Elementary Educator Courses

Dr. Pamela Brittain, Fields Institute for Research in Mathematical Sciences

Math Content Knowledge of Elementary Teachers

- My PhD research showed a significant gap in elementary teacher candidates' mathematics content knowledge
- Research has shown this impacts students
- Very few Universities in Ontario offer programs to address this issue
- Current teachers also face gaps in knowledge
  - Dependance on textbooks
  - Difficulties implementing differentiated instruction and/or authentic assessment
  - Less opportunities for cross-curricular integrations
- Leads to reliance on textbooks and 'limited' answers and

Fields Elementary Educator Programs

- My work at Fields has allowed me to create courses that teach skills to elementary teachers
- Currently the following courses are open for registration
  - Operations (+, -, *, /) with Whole Numbers, Fractions, Decimals, and Negative Numbers
  - Financial Literacy
  - Mathematical Modelling
- We are also working on the following courses:
  - Logic and Computing (launching August 2023)
  - Proofs
  - Operations Part 2
- Along with a number of mini courses on topics like Infinity, Game Theory, Binary and Other Bases, Probability, Graph Theory, and more

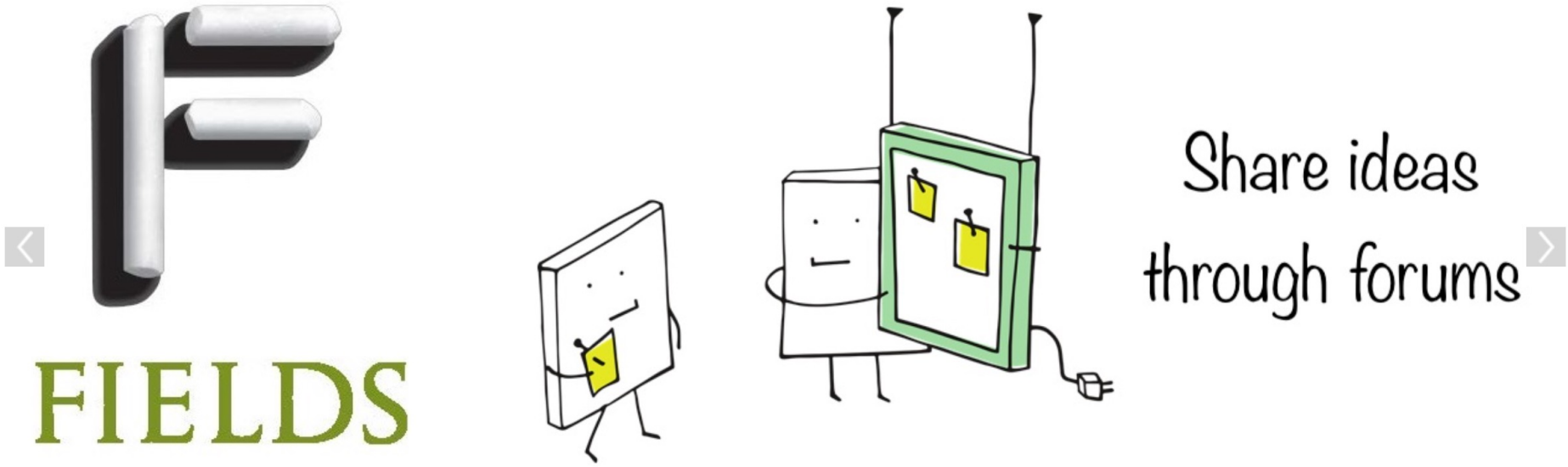
Format of Courses

- Courses are all online, self-paced, asynchronous
- Using Moodle as an LMS and various interactive elements like h5p and PolyPad
- Focus is on the mathematics, but presentation utilizes several different pedagogical methods

fields ••••••••••••• Log in

FIELDS ACADEMY

ANNOUNCEMENTS Current courses in Math Modelling, Operations, and Financial Literacy now available



Welcome to the Fields Academy's Elementary Educator Math Programs Portal. This site is where the content for all of our courses are hosted.

If you are looking to enroll in a specific course you must go through our registration system where you will receive an enrollment code and detailed instructions on how to join the course. To do this you can click on any of the course titles below or go to our **program website** where you can view details on all the courses and find the registration links.

Please note: this site is somewhat new and you may encounter a few 'bugs' (though we are working hard to ensure you don't). Should you have any issues, questions, comments, or concerns, please contact Pamela Brittain, K - 12 Program Coordinator, at pbrittai@fields.utoronto.ca

Otherwise we hope you enjoy our courses, and keep an eye out as we are adding new courses soon!

Navigating the Course — Mark as done

Unit 1: Introduction

- Introduction — Mark as done
- Intro to Math Modelling — Mark as done
- What is a Mathematical Model? — Mark as done
- Types of Mathematical Models — Mark as done

Unit 2: Creating a Mathematical Model

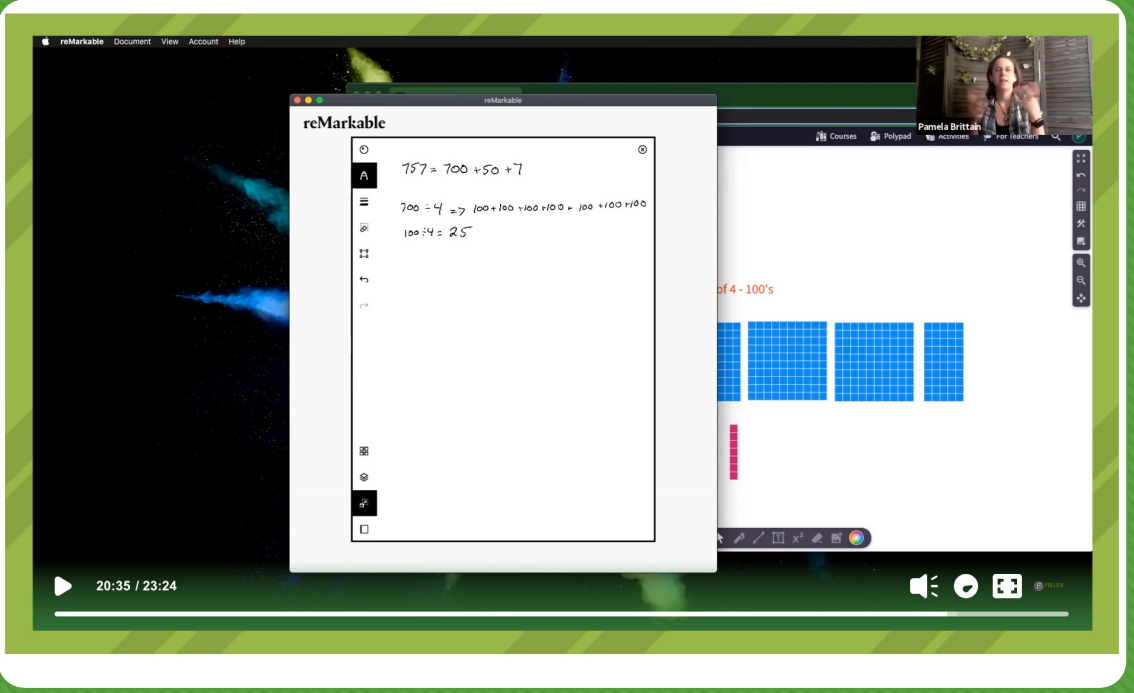
- The 6 Steps of Mathematical Modelling — Mark as done
- Bonus Content — Mark as done
- Lemon Tree Example — Mark as done

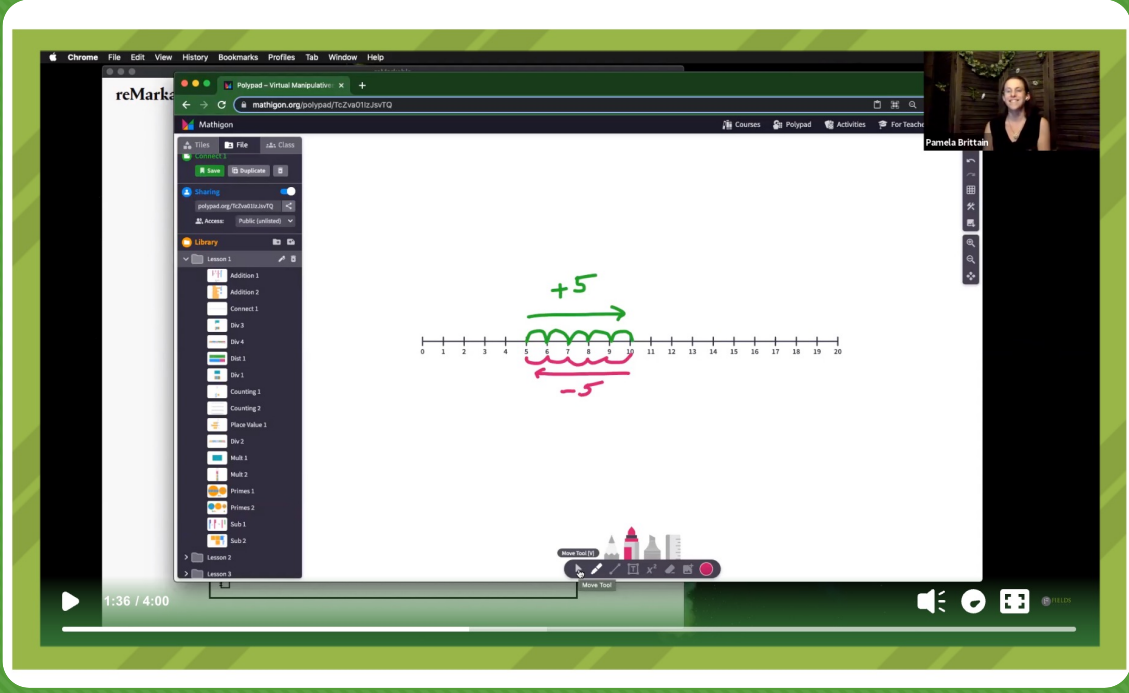
Step 1: Think of a Topic You Want to Study

This first step involves thinking of something you can study and collect data on.

Previous: Introduction Next: Step 2

You will not see the progress bar because you can edit this lesson.


reMarkable
757 = 700 + 50 + 7
700 ÷ 4 = 7
100 ÷ 4 = 25
Pamela Brittain
20:35 / 23:24


Pamela Brittain
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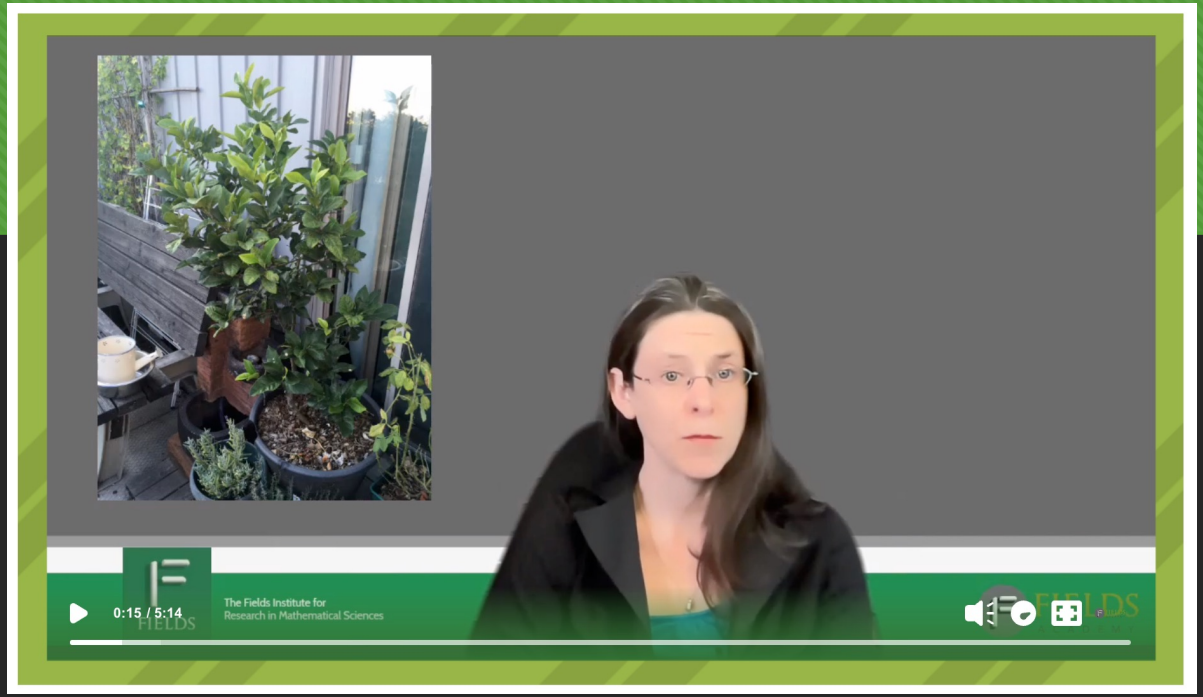

The Fields Institute for
Research in Mathematical Sciences
0:15 / 5:14

What if compounded quarterly?

4% divided by 4 (quarterly) = 1% per quarter

$100.00 * 1.01 = $101.00

$101.00 * 1.01 = $102.01

$102.01 * 1.01 = $103.03

$103.03 * 1.01 = $104.06

Compounded Quarterly
$104.06 - $100 = $4.06

Compounded Bi-Annually
$104.04 - $100.00 = $4.04

Compounded Annually
$104.00 - $100.00 = $4.00

2:10 / 3:17

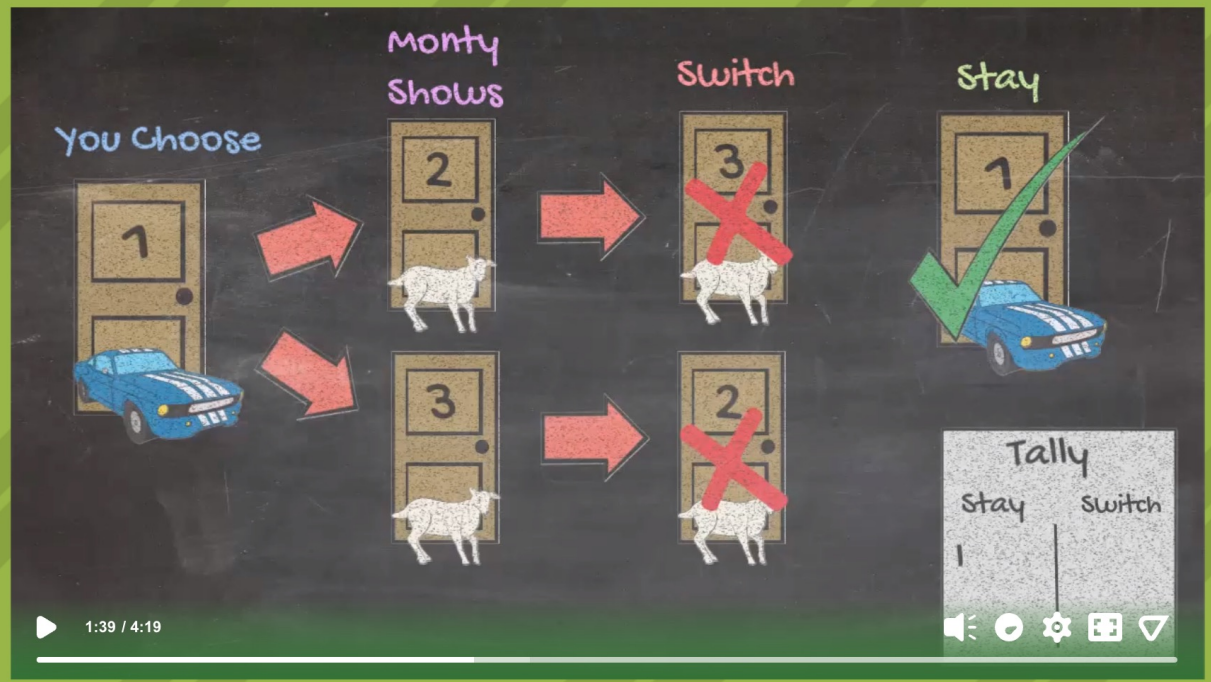
* sometimes called semi-annually

$100.00

4% (compounded bi-annually*)

How much at the end of 1-year?

0:40 / 3:17



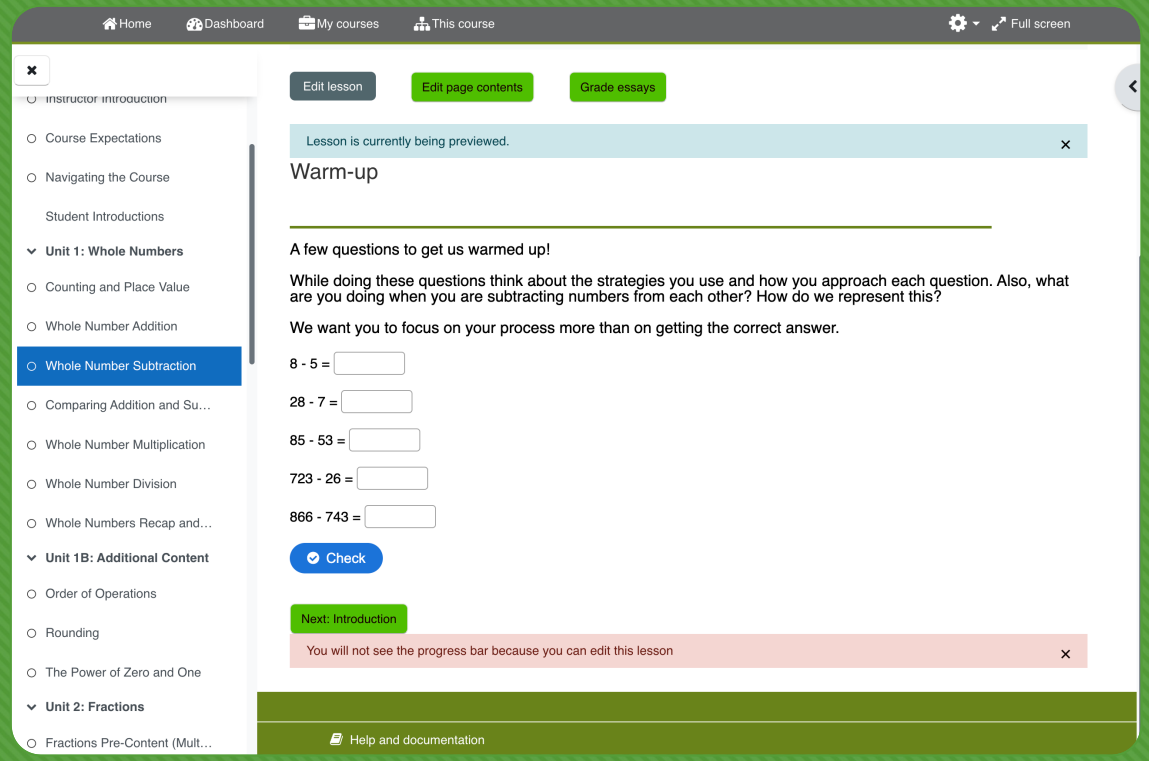
1:39 / 4:19

Activity: When To Use Each Account

Drag the scenarios on the right into the box on the left you think is the most reasonable use for those accounts. You can check out our thoughts by clicking the "Our Answers" button at the bottom of the page.

Account Type	Scenarios
Chequing	More than 6-months worth of savings in account; Buying groceries; Large lottery winning or inheritance; Monthly credit card/loan payment
Savings	Employer pension matching program; Saving for a house downpayment; E-transfering funds; Saving for retirement; Saving for a car; Receiving a tax refund
Investment	Paying debit for lunch; Paying rent/mortgage; Under budget this month / extra funds available; Auto-withdraw bill payments

Check



Compound Interest Calculator

File Edit View Insert Format Data Tools Extensions Help

100% View only

A1

	A	B	C	D	E	F	G	H	I	J	K
1			Compound Interest Calculator								
2										Number of Interest Payments Per Year	
3	End of Year 1	Period	Starting Amount	Annual Interest Rate	Period Interest Rate	Interest Earned Per Period	Ending Amount	Total Interest Earned		Monthly: 12 periods per year	12
4		1	70000	5.75	0.47916667	33541.66667	103541.67	33541.67			
5		2	103541.67	5.75	0.47916667	49613.71528	153155.38	83155.38			
6		3	153155.38	5.75	0.47916667	73386.95385	226542.34	156542.34			
7		4	226542.34	5.75	0.47916667	108551.5359	335093.87	265093.87			
8		5	335093.87	5.75	0.47916667	160565.8135	495659.69	425659.69			
9		6	495659.69	5.75	0.47916667	237503.5992	733163.28	663163.28			
10		7	733163.28	5.75	0.47916667	351307.4071	1084470.69	1014470.69			
11		8	1084470.69	5.75	0.47916667	519642.2063	1604112.90	1534112.90			
12		9	1604112.90	5.75	0.47916667	768637.4302	2372750.33	2302750.33			
13		10	2372750.33	5.75	0.47916667	1136942.866	3509693.19	3439693.19			
14		11	3509693.19	5.75	0.47916667	1681727.989	5191421.18	5121421.18			
15	YES	12	5191421.18	5.75	0.47916667	2487555.983	7678977.17	7608977.17			
16		13	7678977.17	5.75	0.47916667	3679509.892	11358487.06	11288487.06			
17		14	11358487.06	5.75	0.47916667	5442608.381	16801095.44	16731095.44			
18		15	16801095.44	5.75	0.47916667	8050524.897	24851620.34	24781620.34			
19		16	24851620.34	5.75	0.47916667	11908068.08	36759688.41	36689688.41			
20		17	36759688.41	5.75	0.47916667	17614017.36	54373705.78	54303705.78			
21		18	54373705.78	5.75	0.47916667	26054067.35	80427773.13	80357773.13			
22		19	80427773.13	5.75	0.47916667	38538307.96	118966081.09	118896081.09			
23		20	118966081.09	5.75	0.47916667	57004580.52	175970661.61	175900661.61			
24		21	175970661.61	5.75	0.47916667	84319275.35	260289936.96	260219936.96			
25		22	260289936.96	5.75	0.47916667	124722261.5	385012198.42	384942198.42			
26		23	385012198.42	5.75	0.47916667	184485011.7	569497210.17	569427210.17			
27		24	569497210.17	5.75	0.47916667	272884079.9	842381290.04	842311290.04			
28		25	842381290.04	5.75	0.47916667	403641034.8	1246022324.85	1245952324.85			
29		26	1246022324.85	5.75	0.47916667	597052364	1843074688.84	1843004688.84			
30		27	1843074688.84	5.75	0.47916667	883139955.1	2726214643.91	2726144643.91			
31		28	2726214643.91	5.75	0.47916667	1306311184	4032525827.45	4032455827.45			
32		29	4032525827.45	5.75	0.47916667	1932251959	5964777786.44	5964707786.44			
33		30	5964777786.44	5.75	0.47916667	2858122689	8822900475.78	8822830475.78			
34		31	8822900475.78	5.75	0.47916667	4227639811	13050540287.09	13050470287.09			

Instructions Compound Interest Calculator

Lesson is currently being previewed.

Introduction

Curriculum Connections

- Grade 3: Money and Finance (F1)
- Grades 4 – 8: Money and Finance (F1)
- Grade 4: Financial Management (F1.3 – F1.4)
- Grade 4: Consumer and Civic Awareness (F1.5)
- Grade 6: Financial Management (F1.2 – 1.3)
- Grade 6: Consumer and Civic Awareness (F1.4)
- Grade 7: Financial Management (F1.2, F1.4)

In order to spend money, we first need to have access to money. This requires both making money and finding a way to store that

Typically, we make money through a job, where we get paid in order to provide a service. This can include things like doing custom service, working in an office, or working in a factory or other labour or construction jobs. We are paid for our time and the value we to the company we work for. Depending on how the work is set up, we typically get paid on a weekly, bi-weekly, or monthly basis. I have a permanent job, you know how much money you will make each month and your employer takes off taxes from your payche you have a contract or temporary work situation you often only get paid when you invoice your employer and often you are require taxes yourself. We'll discuss income taxes more later in the course, but our takeaway here is we generate income mostly through v though some can also come from other sources like lottery or gambling winnings, investments, inheritance, selling possessions tha appreciated in value since you bought them (house, car, boat, etc).

As we can see there are many ways to generate money, but what do we do once we have it? The most common way to store mon a bank account, although some people do choose to simply deal in cash. Banks are used to store money and often pay a small am interest on the money stored there.

Next: Bank Accounts and Financial Goals

Banks take and store money and use that money to invest in other businesses, provide loans to individuals, and oversee things like credit cards. Banks work with billions of dollars every day, but they don't keep it all on site (in the case of physical locations). Instead the money is stored electronically and moved as needed. Some funds are kept in the form of cash for those who need it but most are handled electronically.

Banks make money from a number of sources including bank fees on having and using an account, loans and credit payments, and interest they make on investments. Some bank account (like chequing accounts) will not pay you interest but others (like savings accounts) will pay you a certain amount for storing your money there.

The Bank of Canada is what's known as a central bank, and this means that they don't deal directly with customers but instead oversee and deal with banks themselves. From their website, the Bank of Canada is responsible for the following:

- Monetary policy: The Bank influences the supply of money circulating in the economy, using its monetary policy framework to keep inflation low and stable.
- Financial system: The Bank promotes safe, sound and efficient financial systems, within Canada and internationally, and conducts transactions in financial markets in support of these objectives.
- Currency: The Bank designs, issues and distributes Canada's bank notes.
- Funds management: The Bank is the "fiscal agent" for the Government of Canada, managing its public debt programs and foreign exchange reserves.
- Retail payments supervision: Under the Retail Payment Activities Act, the Bank will be responsible for supervising payment service providers.

Physical money is printed at the Canadian Mint, but the Bank of Canada oversees how much money is printed / in circulation and also how much that money is worth in terms of things like inflation.

While the Bank of Canada doesn't set what's known as the prime interest rate directly it is influenced by the policies that the Bank of Canada sets. Many things affect this rate including if they want to encourage people to save money or take on debt / spend, and this has a direct effect on inflation and economic growth.

The Bank of Canada does set a key interest rate, called the policy interest rate, which affects the interest rates banks offer. The prime interest rate is mostly used by banks and other money lenders to determine what interest rate they are going to charge on loans and mortgages and it also has some influence on savings and interest/investments as well.

In Canada there are 6 major banks: Bank of Montreal (BMO), Canadian Imperial Bank of Commerce (CIBC), National Bank of Canada, Royal Bank of Canada (RBC), Scotiabank and Toronto-Dominion Bank (TD). There are also a number of credit unions, and smaller financial institutions.

Previous: Introduction | Previous: Types of Bank Accounts | Next: SVB (A Case Study)

Potential for Partnerships

- Courses are now live and open for registration
- Courses have been / are being tested by current and retired teachers, university educators, teacher candidates, math researchers, education researchers, and others
- Open to research collaborations / partnerships on the content, presentation, or other areas

More Details

https://fieldsacademy.ca/eec

pbrittai@fields.utoronto.ca

*please email me if you are interested in taking any of the courses and I will arrange for free access