

Supporting High School Math at Home

HOW DO YOU DEAL WITH THIS QUESTION?

If $3x - y = 12$, what is the value of $\frac{8^x}{2^y}$?

- A) 2^{12}
- B) 4^4
- C) 8^2
- D) The value cannot be determined from the information given.

Facilitated by Benjamin Law
benjamin.law@yrdsb.ca



Mathematical literacy involves more than executing procedures. It implies a knowledge base and the competence and confidence to apply this knowledge in the practical world. A mathematically literate person can estimate; interpret data; solve day-to-day problems; reason in numerical, graphical, and geometric situations; and communicate using mathematics.

- [Leading Math Success: The Report of the Expert Panel on Student Success in Ontario, 2004.](#)

The Ontario Mathematics Curriculum is based on the belief that "all students can learn mathematics and deserve the opportunity to do so"

([Ontario Curriculum Grades 1 to 8, Mathematics, p.3](#)).

Make the row of six cubes activity

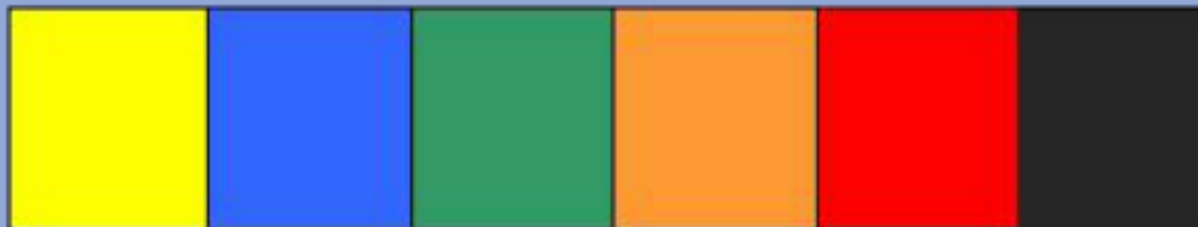
- Open the envelope
- Solve the problem: Make the row of six cubes into the right order
- **2 Versions:** Easy level and Challenging level



Easy or Challenging level?

- The green cube is between the orange cube and the yellow cube
- The blue cube is between the green cube and the yellow cube
- The red cube is between the black cube and the green cube
- The yellow and the black cubes are not between any cubes
- The orange cube is between the green cube and the red cube

Answer (for both easy and "challenging" level)



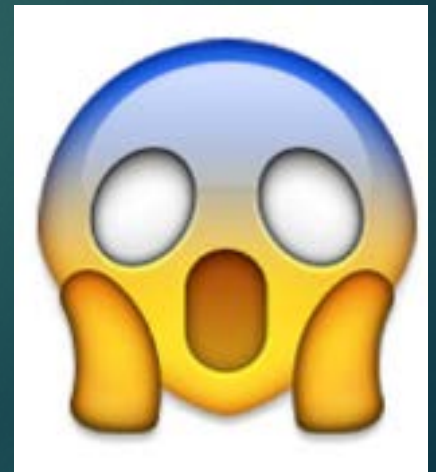
or



Reflections

- ▶ How do you feel* when they you are facing "challenges"?
- ▶ How does your child feel* when (s)he is facing "challenges" in the classroom?

* by being told by teachers/peers?
by their own perception?
by previous experience?



Growth vs Fixed Mindset

Your intelligence is something very basic about you that you can't change very much.

Strongly Agree

0

Agree

0

Disagree

0

Strongly Disagree

0

Please participate in this online interaction
if you have an internet connected device

4) You can always change basic things about the kind of person you are



0 votes - 0 participants

Direct
Poll

Traits of fixed(closed) mindset: when students are facing mathematical challenges

- Belief that intelligence and abilities cannot be developed
- Avoid challenges; problem-solving evasion;
- Lack of perseverance;
- Believe there is only one fixed way to solve problems;



Traits of growth mindset: when students are facing mathematical challenges

- Embrace challenges;
- Persistence;
- Embrace constructive criticism;
- Find inspiration in the success of others;
- Take failure as an opportunity of growth;
- Believe there are multiple ways to solve problems;



Self Reflections:

Traits of growth mindset: when students are facing mathematical challenges

- Embrace challenges;
- Persistence;
- Embrace constructive criticism;
- Find inspiration in the success of others;
- Take failure as an opportunity of growth;
- Believe there are multiple ways to solve problems;



What type of mindset do YOU have?

What type of mindset does YOUR CHILD have?

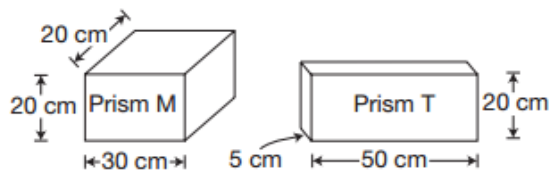
Traits of fixed(closed) mindset: when students are facing mathematical challenges

- Belief that intelligence and abilities cannot be developed
- Avoid challenges; problem-solving evasion;
- Lack of perseverance;
- Believe there is only one fixed way to solve problems;



Differences and similarities

Two rectangular prisms are shown below.



How much larger is the volume of Prism M than that of Prism T?

- ☐ 5000 cm^3
- ☐ 7000 cm^3
- ☐ 12 000 cm^3
- ☐ 17 000 cm^3

UNBELIEVABLE PESACH BROWNIES

YIELD: 18 BROWNIES

INGREDIENTS:

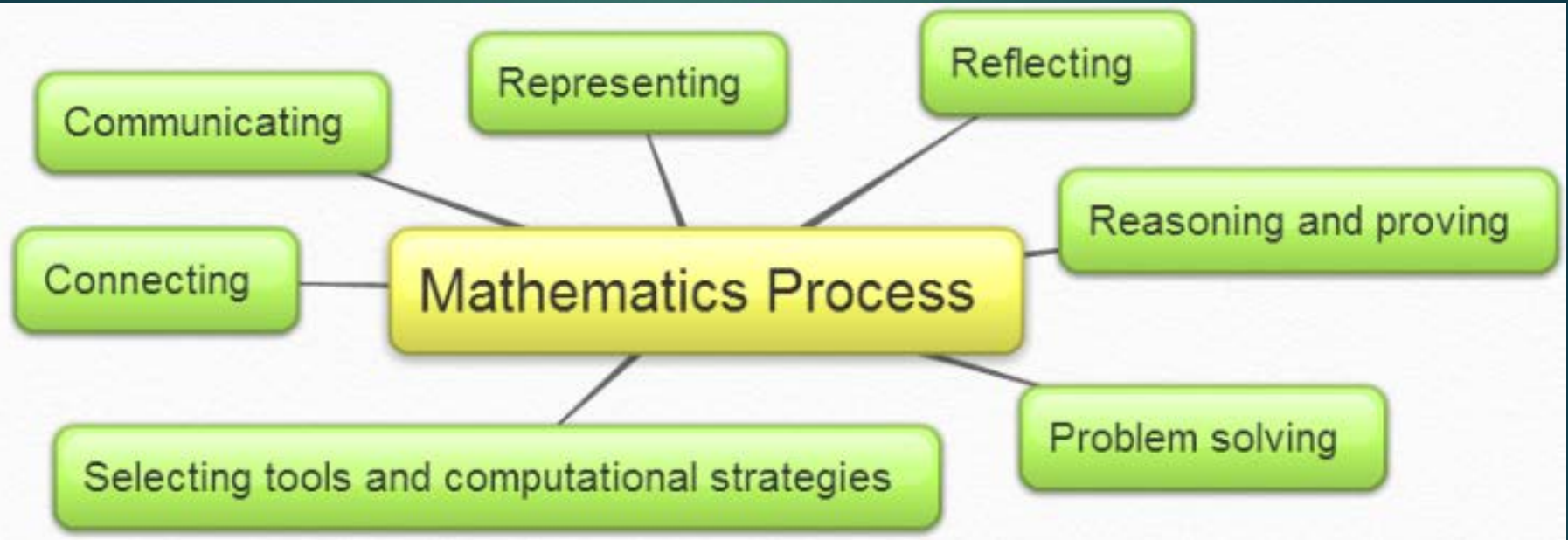
- nonstick cooking spray
- 4 large eggs
- 2 cups sugar
- 1 cup vegetable oil
- $\frac{1}{2}$ teaspoon fine sea salt
- $\frac{3}{4}$ cup Dutch process cocoa powder
- 1 cup potato starch
- $\frac{1}{2}$ cup semi-sweet chocolate chips (optional)

DIRECTIONS:

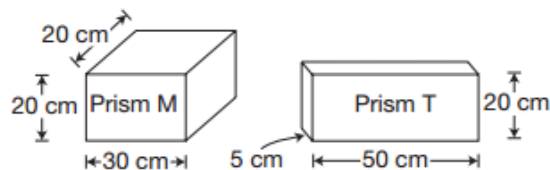
1. Preheat oven to 350°F.
2. Spray an 11- by 7-inch brownie pan with nonstick cooking spray. Set aside.
3. In the bowl of an electric mixer, beat the eggs and sugar until smooth. Add the oil and salt. Mix. Sprinkle in the cocoa powder and mix to make the batter chocolatey. Add the potato starch and mix to combine. Scrape down the sides with a spatula. Stir in the chocolate chips if using.
4. Pour into prepared pan. Bake for 35-40 minutes. Allow to cool before serving.



7 Mathematical Process



Two rectangular prisms are shown below.



How much larger is the volume of Prism M than that of Prism T?

- ☐ 5000 cm^3
- ☐ 7000 cm^3
- ☐ 12 000 cm^3
- ☐ 17 000 cm^3

UNBELIEVABLE PESACH BROWNIES

YIELD: 18 BROWNIES

INGREDIENTS:

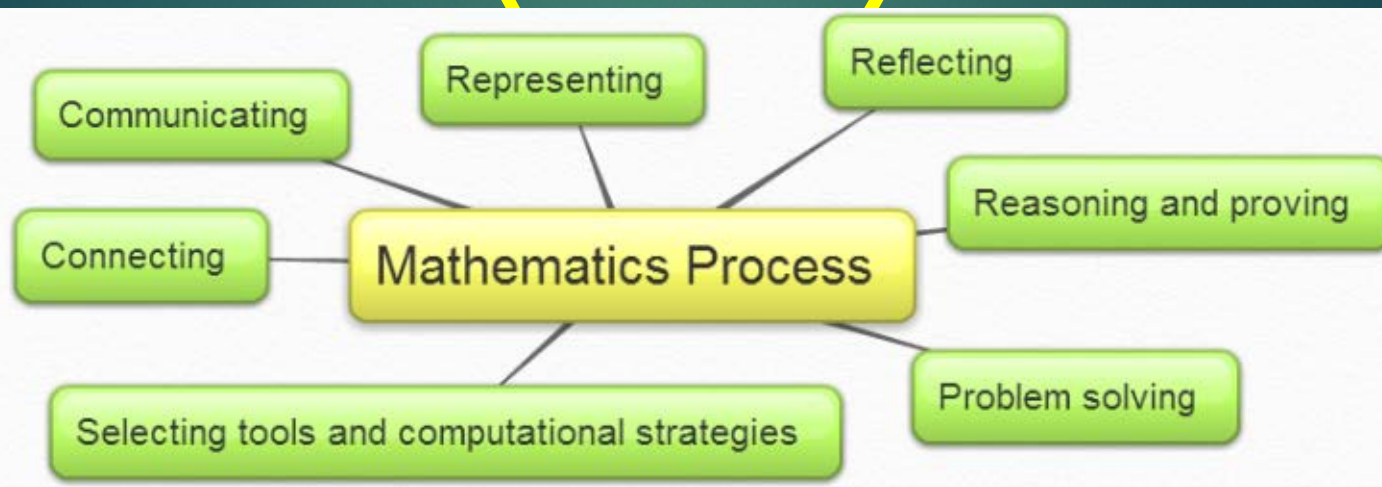
- nonstick cooking spray
- 4 large eggs
- 2 cups sugar
- 1 cup vegetable oil
- $\frac{1}{2}$ teaspoon fine sea salt
- $\frac{3}{4}$ cup Dutch process cocoa powder
- 1 cup potato starch
- $\frac{1}{2}$ cup semi-sweet chocolate chips (optional)

DIRECTIONS:

- 1 Preheat oven to 350°F.
- 2 Spray an 11- by 7-inch brownie pan with nonstick cooking spray. Set aside.
- 3 In the bowl of an electric mixer, beat the eggs and sugar until smooth. Add the oil and salt. Mix. Sprinkle in the cocoa powder and mix to make the batter chocolate. Add the potato starch and mix to combine. Scrape down the sides with a spatula. Stir in the chocolate chips if using.
- 4 Pour into prepared pan. Bake for 35-40 minutes. Allow to cool before serving.



Scroll Math Inc. All rights reserved.



Is this math?



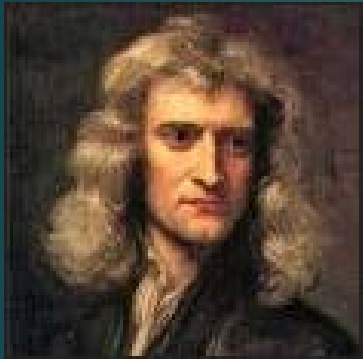
A

B

C

D

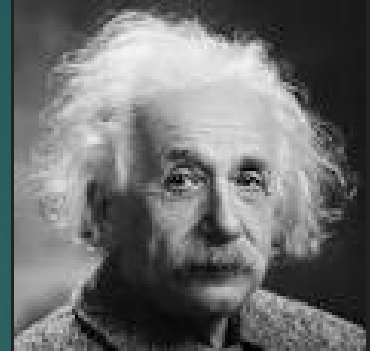
Great mathematicians in the past...



Isaac Newton
1643–1727



Sofia
Kovalevskaya
1850–1891



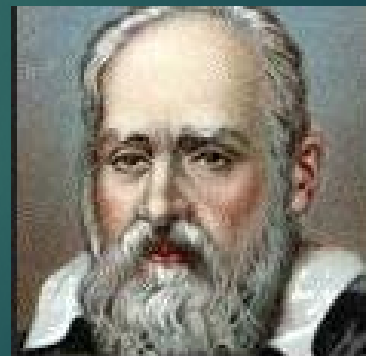
Albert Einstein
1879–1955



Marjorie Lee
Browne
1914–1979



Alan Turing
1912–1954



Galileo Galilei
1564–1642



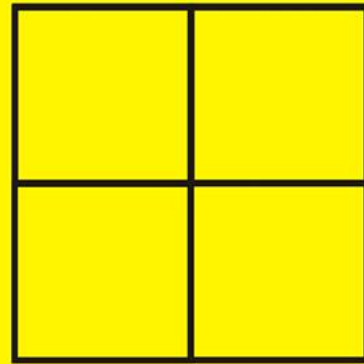
NOW IT'S
YOUR TURN.



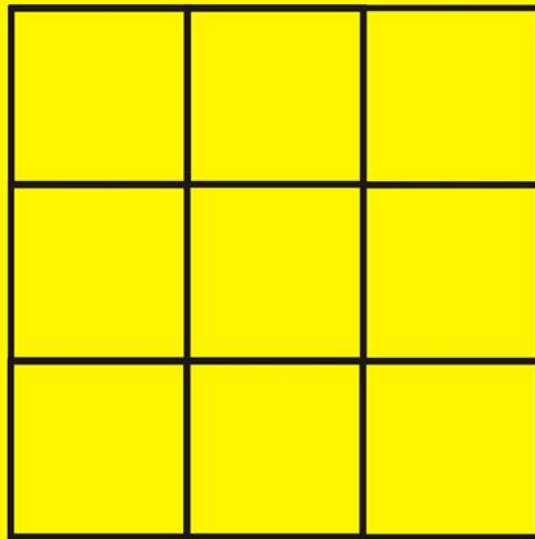
- ▶ What kinds of challenges are parents facing when discussing/teaching/supporting mathematics at home?
- ▶ What can we do about the challenges?

You don't
order to
can you

- Know
weal
colle
- Deve
and



= 5



= ?

v

hs and
are

gies
uriosity

You don't
order
can you

$$\text{Apple} = 7$$

$$\text{Grapes} = 5 + \text{Apple}$$

$$\text{Apple} = 1 + \text{Banana}$$

$$\text{Apple} + \text{Grapes} + \text{Banana} = ?$$

You
order
can



own
aches

I'm still confused as to why I need to put
my cake in the oven at 120°

You do
order to
can you

- ▶ Gro
eve
- ▶ Gro
cap
step

T.C. Hale

Math Test

1. Bob has 36 candy bars. He eats 29.
What does he have now?

Diabetes.

Bob has diabetes.

2. Two trains left Kalamazoo, one heading
and the other heading south. The
and the second

f
hool.

irst

You don't have to be a mathematician in order to help your child in numeracy. How can you help?

- ▶ **Growth Mindset**: Your child should be thinking and acting like mathematicians (That means being able to solve problems)
- ▶ **Growth Mindset**: They need to feel that their ideas are valued. **Praise their effort**
- ▶ But if you always praise your children that they are smart? → that could foster a **fixed mindset** instead
- ▶ → Some children later experience struggle, they tend to conclude that their ability is not high after all, and as a result they lose confidence

You don't have to be a mathematician in order to help your child in numeracy. How can you help?

- ▶ Sometimes working hard won't improve learning
 - ▶ Praise the effort, as well as encourage exploring ways/strategies to improve
 - ▶ Students need to make use of the feedback that they receive and need to reflect upon how to learn something that they are having trouble with.
- ▶ Growth Mindset: Opportunities to talk and challenge each others' thinking
- ▶ Growth Mindset: Feel safe enough to make mistakes
(Take advantage of the formative assessments at school)

➔ Where **deep learning** happens (Moving their learning to a deeper level)

Besides fostering a growth mindset.....

- ▶ Encourage positive communication with the math teacher who should be the primary resource for extra help in math.
- ▶ Tutoring or not?

We are not afraid of making mistakes



Inspiring Video- If you've never failed, you've never tried anything new

- ▶ <https://goo.gl/1Sup6k>(3 mins)



Basic numeracy skills contribute to a learner's ability to cope independently with everyday life in Canada. "These skills are as important in every life as being able to read and write"

(Centre for Canadian Language Benchmark, 2000, p. iv)

What can you say to your child when.....

What Can I Say To Myself?

Instead of:	Try thinking:
I'm not that good at this.	What am I missing?
I'm awesome at this.	I'm on the right track.
I give up.	I'll use some of the strategies we've learned.
This is too hard.	This may take some time and effort.
I can't make this any better.	I can always improve, so I'll keep on trying.
I just can't do maths.	I'm going to train my brain in maths.
I made a mistake.	Mistakes help me learn better.
She's so smart. I'll never be that smart.	I'm going to figure out how she does it so I can try it.
Plan A didn't work.	Good thing the alphabet has 25 more letters.
It's good enough.	Is it really my best work?

HOW TO ENCOURAGE STUDENTS

Growth Mindset

What to say:

"When you learn how to do a new kind of problem, it grows your math brain!"

"If you catch yourself saying, 'I'm not a math person,' just add the word 'yet' to the end of the sentence."

"That feeling of math being hard is the feeling of your brain growing."

"The point isn't to get it all right away. The point is to grow your understanding step by step. What can you try next?"



Fixed Mindset

What not to say:

"Not everybody is good at math. Just do your best."

"That's OK, maybe math is not one of your strengths."

"Don't worry, you'll get it if you keep trying."*

*If students are using the wrong strategies, their efforts might not work. Plus they may feel particularly inept if their efforts are fruitless.

"Great effort! You tried your best."*

*Don't accept less than optimal performance from your students.



SOURCE: Carol Dweck

Important milestones of high school mathematics

- ▶ Different streaming options (L/D/P/U/E/M/C)
- ▶ OSSD requirement: **3 credits in mathematics** (Gr.9, Gr.10, +1 credit in Grade 11 or 12)
- ▶ Grade 9 – EQAO (Mathematics)
- ▶ Usually take place in early June. (Will take place in June 1 to June 16 this year)
- ▶ This EQAO tests the math skills students are expected to have learned by the end of Grade 9

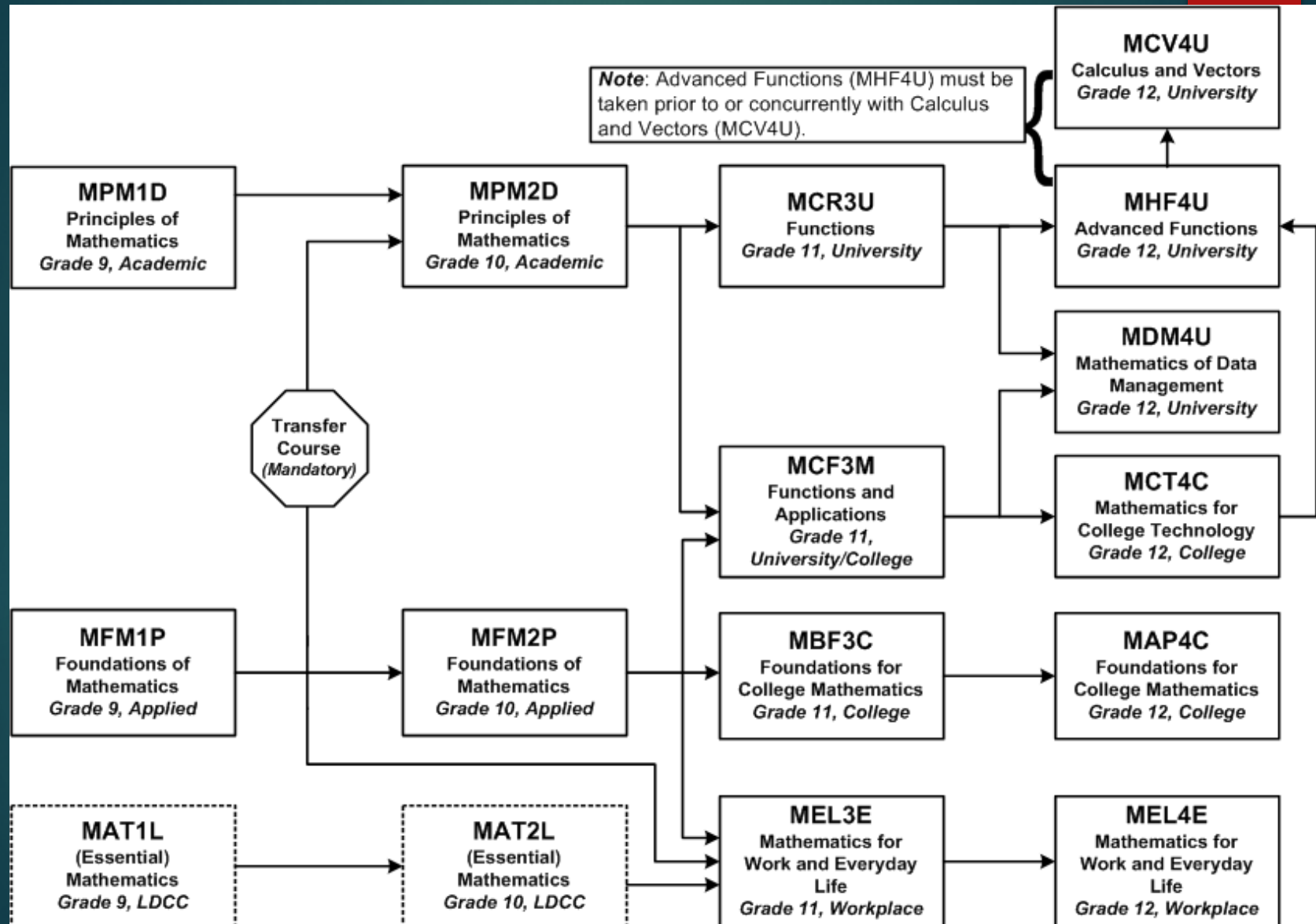
Courses in Mathematics, Grades 9 and 10*

Grade	Course Name	Course Type	Course Code	Credit Value	Prerequisite**
9	Principles of Mathematics	Academic	MPM1D	1	
9	Foundations of Mathematics	Applied	MFM1P	1	
10	Principles of Mathematics	Academic	MPM2D	1	Grade 9 Mathematics, Academic
10	Foundations of Mathematics	Applied	MFM2P	1	Grade 9 Mathematics, Academic or Applied

Courses in Mathematics, Grades 11 and 12

Grade	Course Name	Course Type	Course Code	Prerequisite
11	Functions	University	MCR3U	Grade 10 Principles of Mathematics, Academic
11	Functions and Applications	University/ College	MCF3M	Grade 10 Principles of Mathematics, Academic, or Grade 10 Foundations of Mathematics, Applied
11	Foundations for College Mathematics	College	MBF3C	Grade 10 Foundations of Mathematics, Applied Mathematics
11	Mathematics for Work and Everyday Life	Workplace	MEL3E	Grade 9 Principles of Mathematics, Academic, or Grade 9 Foundations of Mathematics, Applied, or a Grade 10 Mathematics LDCC (locally developed compulsory credit) course
12	Advanced Functions	University	MHF4U	Grade 11 Functions, University
12	Calculus and Vectors	University	MCV4U	Grade 12 Advanced Functions, University, must be taken prior to or concurrently with Calculus and Vectors.
12	Mathematics of Data Management	University	MDM4U	Grade 11 Functions, University, or Grade 11 Functions and Applications, University/College
12	Mathematics for College Technology	College	MCT4C	Grade 11 Functions and Applications, University/College, or Grade 11 Functions, University
12	Foundations for College Mathematics	College	MAP4C	Grade 11 Foundations for College Mathematics, College, or Grade 11 Functions and Applications, University/College
12	Mathematics for Work and Everyday Life	Workplace	MEL4E	Grade 11 Mathematics for Work and Everyday Life, Workplace

Importance of picking the right course



Gr. 9 EQAO (Mathematics)

- ▶ Unlike Gr. 10 EQAO (Literacy Test), Gr. 9 EQAO is NOT a graduation requirement.
- ▶ However it is still important to take this test seriously → Achievement check point before going to Gr. 10.

EQAO information

(<http://goo.gl/yYOiNF>)

- ▶ What is tested on the assessment?
- ▶ Are all students required to participate?
- ▶ How is the assessment scored?
- ▶ How are students with special education needs supported?
- ▶ When is the assessment administered?
- ▶ How should my child prepare for the assessment?
- ▶ Are the results valid and reliable?

Sample EQAO questions?

► <http://goo.gl/GQ9ful>

Student Assessment Booklets and Scoring Guides

Grade 9 Assessment and Scoring Materials, 2014-2015

EQAO releases examples of actual questions from its previous assessment booklets to help students, parents and educators get familiar with the format of the assessment and the type of questions asked. We provide scoring guides and sample student responses to show how the assessments are scored and what student responses at each score code look like. The last five years of released assessment materials are available.

EQAO releases approximately half of its test questions (called "items") each year. This process allows EQAO to build up a bank of items that can be used in future years.

More Resources

Tip Sheet for Students:
New Booklet Layout

Video: New Test
Booklets to Support
Online Scoring

Examples From Other Years

2014-2015

2013-2014

2012-2013

2011-2012

2010-2011

NOW IT'S
YOUR TURN.



- How do you help your child pick the right math course?
- How do you help your child prepare for the EQAO in Math?

To help your child with math....

- ▶ Believing your child can learn and improve in math
- ▶ Providing a safe and comfortable learning environment for your child to take challenges
- ▶ Making mistake is fine. It is a learning opportunity
- ▶ Connecting with classroom teacher for advice and strategies to specific math topics
- ▶ Demonstrating growth mindset as a parent
- ▶ Understanding the mathematical process. Math is NOT just about numbers.
- ▶ Guiding your child to take appropriate courses

More resources from YRDSB



Achieving Excellence in Mathematics

In order for students to achieve excellence in an area like mathematics, there must be a balance between understanding basic math concepts, practicing skills like multiplication tables, and developing the thinking skills needed for advanced problem solving. These foundational skills remain a focus – and combined with creativity and critical thinking, innovative problem solving, effective communication and collaboration, they lead to excellence.

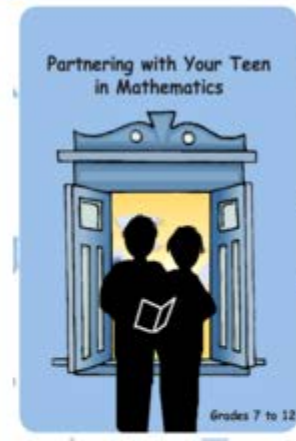
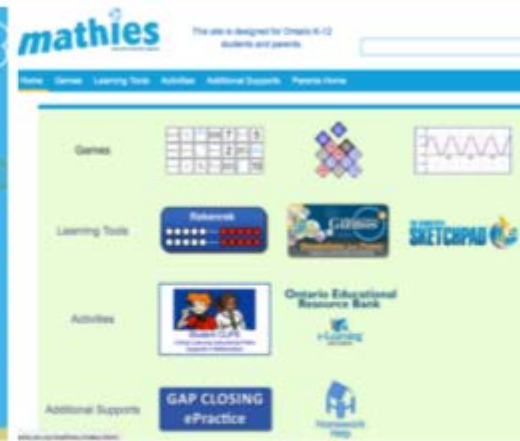
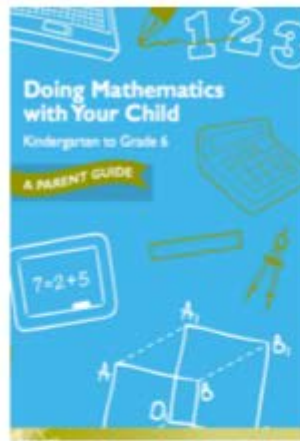
Achieving Excellence: A Renewed Vision for Education in Ontario, April 2014



Before your child can learn mathematics, he or she needs to believe in his or her ability to do so. That's where you come in. You can be your child's first role model for learning. When you engage with your child in a supportive, relaxed atmosphere, your child will enjoy taking risks while having fun with math!

Doing Mathematics with Your Child: A Parent Guide

More resources:



<http://goo.gl/XVLTcX>



URL to this presentation:

<https://goo.gl/98WqDk>

Please provide feedback to my presentation

<https://goo.gl/U04AVS>