INDIGENIZING MATH

Weaving together Indigenous Knowledge and Math

TERRITORY ACKNOWLEDGEMENT

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Líl'wat

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NORTH VANCOUVER

Squamish & Tsleil-Waututh
Coast Salish Territory

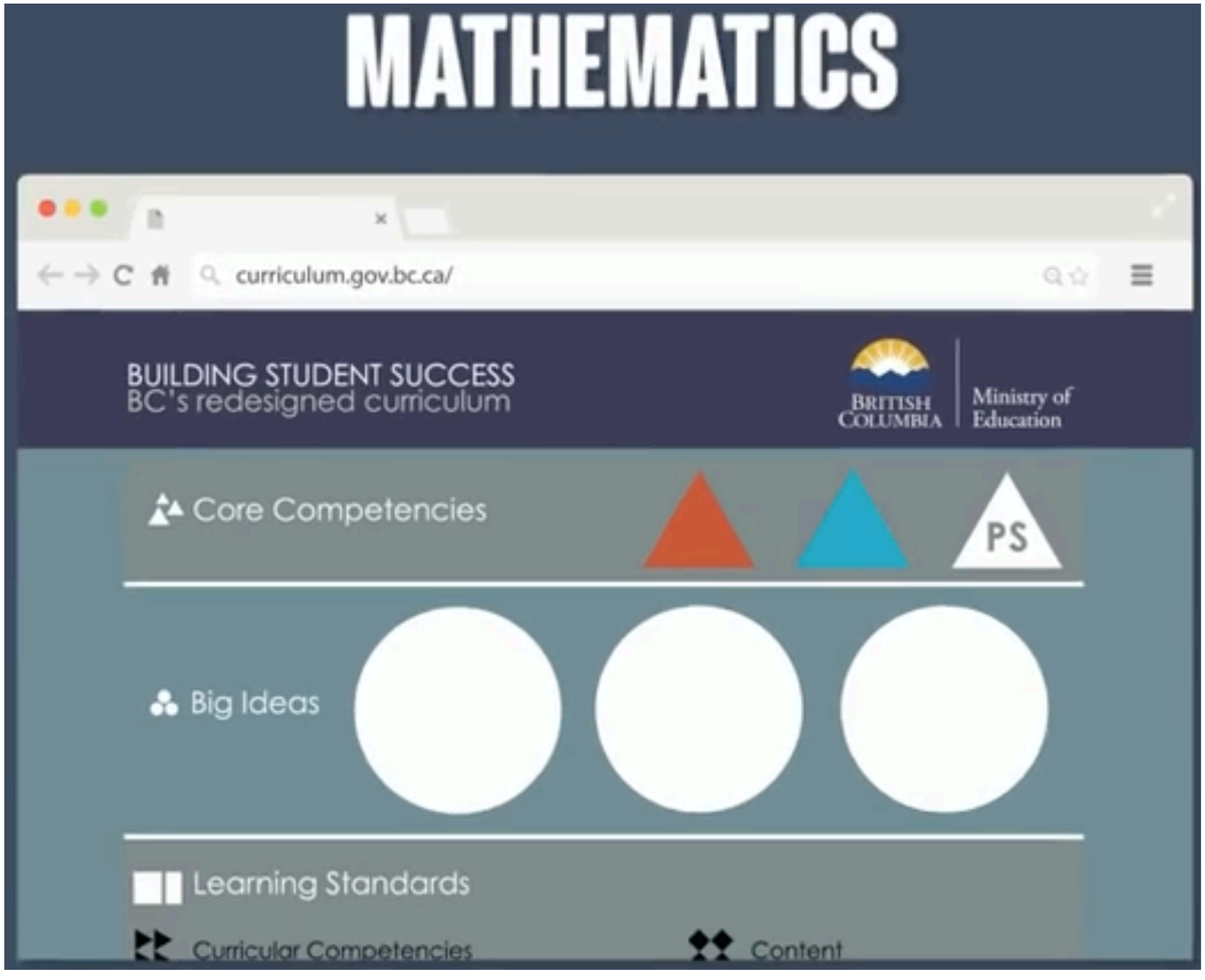
THREE PATHWAYS

BC CURRICULUM

➤ Communication

➤ Thinking

➤ Personal Social



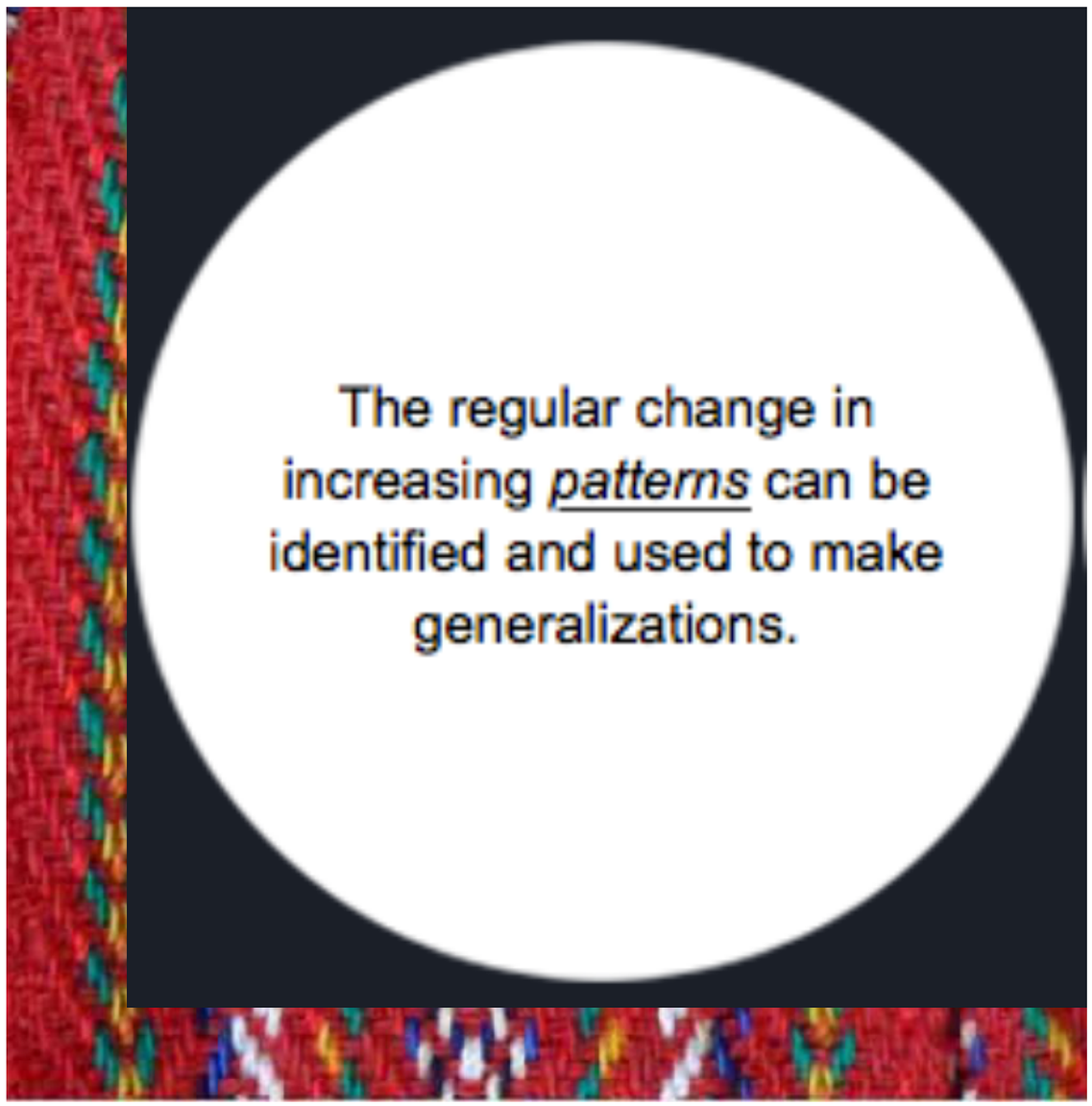
BC CURRICULUM

- repeating and increasing *patterns*

  - exploring more complex repeating patterns (e.g., positional patterns, circular patterns)
  - identifying the core of repeating patterns (e.g., the pattern of the pattern that repeats over and over)
  - increasing patterns using manipulatives, sounds, actions, and numbers (0 to 100)
  - Métis finger weaving
  - First Peoples head/armband patterning
  - online video and text: *Small Number Counts to 100* (mathcatcher.irmacs.sfu.ca/story/small-number-counts-100)

CROSS CURRICULAR

Grade 2 Mathematics



Grade 2 Social Studies

ENTRY POINT LESSON PLAN

Mathematics: Curricular Competencies

Content

- (2) Repeating and increasing patterns
- (2) Identifying the core of repeating patterns
- (3) Pattern rules using words and numbers, based on concrete experiences

Resources: *https://www.youtube.com/watch?v=GtBME0YFrLk* *http://www.youtube.com/watch?v=GtBMEOYFrLk*
5x15-20cm strands of yarn. Tape. Scissors.

- *Suggestion: Teacher may want to prep 5 strands sets for students before hand*

Introduction	Show students examples of Métis weaving (in person or online) and ask them to identify any patterns that they see. For example, colours, shapes, designs, etc. Watch the Video to introduce students to the S.T.A.R. weaving method (S-Select, T-Travel, A-Arrange, R-Repeat), This video uses 2 colours and 8 strands, but to simplify we suggest starting with 5 strands. Detailed instructions below.
Activity	Each student will need 5 strands of yarn (15-20cm in length each). We suggest using traditional Métis weaving colours (*see background information).* Tie 5 strands together with a simple knot at the end. Tape the knot to the student's desk or table. Spread the stands out on the table numbering from left 1,2,3,4,5. Start by picking up strands 2 and 4. To begin: Select strand 5, Travel under 2 and 4 (past 1 spot to become the new 1 spot), Arrange them back in their new order, and repeat. If loose, hold down new strands 2-5 and gently tug the new strand 1 (former strand 5) up towards the knot. Tie in a knot at the opposite end.
Conclusion	Why do you think weaving was important to Métis people? What do you think the Sash could have been used for? Share.

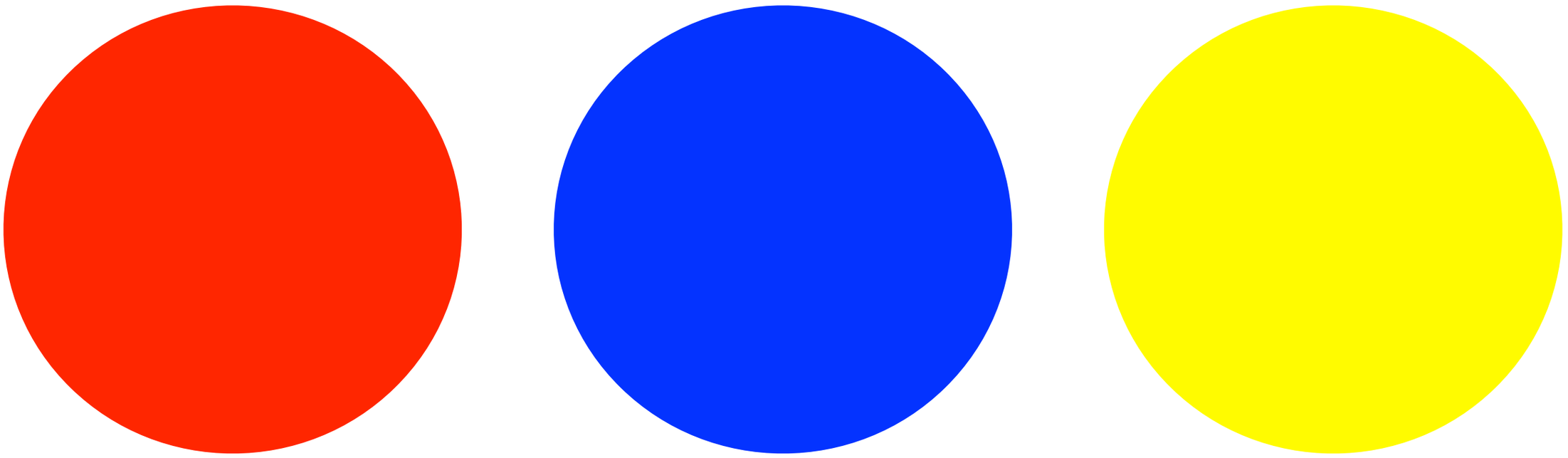
Background Information for Teacher: *It is important to realize that fingerweaving is not a craft. You are*

MÉTIS SASH: START WITH STUDENT INQUIRY

WHAT DO YOU NOTICE? WHAT MIGHT THIS BE USED FOR? WHAT PATTERNS DO YOU SEE?

MÉTIS SASH: COLOURS AND SYMBOLISM

WHAT DOES EACH COLOUR REMIND YOU OF? HOW DO THESE COLOURS MAKE YOU FEEL?



Red – Is for the blood of the Métis that was shed through the years while fighting for our rights.
Blue – Is for the depth of our spirits
Green – Is for the fertility of a great nation
White – Is for our connection to the earth and our creator
Yellow – Is for the prospect of prosperity
Black – Is for the dark period of the suppression and dispossession of Métis land

https://www.mnbc.ca/about/metis-history

DIFFERENT WAYS TO IDENTIFY & RECORD PATTERNS

Métis Finger Weaving Patterning Chart

Name: Jessica Johnson

Lift strands 2 and 4. Move strand 5 under 2 and 4, over 1 and 3, to become strand 1.

1	2	3	4	5
1	2	3	4	5
5	1	2	3	4
4	5	1	2	3
3	4	5	1	2
2	3	4	5	1
1	2	3	4	5

DIFFERENT WAYS TO IDENTIFY & RECORD PATTERNS

Métis Finger Weaving Patterning Chart

Name: Jessica Johnson

Lift strands 2 and 4. Move strand 5 under 2 and 4, over 1 and 3, to become strand 1.

1	2	3	4	5
R	Y	G	B	W
W	R	Y	G	B
B	W	R	Y	G
G	B	W	R	Y
Y	G	B	W	R
R	Y	G	B	W

DIFFERENT WAYS TO IDENTIFY & RECORD PATTERNS

Métis Finger Weaving Patterning Chart

Name: Jessica Johnson

Lift strands 2 and 4. Move strand 5 under 2 and 4, over 1 and 3, to become strand 1.

1	2	3	4	5
R	Y	G	B	W
W	R	Y	G	B
B	W	R	Y	G
G	B	W	R	Y
Y	G	B	W	R
R	Y	G	B	W

DIFFERENT WAYS TO IDENTIFY & RECORD PATTERNS

MÉTIS FINGER WEAVING PATTERNING CHART

Métis Finger Weaving Patterning Chart

Name: _____

Lift strands 2 and 4. Move strand 5 under 2 and 4, over 1 and 3, to become strand 1.

1	2	3	4	5

CAROL DWECK – GROWTH MINDSET

Fixed Mindset

VS

Growth Mindset

INCREMENTAL VS. ENTITY THEORISTS

Attribution Theory of Motivation

	Internal	External
Stable	ABILITY	TASK DIFFICULTY
Unstable	EFFORT	LUCK

MINDSET CHARACTERISTICS

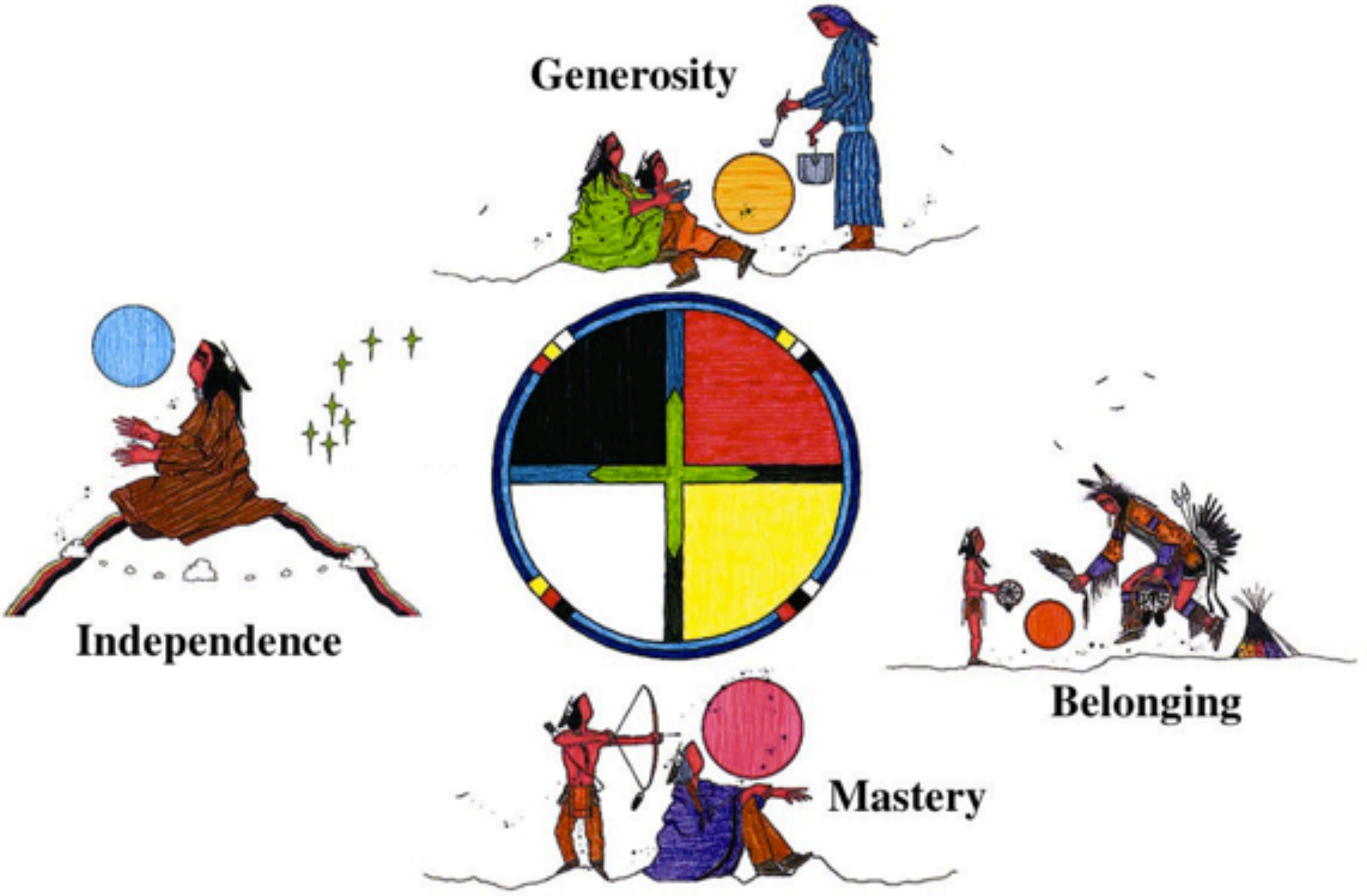
FIXED MINDSET		GROWTH MINDSET
SKILLS ARE BORN YOU CAN'T LEARN & GROW	BELIEFS	SKILLS ARE BUILT YOU CAN LEARN & GROW
PERFORMANCE & OUTCOMES NOT LOOKING BAD	FOCUS	THE PROCESS GETTING BETTER

KEYS TO GROWTH

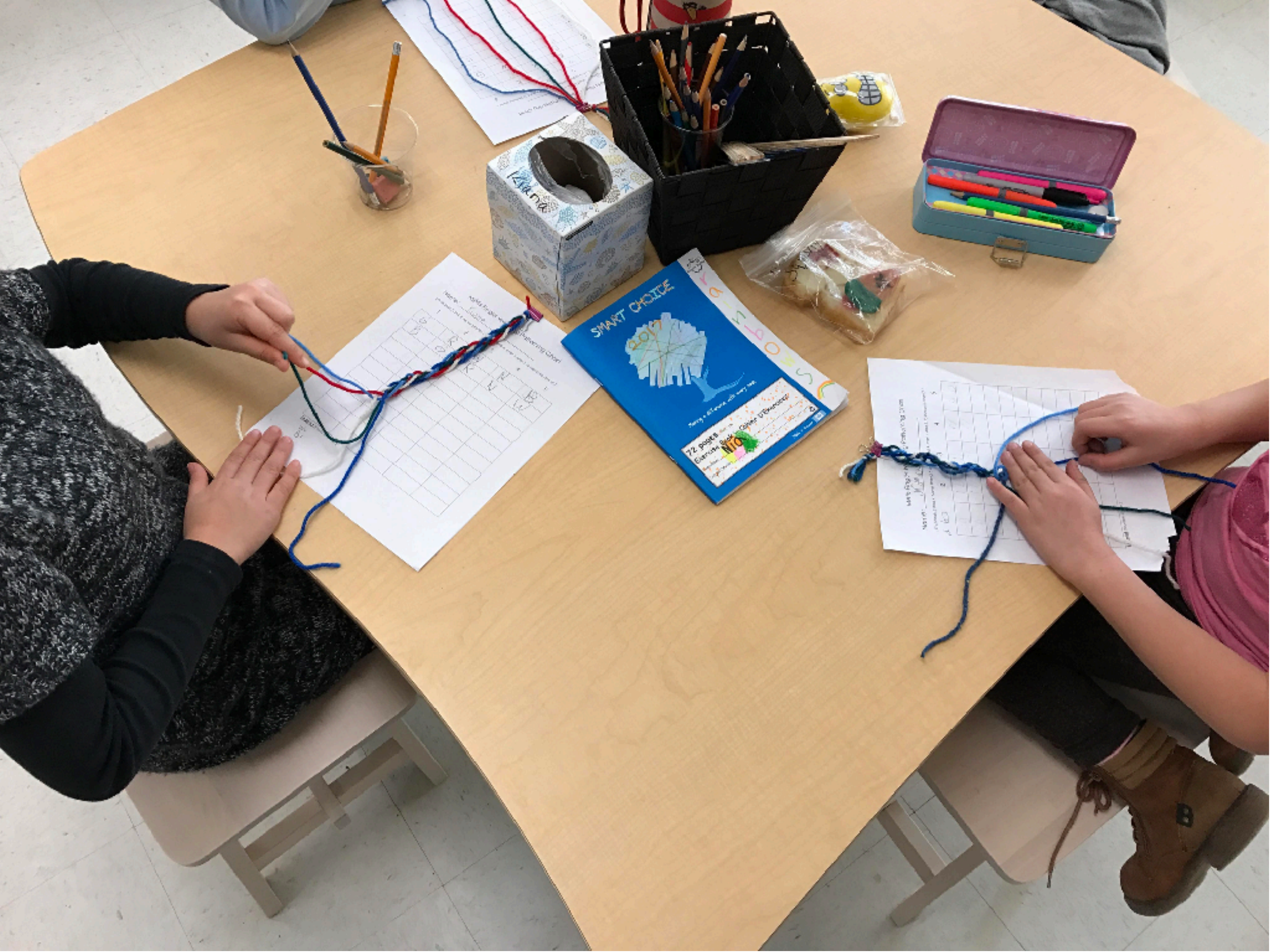
NOT NECESSARY NOT USEFUL	EFFORT	USEFUL WILL LEAD TO GROWTH
BACK DOWN & AVOID FRAME AS A THREAT	CHALLENGES	EMBRACE & PERSEVERE FRAME AS AN OPPORTUNITY
HATE THEM & GET DISCOURAGED TRY TO AVOID MAKING THEM	MISTAKES	USE THEM TO LEARN TREAT THEM AS OPPORTUNITIES
NOT HELPFUL GET DEFENSIVE & TAKE PERSONALLY	FEEDBACK	USEFUL INFORMATION APPRECIATE IT & USE IT TO GROW

GROWTH MINDSET

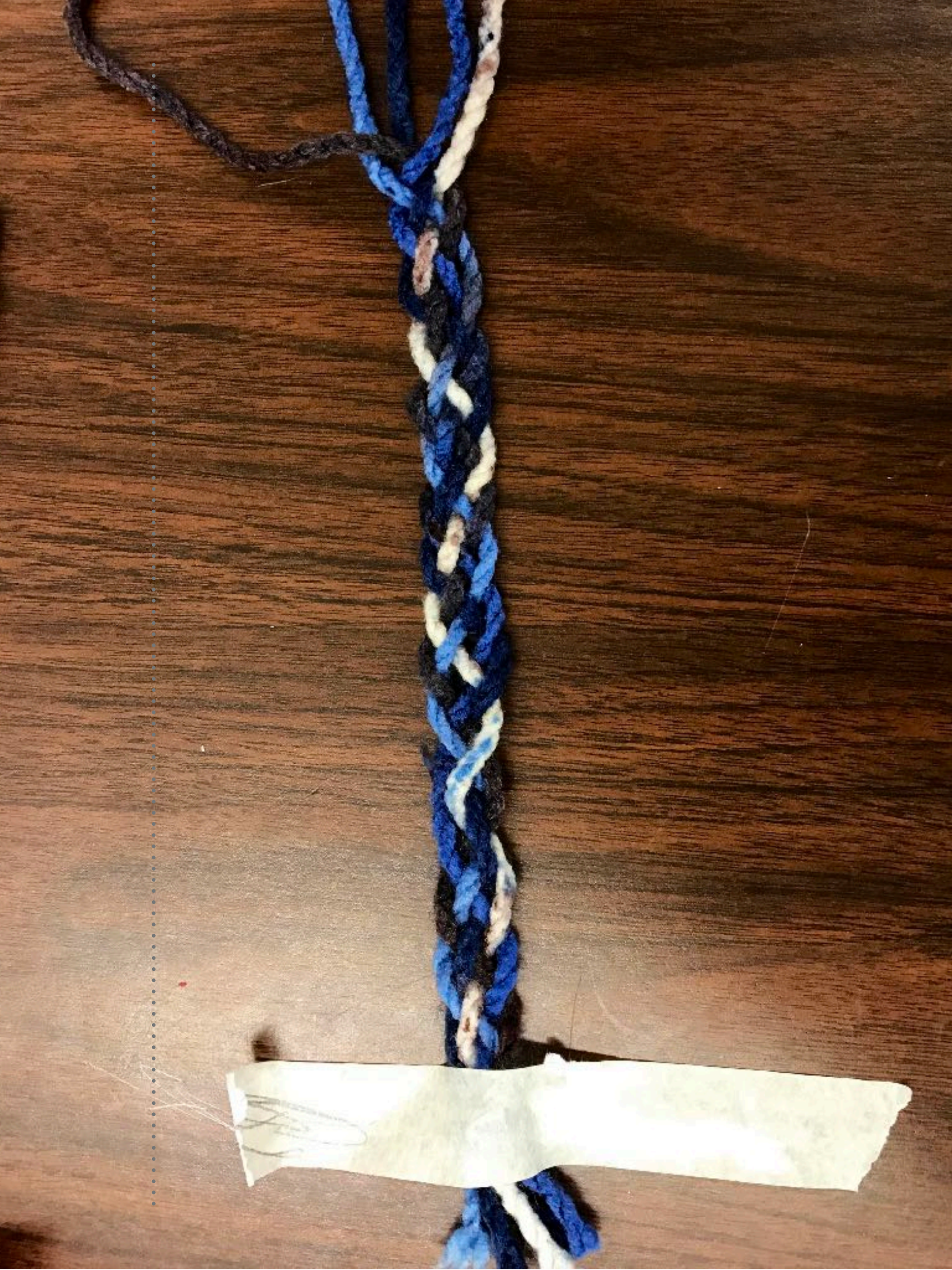
TEACHINGS FOR STUDENTS BEFORE THEY BEGIN



STUDENTS IN ACTION


SMART CHOICE
2017

MacKenzie
Name:



First Peoples Math Lessons

BENTWOOD BOX LESSON

- Measurement
- Volume
- Capacity
- Angles

- Big Idea: Properties of objects and shapes can be described measured and compared using volume, area, perimeter, and angles

BENTWOOD BOX LESSON

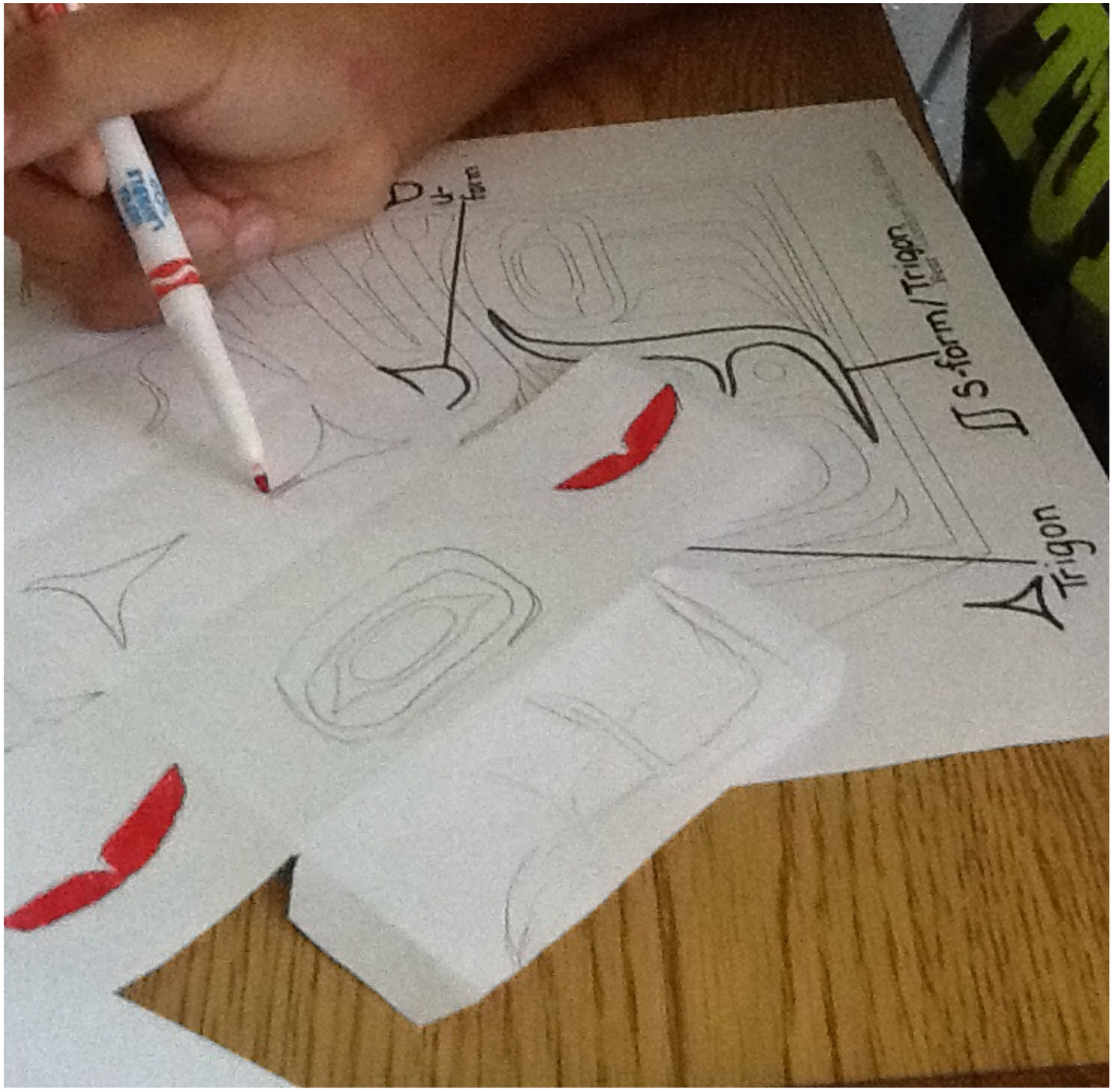
- Use cube or rectangular prism net for students to construct
- Glue or tape edges
- Have students measure the volume = LxWxH
- Convert to capacity
- Surface area = 2(wh+lw+lh)

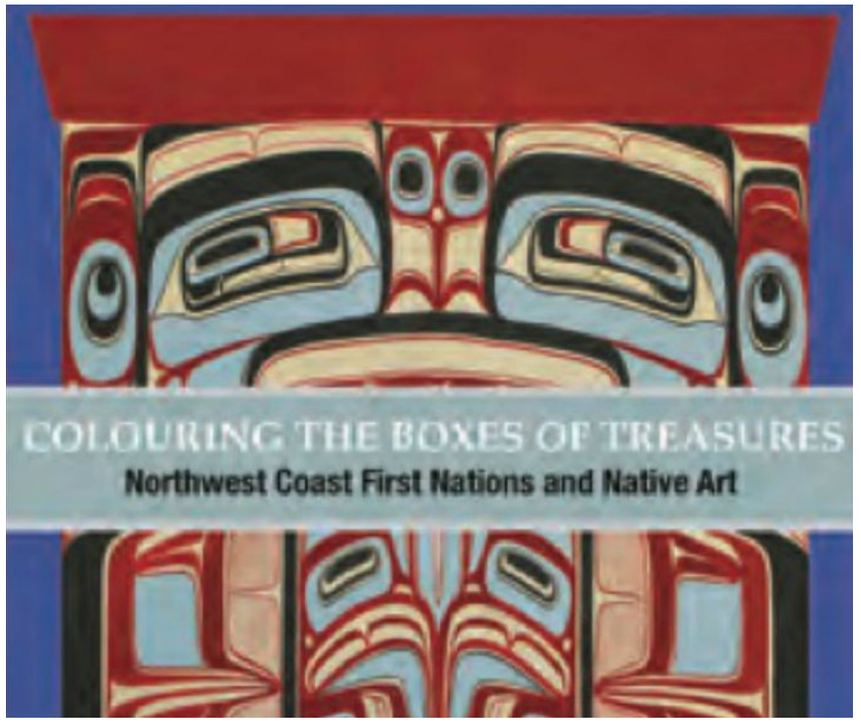
- Cross curricular: Add elements of Northwest Coast design to the lesson (Art, Social Studies)

BENTWOOD BOX LESSON

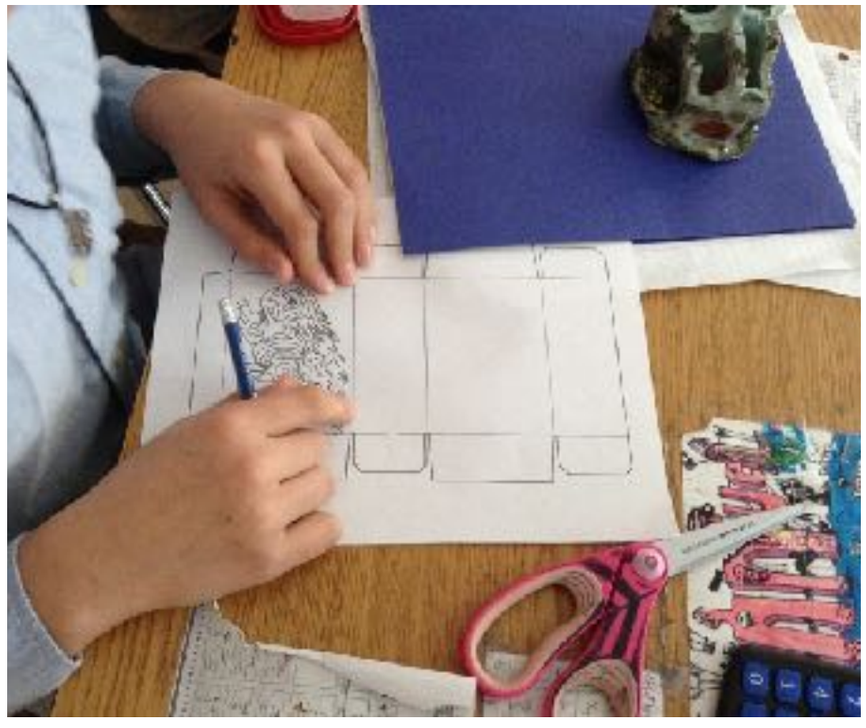
- Explore elements of NWC design
- Similarities/Differences between Coast Salish and Northwest Coast design elements
  - Ovoid
  - U-form
  - S-form
  - Circle
  - Crescent
  - Trigon

Glen Rabena - Oystercatcher

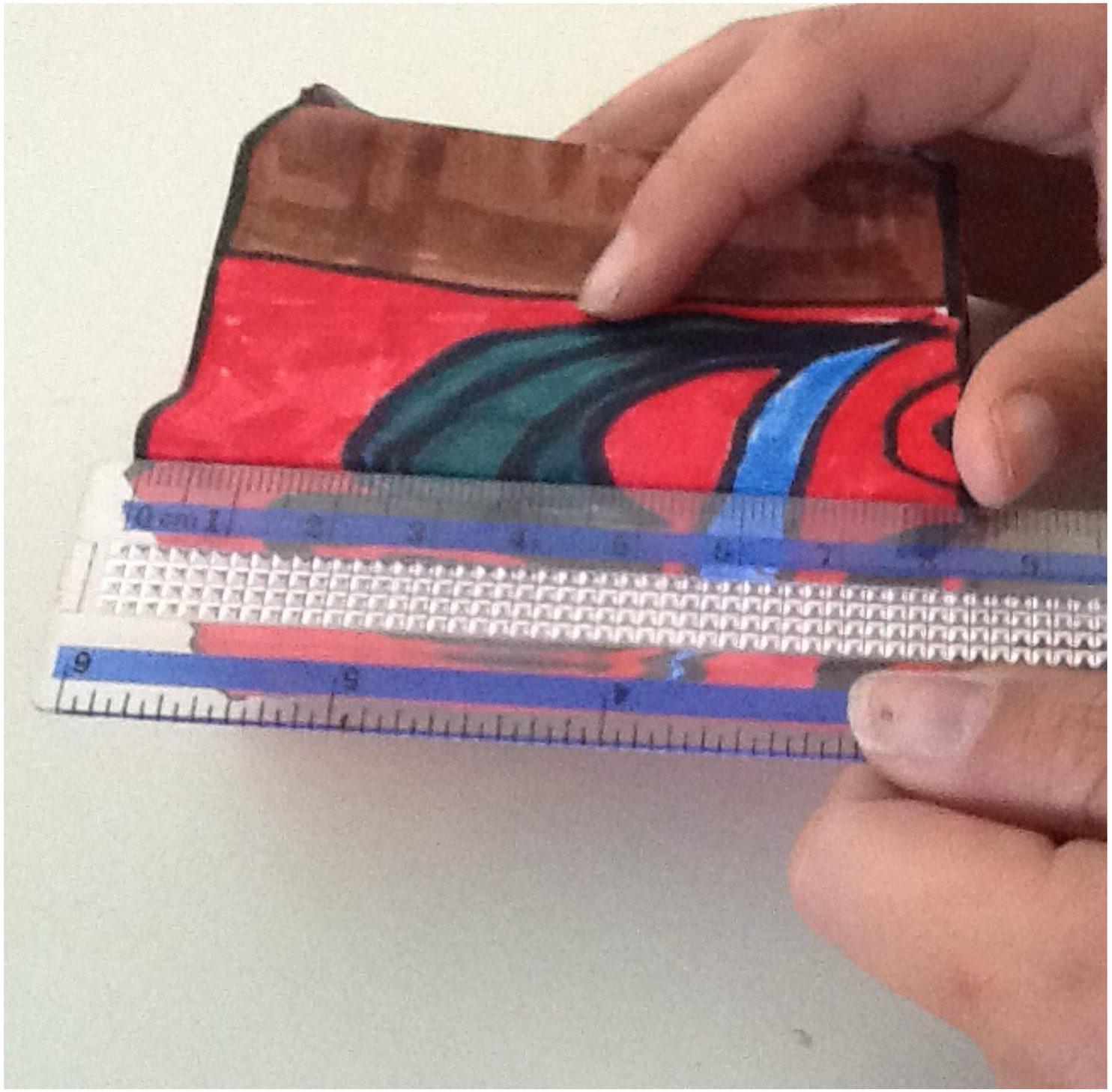


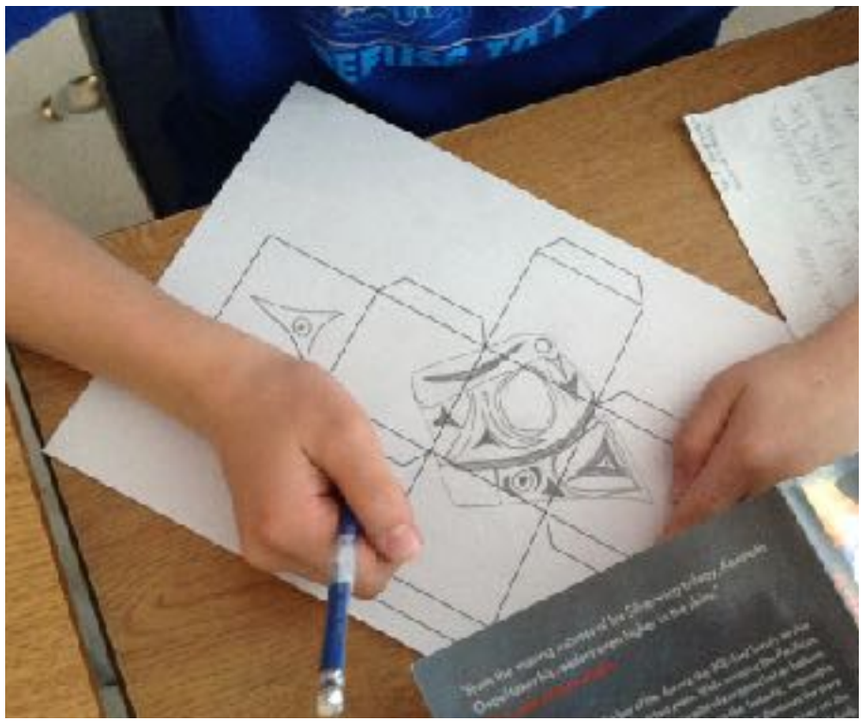


Identifying artistic elements and designing and building ‘bentwood boxes’



Exploring and inquiring about nets

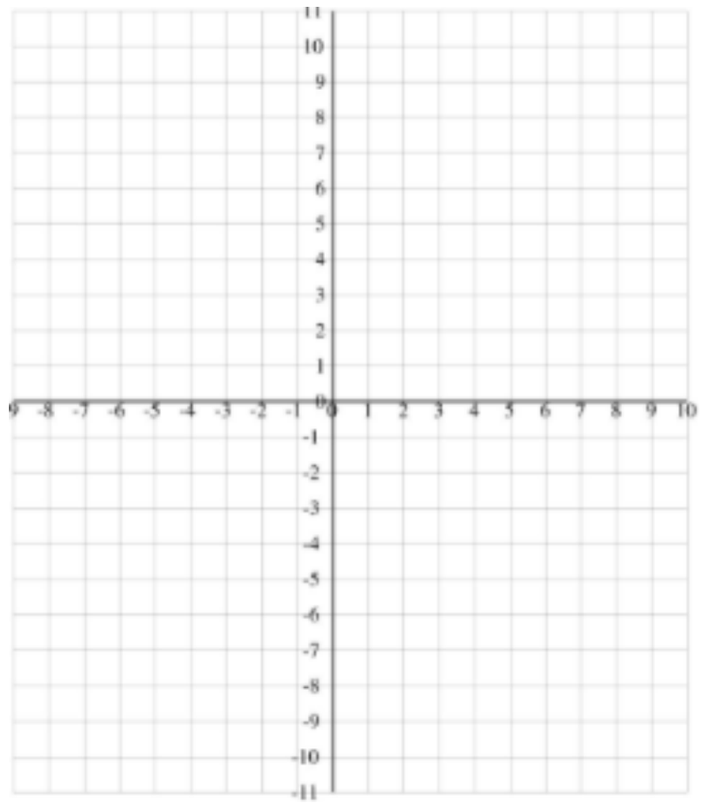




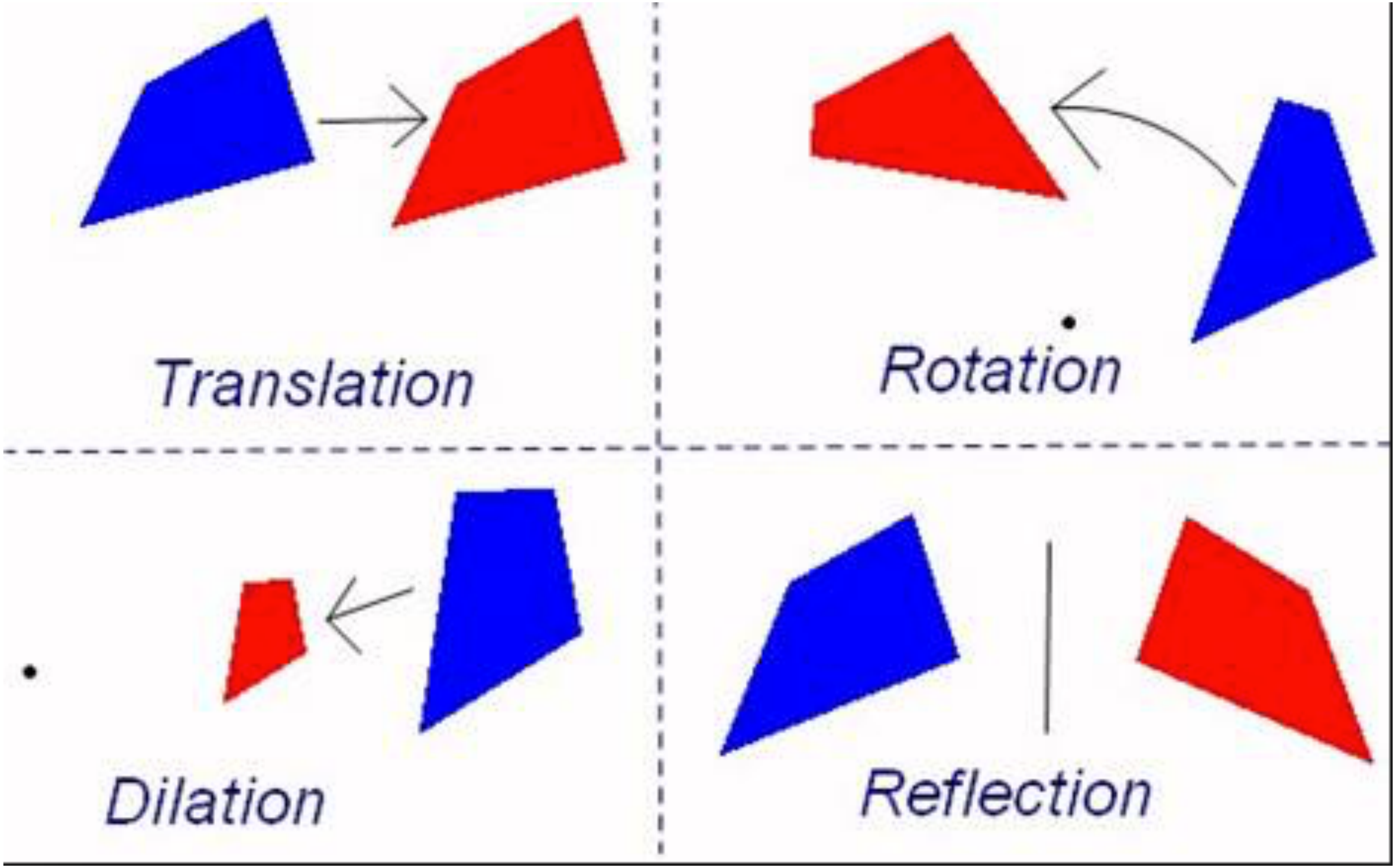
Spindle Whorl Lesson

SPINDLE WHORL LESSONS

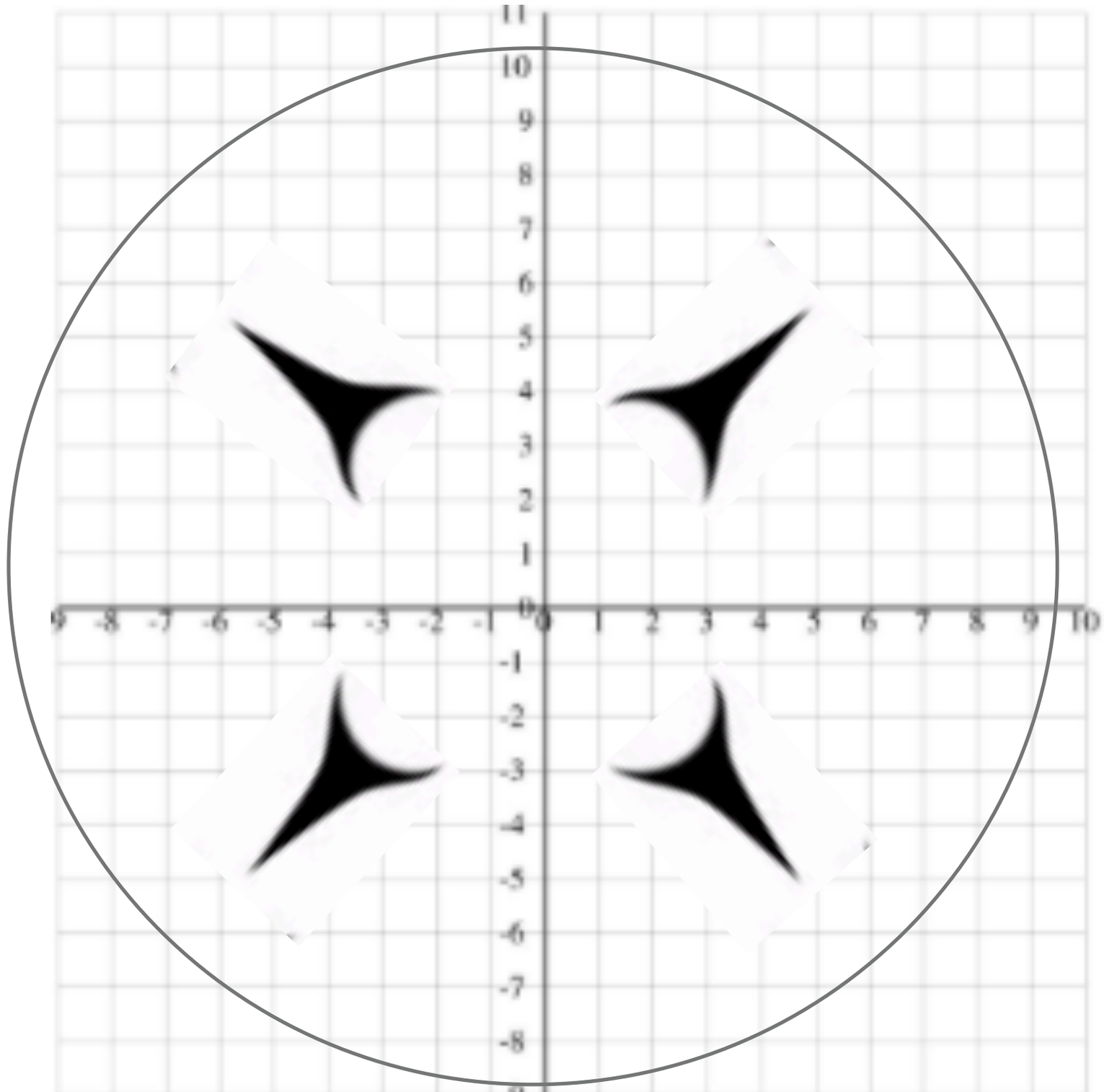
- Transformations
- Spacial Proportional Reasoning
- Cartesian Coordinates
- Circumference



TRANSFORMATIONS

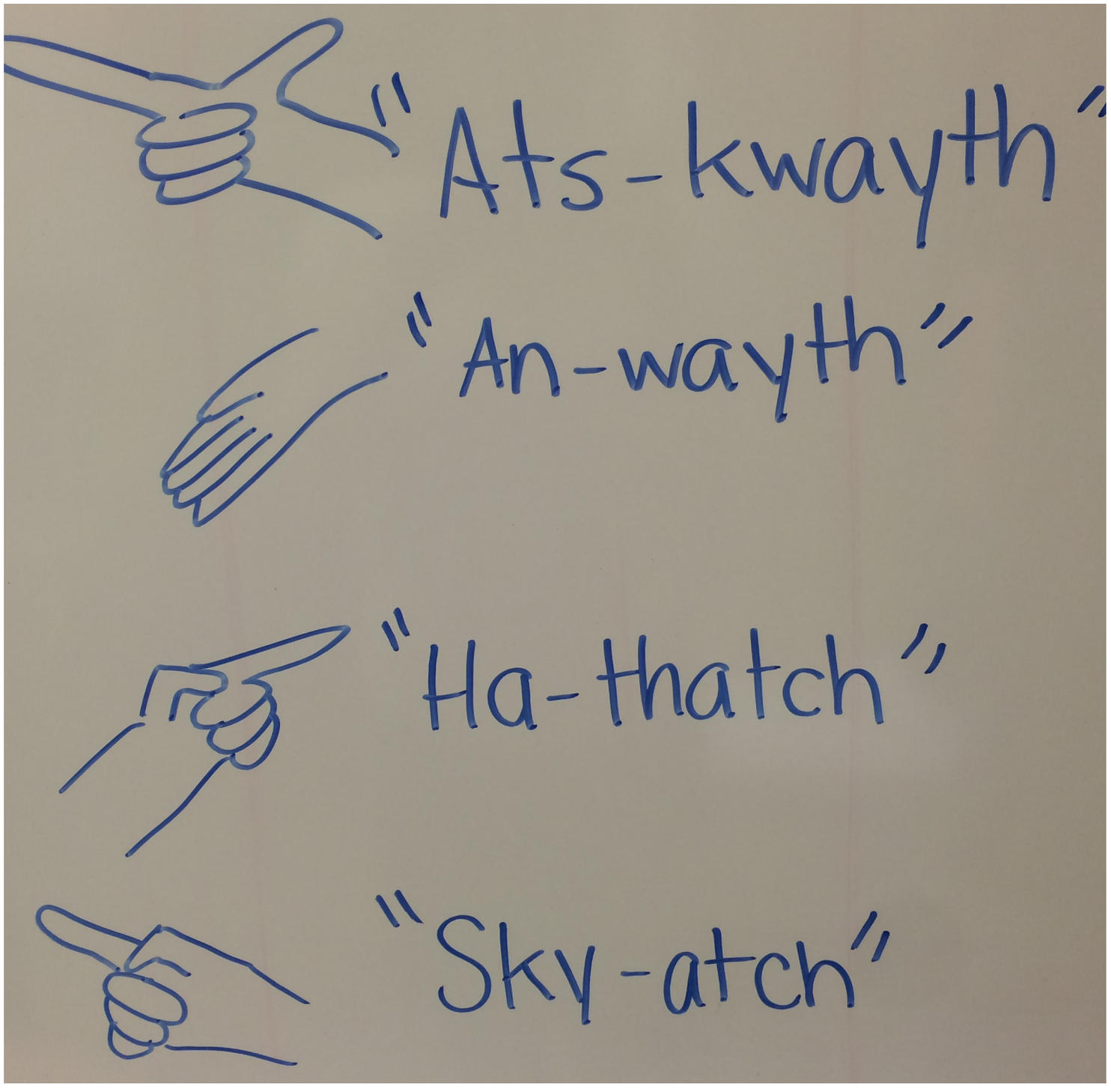


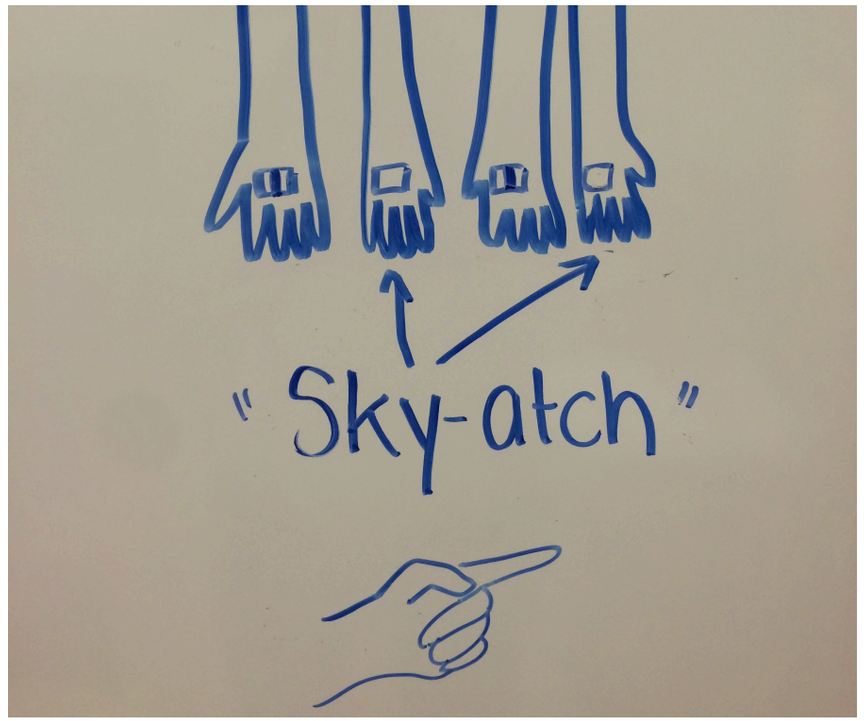
CREATE A SPINDLE WHORL

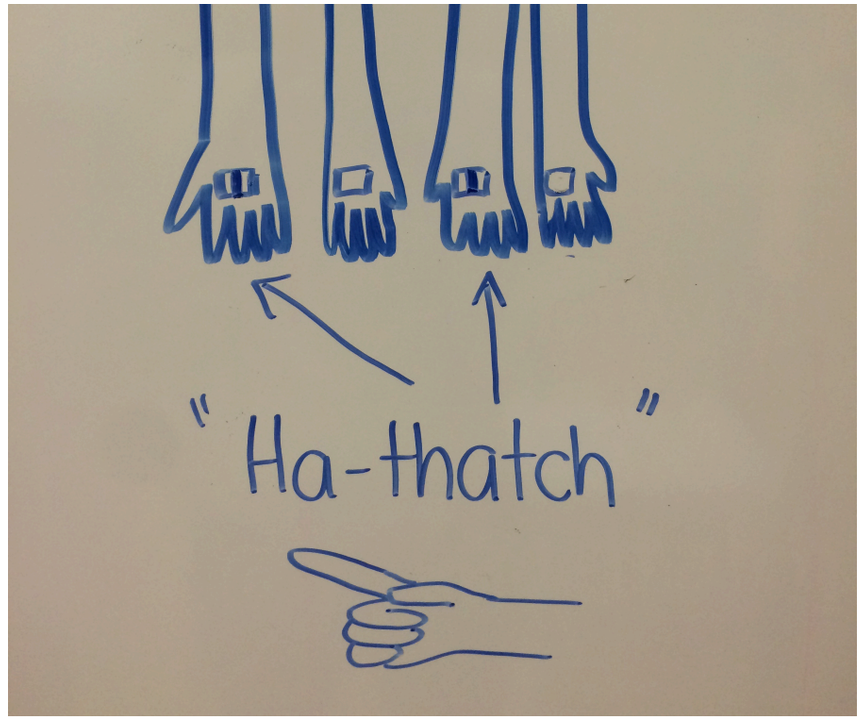


SLAHAL LESSON

- Probability
- Big Idea: Single outcome probability events. Both theoretical and experimental







SLAHAL CALLS IN SKWXWU7MESH SNICHIM (Squamish Language)

Different calls for each guess option
Example: Ats'kiwilh – Outside measurement

GO FORWARD WITH COURAGE

Niá:wen, Hai Hai, Maarsii, Emote, Huy Chexw, Thank you, Merci, Kiitos

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