

THE CATHOLIC
DISTRICT
SCHOOL BOARD
OF EASTERN
ONTARIO

*How do we create a
“Growth Mindset” in
our schools to improve
student confidence in
mathematics?*



*Witnesses
to Hope*

Remembering - Celebrating - Believing

CATHOLIC DISTRICT SCHOOL BOARD OF EASTERN ONTARIO

Fostering a Growth Mindset in the Mathematics Classroom

Who?

- Gr. 7, 8 & 9 Math classes and Mathematics teachers

Steps?

1. Pre- and Post- Student Survey
2. Mindset lesson focused on Numeracy
3. Mindset video clips
4. Problem solving strategies to assist with deconstructing math word problems – placemat, IDEAs, word walls
5. Student Interviews
6. Staff Education

Steps?

7. Inquiry-based learning & open ended questions with rubrics
8. Use of manipulatives
9. Promoting positive language in the class - **“I haven’t yet...”**
10. Mindset anchor charts
11. Catholic Professional Learning Community sessions
12. Carol Dweck & Jo Boaler – video clips and articles on “Mindset”
13. Student Profiles



Artefacts from our Inquiry

What is the question asking me to do?

DECONSTRUCTING WORD PROBLEMS IN MATH

Solve the Question!

Important Numbers & Math Vocabulary

Checklist

- Have I shown all of my steps in a logical, neat order?
- Have I included my rough work in an organized way?
- Does my answer make sense?
- Have I included a "Therefore Statement"?

Therefore Statement

..

St. Michael Catholic High School
Student Profile 2013-2014

Student Name: Alex Clarke Birth Date: Oct. 26, 1999
Grade: 9 Attendance Concerns
 I.E.P. I.P.R.C. Exceptionality: _____

Report Card Data

Secondary	Midterm Mark	Final Mark
MFIM JP	57	
ENGL JP		

Elementary I English	Report 1	Report 2
English - Reading	70	72
English - Writing	70	69

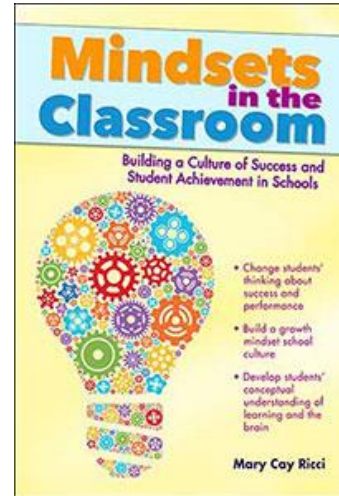
Elementary - Mathematics	Report 1	Report 2
Number Sense & Numeration	86	55
Measurement	70	55
Geometry & Spatial Sense	50	55
Patterning & Algebra	55	72
Data Management & Probability	62	72

EQAO Assessment Data

EQAO Assessment	2010-2011	2007-2008
Reading	3.3	3.7
Writing	3.1	3.7
Mathematics	2.9	3.1

Student Notes

- Lives in a foster home
- Strengths include art, memory skills, verbal comprehension
- Areas of need include organization, number sense
- Benefits from Assistive Technology



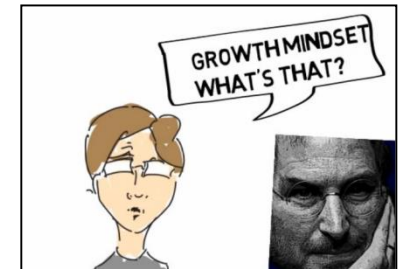
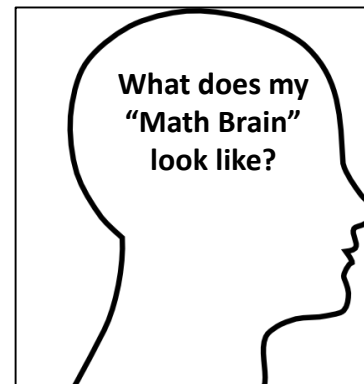
FIXED MINDSET	SKILLS	GROWTH MINDSET
<ul style="list-style-type: none"> • SOMETHING YOU'RE BORN WITH • FIXED 		<ul style="list-style-type: none"> • COME FROM HARD WORK. • CAN ALWAYS IMPROVE
<ul style="list-style-type: none"> • SOMETHING TO AVOID • COULD REVEAL LACK OF SKILL • TEND TO GIVE UP EASILY 	CHALLENGES	<ul style="list-style-type: none"> • SHOULD BE EMBRACED • AN OPPORTUNITY TO GROW. • MORE PERSISTANT
<ul style="list-style-type: none"> • UNNECESSARY • SOMETHING YOU DO WHEN YOU ARE NOT GOOD ENOUGH 	EFFORT	<ul style="list-style-type: none"> • ESSENTIAL • A PATH TO MASTERY
<ul style="list-style-type: none"> • GET DEFENSIVE • TAKE IT PERSONAL 	FEEDBACK	<ul style="list-style-type: none"> • USEFUL • SOMETHING TO LEARN FROM • IDENTIFY AREAS TO IMPROVE
<ul style="list-style-type: none"> • BLAME OTHERS • GET DISCOURAGED 	SETBACKS	<ul style="list-style-type: none"> • USE AS A WAKE-UP CALL TO WORK HARDER NEXT TIME.



St. Michael Catholic High School
Mathematics Survey

Please read the following questions regarding solving word problems in mathematics. Check the column that applies to you. If you do not understand the question, please ask the teacher for clarification.

Survey Questions	Agree	Neutral	Disagree
1. I feel confident solving mathematical word problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I like solving math word problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I can usually figure out what the word problem is asking me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I often estimate an answer before solving a math word problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I am able to find the important information in a word problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I am usually able to recognize what operation to use from the words in the math problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I find decoding the language in math word problems the most challenging part.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I find it helpful to draw a picture when solving a math word problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I find it easier to solve a word problem when there is a diagram provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I usually go back and check my answers to word problems to see if they make sense.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



St. Michael Catholic High School
Problem Solving Rubric

Success Criteria	Level 1	Level 2	Level 3	Level 4
Demonstrates an understanding of what the problem is asking	Student demonstrates a limited understanding of the problem	Student demonstrates some understanding of the problem	Student demonstrates a considerable understanding of the problem	Student demonstrates a thorough understanding of the problem
Identifies important math elements of the problem	Student identifies a limited amount of important math language and numbers	Student identifies some of the important math language and numbers	Student identifies most of the important math language and numbers	Student identifies all important math language and numbers
Evidence of a solution process that is organized and clear	Student's solution shows minimal evidence of a solution process	Student includes a solution process that is incomplete	Student includes a solution process that is mostly complete	Student includes a complete solution process
Reflects on solution/accuracy of calculations (use of check list) and communicates conclusions ("Therefore" statement)	Student's solution is difficult to read and follows and lacks organization	Student's solution shows some evidence of organization	Student's solution shows evidence of clear organization	Student's solution is detailed and is highly organized
	Student's solution is limited in its accuracy or appropriateness	Student's solution is somewhat accurate or appropriate	Student's solution is generally accurate or appropriate	Student's solution is accurate or mostly appropriate
	Solution shows no/minimal reflection on whether the final answer makes sense and no conclusion presented	Solution shows some reflection on whether the final answer makes sense and simple conclusions are made	Solution shows evidence of reflection on whether the final answer makes sense and appropriate conclusions are made	Solution shows evidence of a thorough reflection on whether the final answer makes sense and insightful conclusion made



What Did We Discover?

- **The Collaborative Process**

- Takes time and perseverance
- It is an effective way to promote change
- It works!

- **AHA Moment from Our Inquiry Question**

- Most students believe they are either born “good” or “not good” at mathematics
- Students’ mathematical mindset can be influenced in a positive manner

- **The Use of Data or Evidence**

- Qualitative data may be more difficult to analyze and categorize but it is very rich in identifying student voice
- It can be challenging when designing an effective survey without bias language in it

