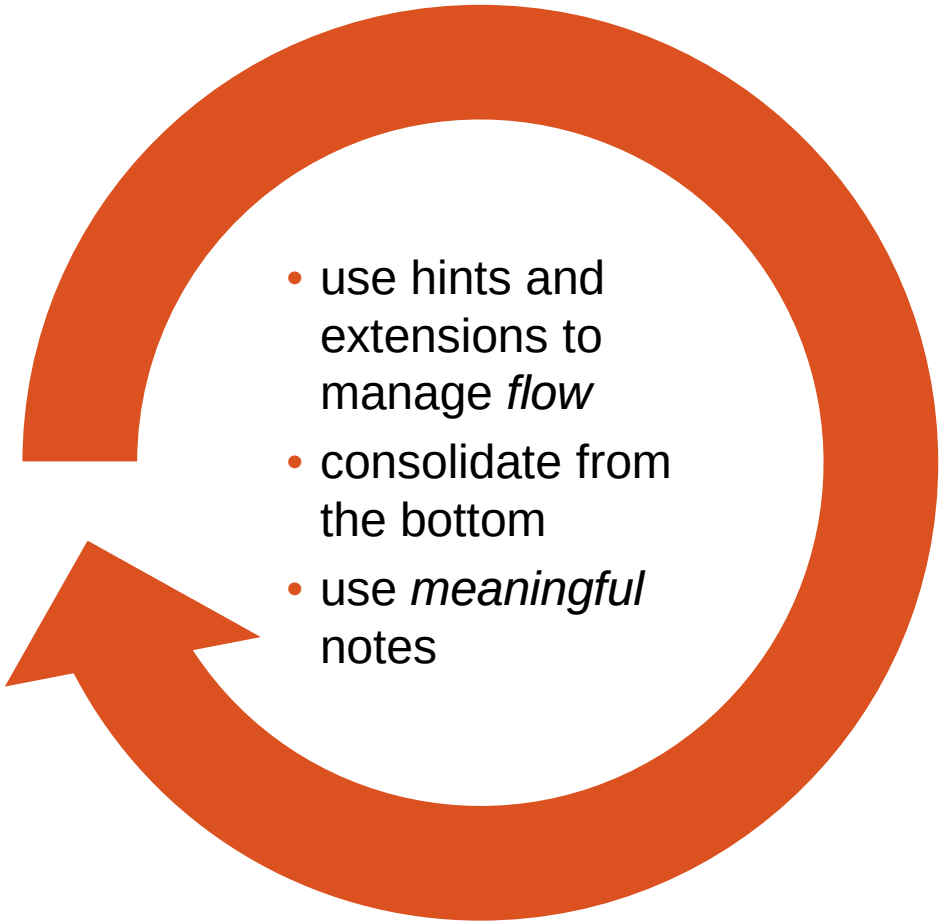
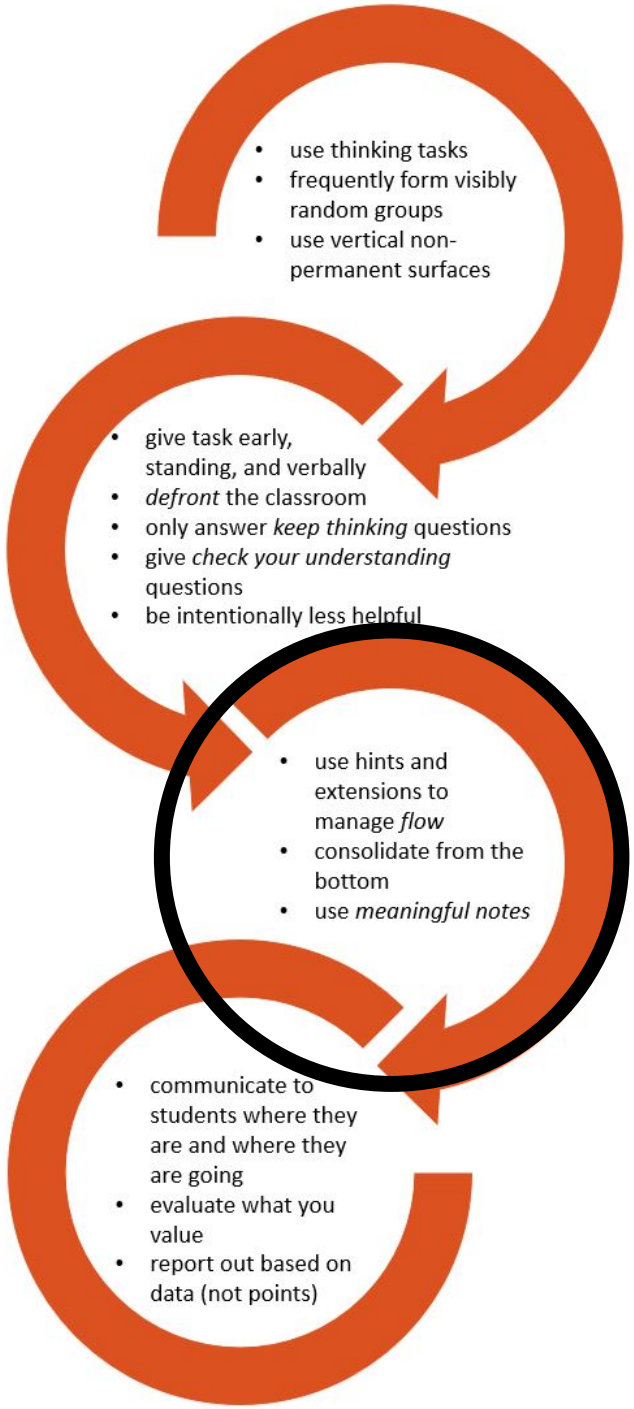

use hints and extensions to manage *flow*
consolidate from the bottom
use *meaningful* notes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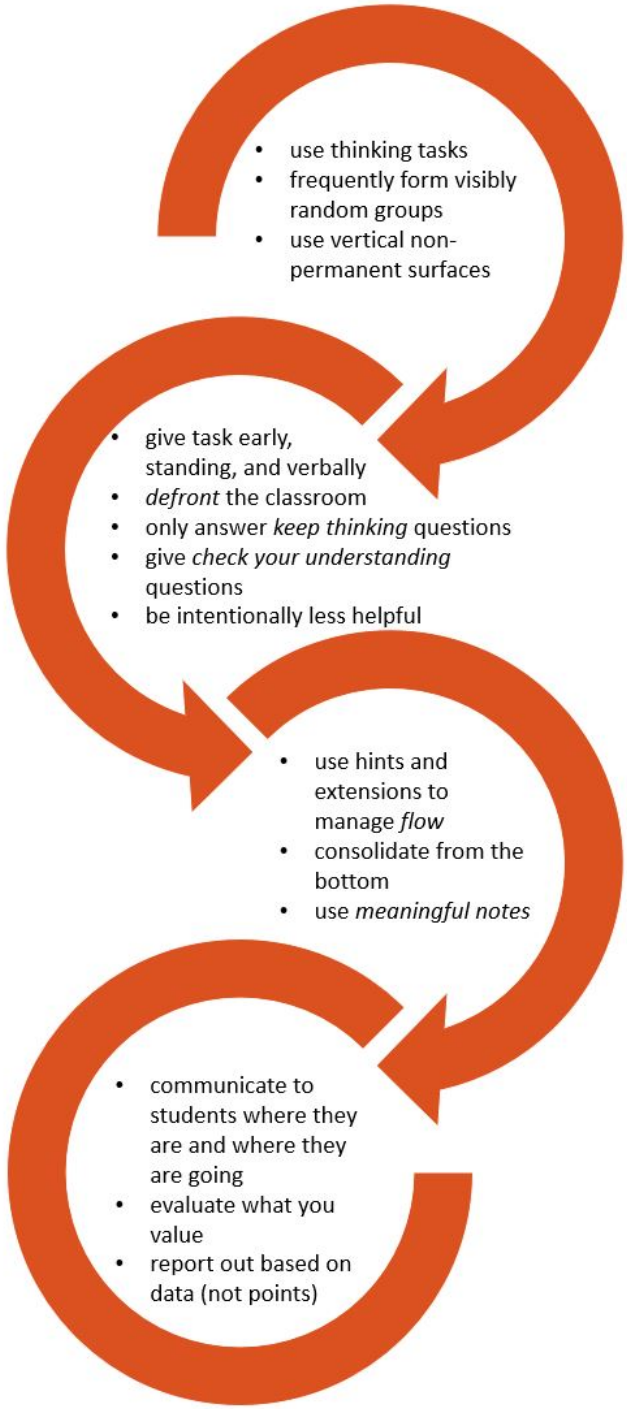
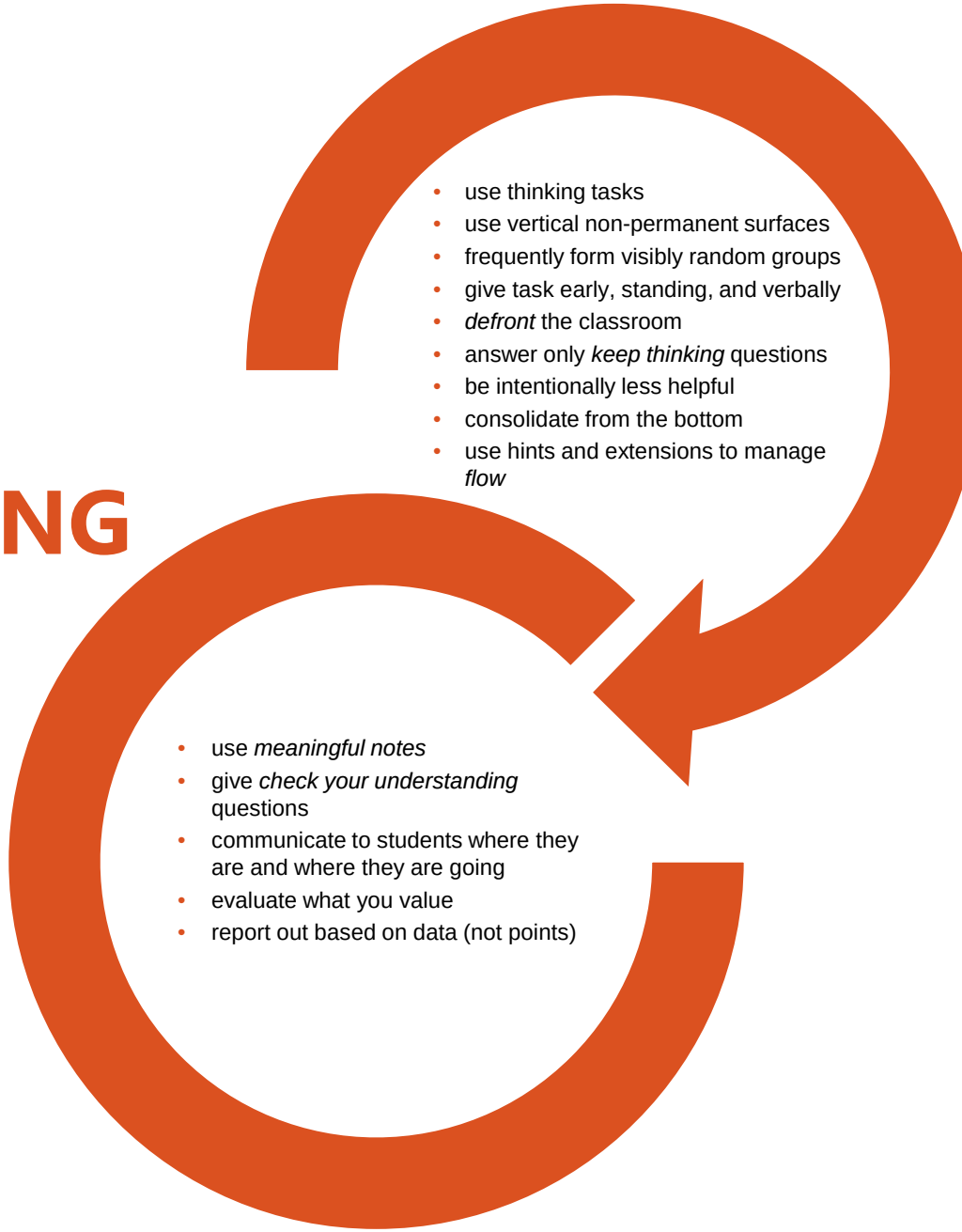


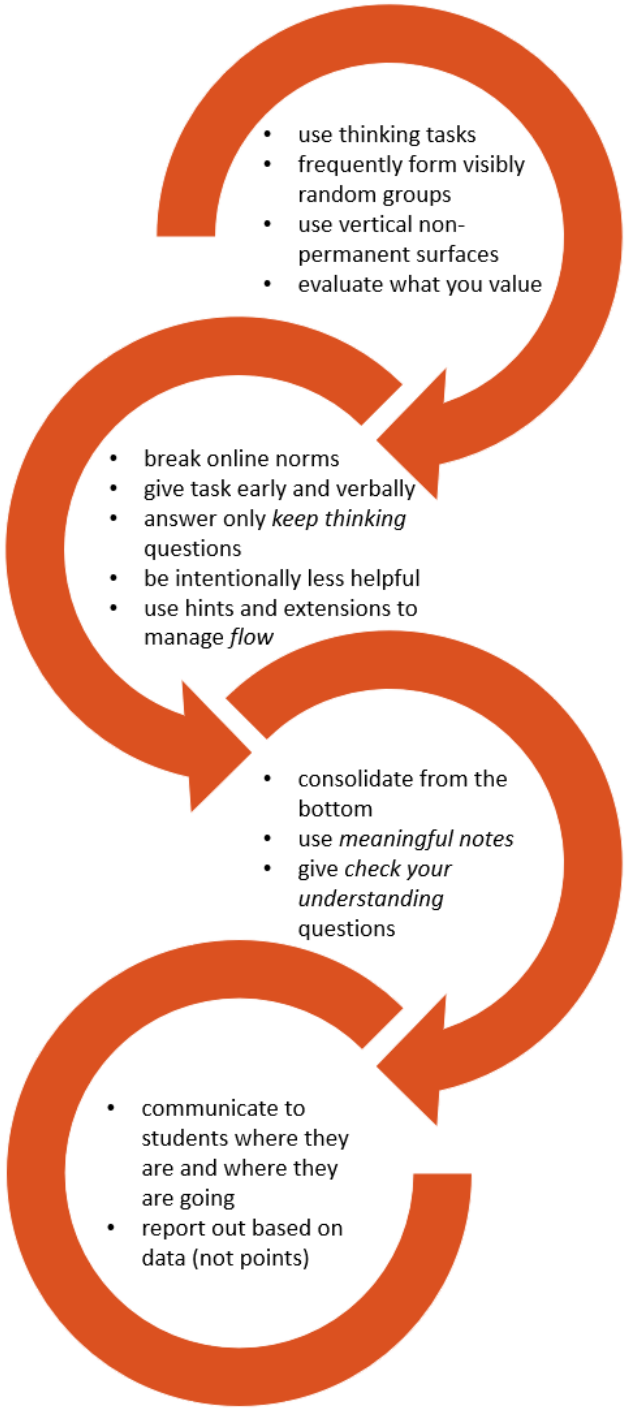
BUILDING THINKING CLASSROOMS

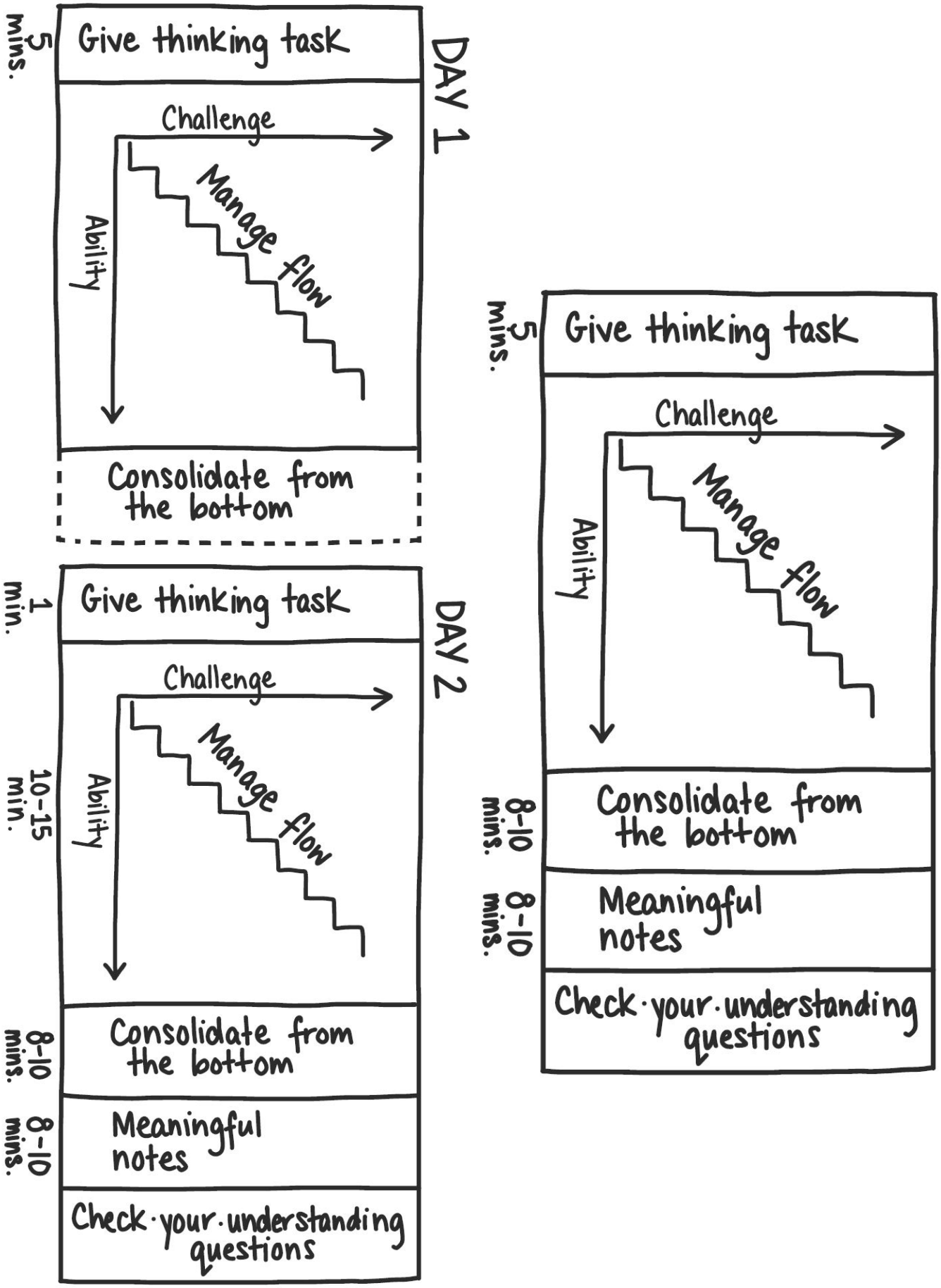
year II



BUILDING THINKING CLASSROOMS

online




DAY 1
5 mins.
Give thinking task
Challenge
Ability
Manage flow
Consolidate from the bottom
DAY 2
1 min.
Give thinking task
Challenge
Ability
Manage flow
10-15 min.
8-10 mins.
Consolidate from the bottom
8-10 mins.
Meaningful notes
Check your understanding questions
5 mins.
Give thinking task
Challenge
Ability
Manage flow
8-10 mins.
Consolidate from the bottom
8-10 mins.
Meaningful notes
Check your understanding questions

THANK YOU!

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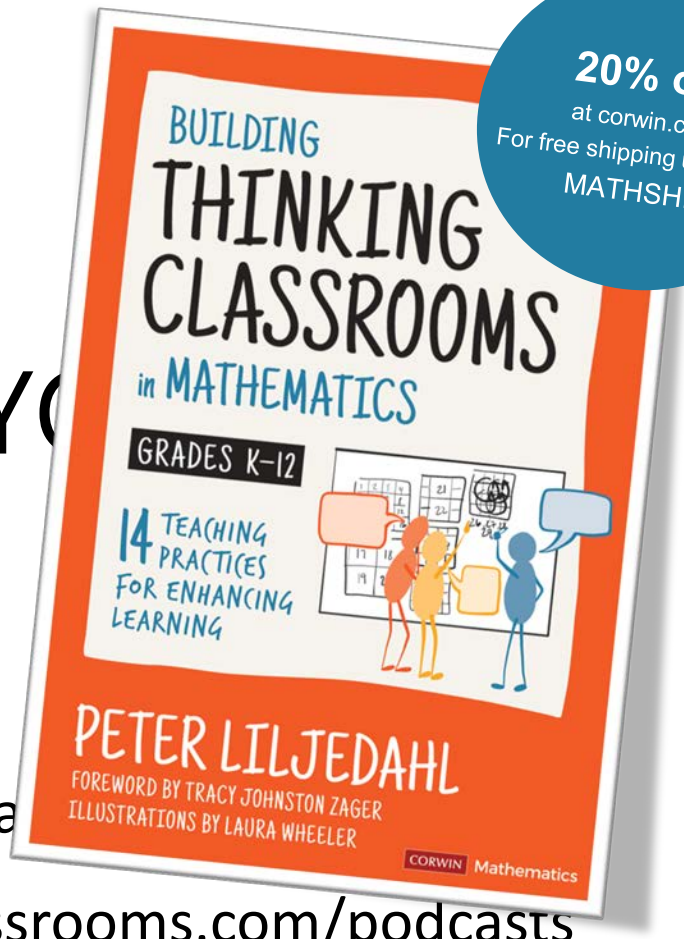
THANK YO



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