

# Building Successful SLIFE Math <sup>Numeracy</sup> Assessments: Using the Apollo 13 Approach

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# Agenda

- ★ SLIFE Numeracy Assessment Protocol Project
- ★ SLIFE Numeracy Definition
- ★ The Apollo 13 Metaphor
- ★ 4-Step Protocol & Numeracy Skills Progression Chart
- ★ Sample Assessment- The Calibration



# SLIFE Assessment Protocol Project

- ★ Expansion in response to SLIFE Guidance document from the field
- ★ How do we assess numeracy skills for potential SLIFE?

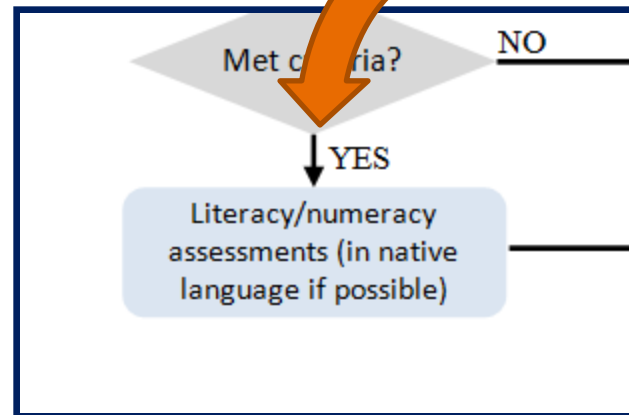
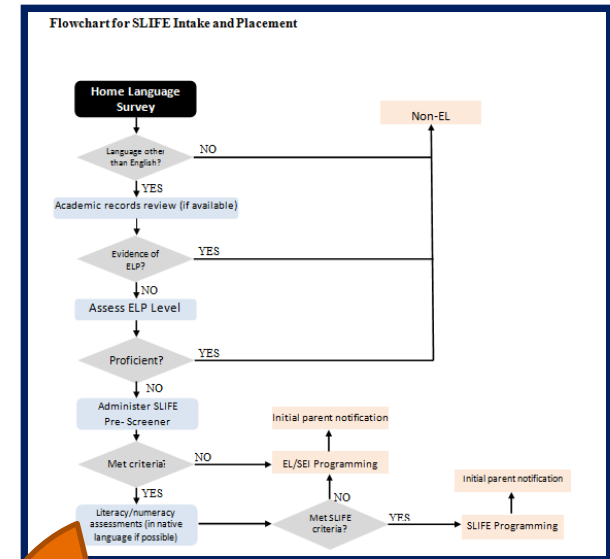


# Numeracy Skills Assessment

## ★ SLIFE Identification Criteria

“Administer native language literacy and numeracy assessments (if possible) to determine if the student is academically functioning two or more years below expected grade level relative to typical peers.”

-[\*SLIFE Guidance\*](#), p. 7, 9



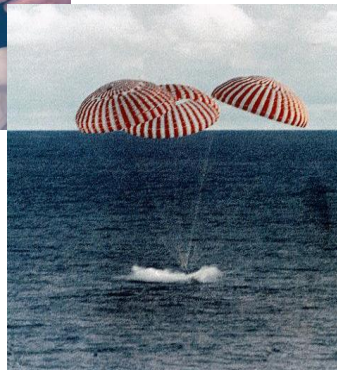
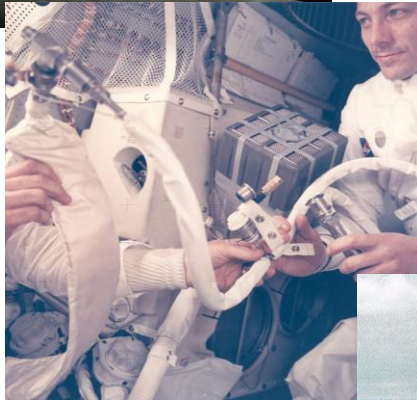
# Numeracy Skills Definition

*Students can demonstrate and apply grade level basic and computational skills by identifying and understanding numbers, performing simple arithmetic operations, and comparing numerical magnitude.*

Adapted from ["How numeracy influences risk comprehension and medical decision making"](#) Reyna, V. F.; Nelson, W. L.; Han, P. K.; Dieckmann, N. F. (2009). *Psychological Bulletin*. In consultation with Andrew Chen (assisted with new mathematics frameworks)



# Apollo 13 and the SLIFE Journey - What is the Connection?



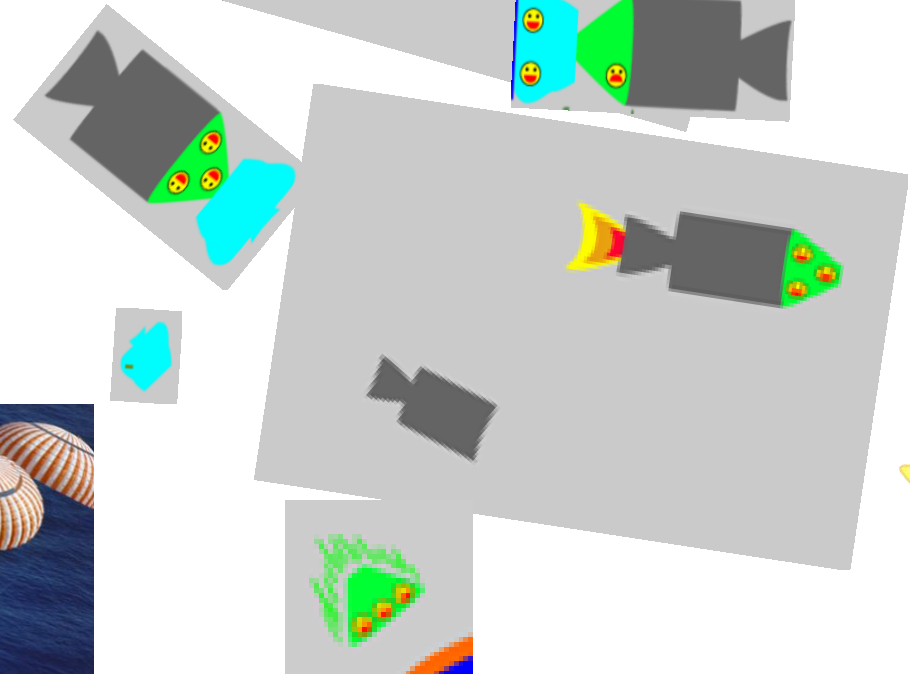
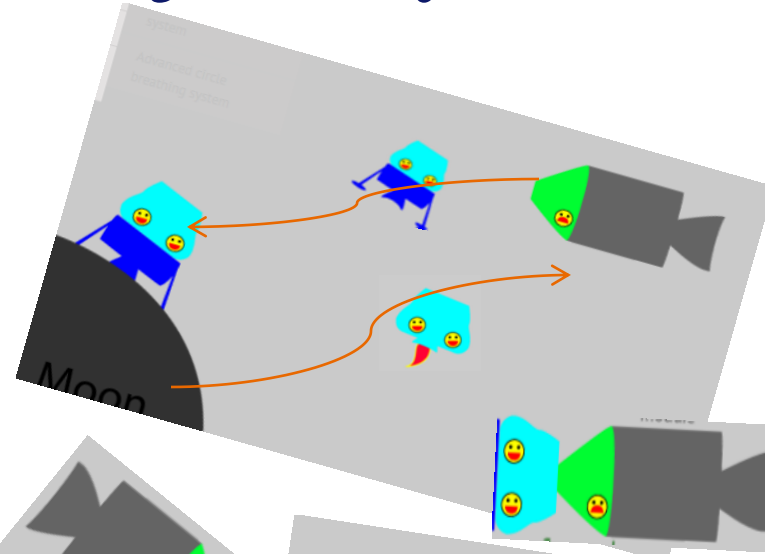
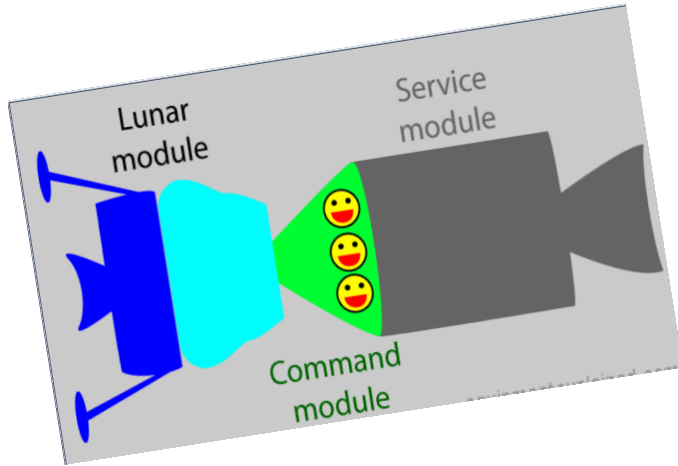
Journey interrupted

Problem solving  
square peg in a  
round hole

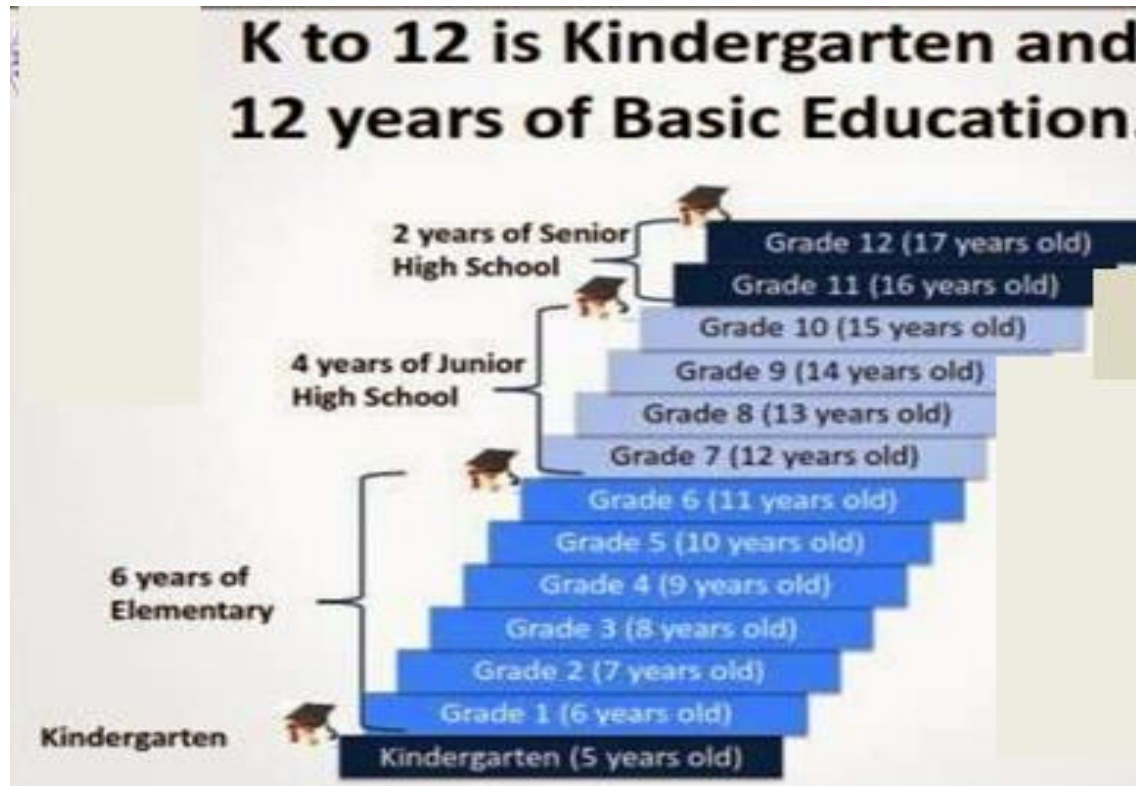
Acculturation



# Apollo 13: The planned journey

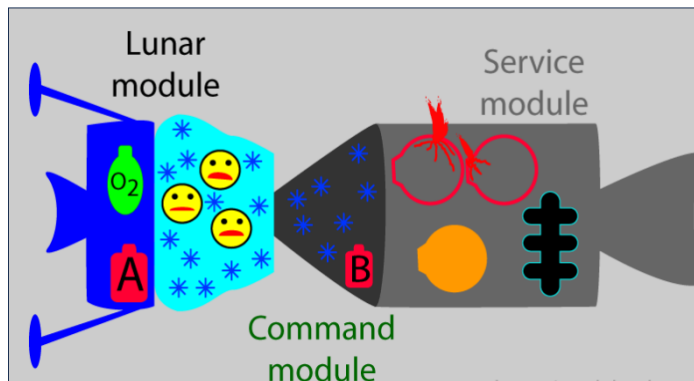
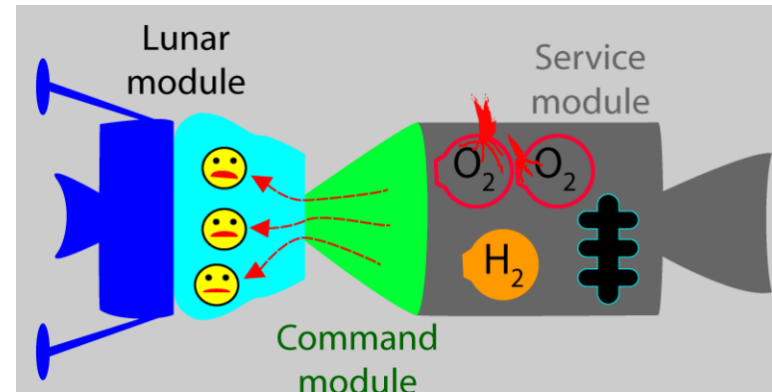
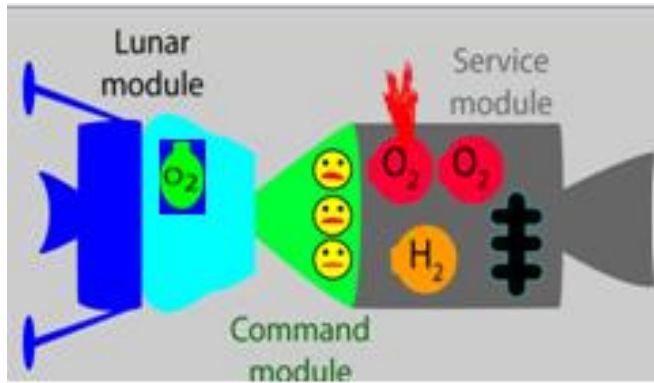


# K-12: The planned journey

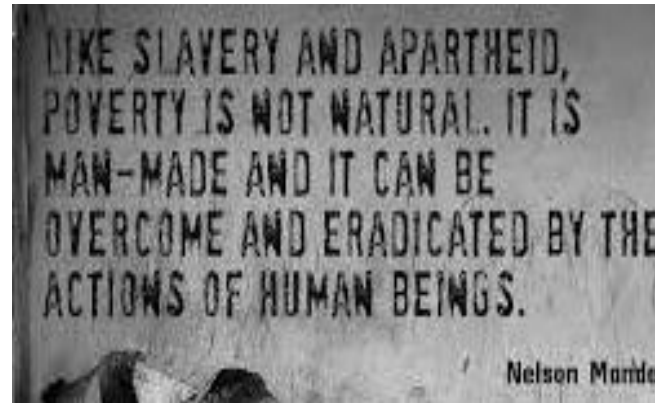




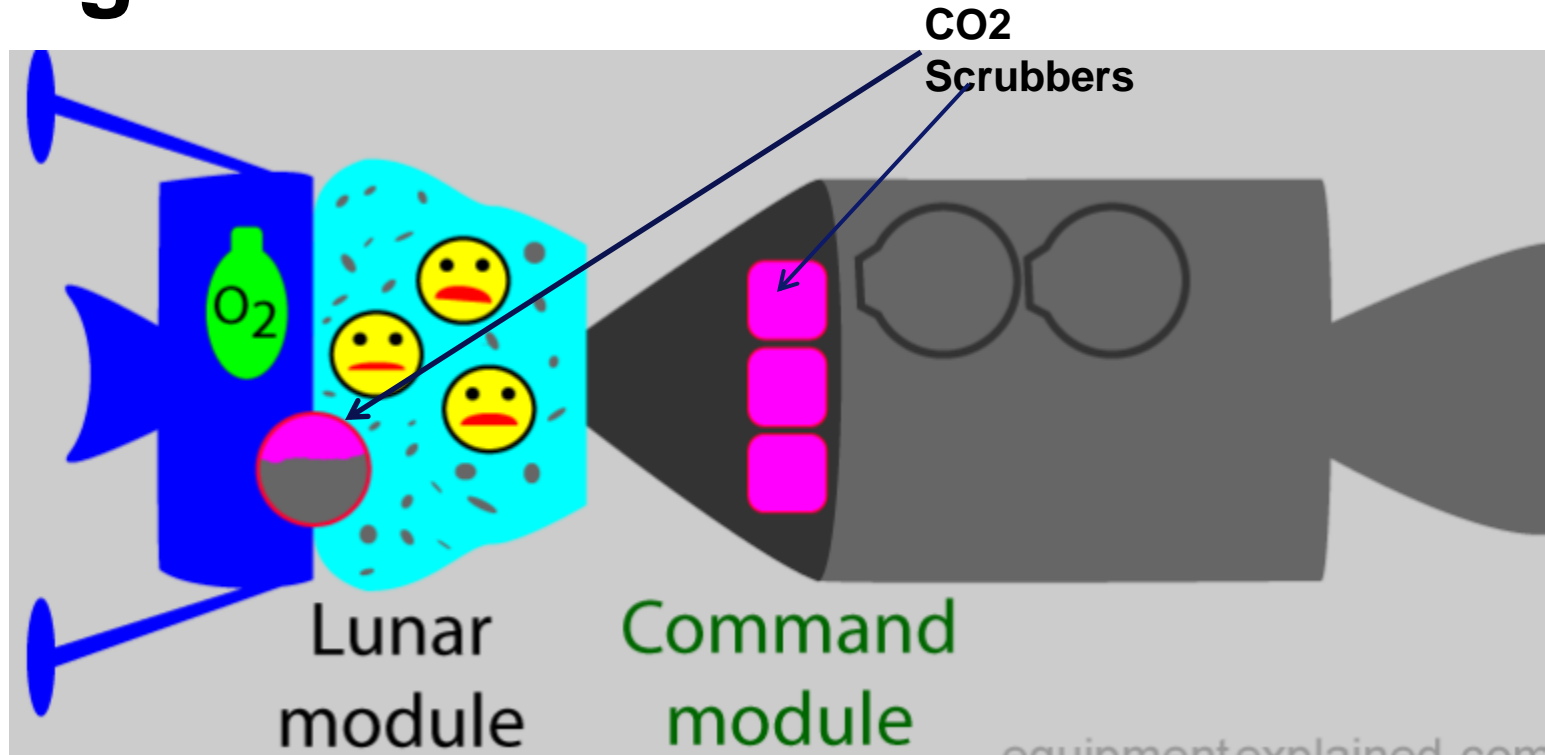
# Journey Interrupted: making the final destination mission critical



# Journey Interrupted: making the final destination mission critical



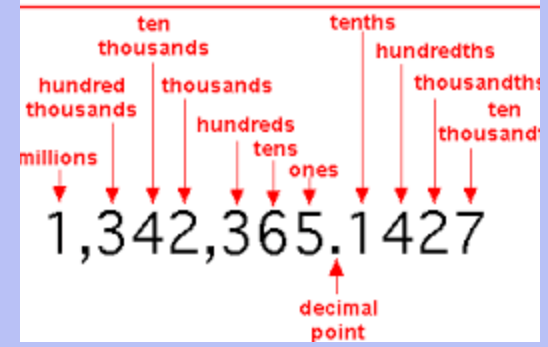
# Challenge? How to fit a square peg in a round hole?



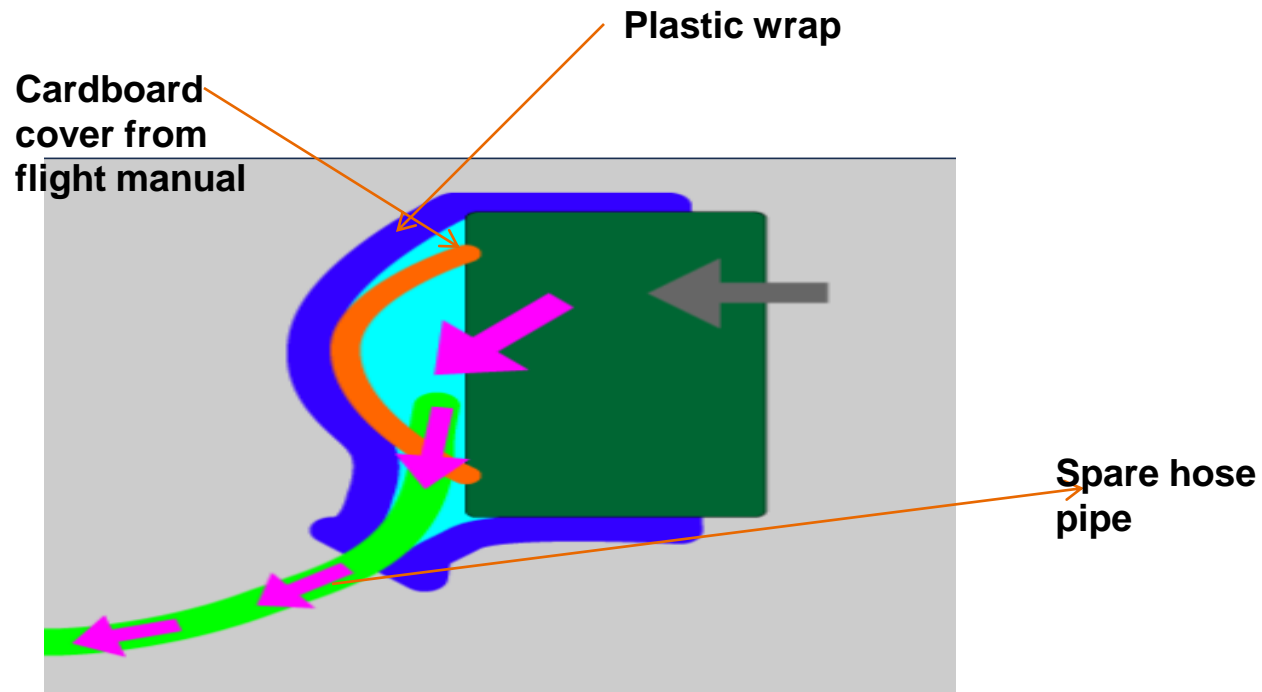
# Challenge? How to fit a square peg in a round hole?

Numeracy skills

$$123 + = ABC$$



# Rising to the challenge: Using existing resources and adaptation



# Rising to the challenge: Using existing resources and adaptation

## Numeracy Skills Progression Chart

**Numeracy Progression Chart**

	PK	K	1	2	3	4	5	6	7	8
Counting & Cardinality	Counting & Cardinality									
Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking
		Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten
						Number & Operations - Fractions	Number & Operations - Fractions			
							<ul style="list-style-type: none"> <li>Use the four operations with whole numbers to solve problems.</li> <li>Gain familiarity with fact and multiples.</li> <li>Generate and analyze patterns.</li> </ul>			
								System	Eq	Eq
								Measurement & Data	Measurement & Data	Measurement & Data
								Geometry	Geometry	Geometry
										Sta Phc

Base Ten Finger and Finger Cards.

Column One (Proctor "I Do")	Column Two (Proctor "I Do")
No picture (Gesture by hand nothing, empty space)	No picture (Gesture by hand nothing, empty space)

⇔ (counting)



# Acculturation



# SLIFE Numeracy Skills Assessment Protocol

- ★ Identify Grade Level and Domains by student's age
- ★ Determine Progression
- ★ Adapt/Develop Numeracy Assessment
- ★ Assess Skill Level

## Numeracy Skill Assessment Activity Scenario

Student age: 10 years

Expected grade level: MA grade 4

### Language & Culture Considerations:

Low incidence language; limited information on previous academic experience

### Numeracy Progression Chart

#### Domain(s) assessed:

- Operation & Algebraic Thinking
- Number & Operations in Base Ten
- Number & Operations –Fractions
- Measurement & Data
- Geometry

### Materials:

- Numeracy Skills Progression Chart
- MA Mathematics Framework
- Base ten manipulatives
- Activity mats
- Proctor record sheet





# Numeracy Skills Progression Chart

Numeracy Progression Chart									
PK	K	1	2	3	4	5	6	7	8
Counting & Cardinality	Counting & Cardinality								
Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking	Operations & Algebraic Thinking			
	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten	Number & Operations in Base Ten				
				Number & Operations - Fractions	Number & Operations - Fractions				
							Number Systems	Ratios & Proportional Relationships	
							Number Systems	The Number System	The Number System
Measurement & Data	Measurement & Data	Measurement & Data	Measurement & Data	Measurement & Data	Measurement & Data	Measurement & Data	Expressions & Equations	Expressions & Equations	Expressions & Equations
									Functions
Geometry	Geometry	Geometry	Geometry	Geometry	Geometry	Geometry	Geometry	Geometry	Geometry
							Statistics & Probability	Statistics & Probability	Statistics & Probability



• Use the four operations with whole numbers to solve problems.  
 • Gain familiarity with factors and multiples.  
 • Generate and analyze patterns.



# Sample Assessment: The Calibration

- ★ Introduce materials
- ★ Participants gain familiarity with materials
- ★ Calibration activity
- ★ Discuss and gather feedback



# Thank you for taking this journey with us and moving this work forward!

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