How to Answer the Question

WHY DO I HAVE TO LEARN MATH?

by Anthony Persico

A Visual Guide for Students, Parents, and Teachers!

Explore the Reasons Why
Learning Math is Vital to Your Future (and Our World), Where Math Can Take You, and How Changing the Way You Think About Math Can Transform Your Skills and Allow You to Become a More Creative Problem Solver.

TABLE OF CONTENTS

Introduction

EVERY MATH STUDENT HAS, AT ONE POINT, OR ANOTHER ASKED ONE OF THE FOLLOWING QUESTIONS:

?

-Why do I have to learn math?

-When am I ever going to use this stuff in real life?

-Why do I have to learn math if I don't plan on pursuing a mathematical career?

-What can I actually do with my math skills besides passing a test?

These are fair and honest questions. When you are learning something, it's natural to want to understand how the material is valuable to yourself and your personal goals and interests.

Students often perceive learning math as a practice in memorizing formulas, theorems, and procedures that have little or no application to real life.

What about those “real world” problems about a farmer finding the area of her pumpkin patch? Well, they don’t do much to engage your mind or convince you that what you learn in math class actually applies to solving problems in real life.

The Mistake That Most Teachers Make:

Most math teachers and parents have a standard and uninspired response to the question: *Why do I have to learn math?*

These stock responses often include the importance of grades, getting into the right college, and finding a high-paying career.

Here's the problem: students are constantly being told that math skills are important, but this information alone is not enough to excite them about learning the subject.

Students can't engage in the learning process if they do not understand why they are learning the skills in the first place.

SHOW, DON'T TELL

**"Education is not the learning of facts,
but the training of the mind to think."**

-Albert Einstein

Why math?

If you want to understand
why learning math is valuable
to yourself, your community,
and the world as a whole,
then you're in the right place.
Learning to think mathematically
will help you to develop into a
problem solver, which is a trait
that every person needs.

!!

my story

and what I learned from telling the truth.

Corey was the kind of student that math teachers root for.

His grades were average, but he always made a strong effort in class and asked thoughtful questions often. A burly senior who played Varsity Football and was committed to join the U.S. Army, Corey was one of the more outspoken students in the Applied Algebra course that I was teaching at the time.

On one class day, during a lesson on solving quadratic systems, Corey asked, "What's the point of me learning this when I already know that I am going into the military and will never use it?"

He had a point. He would never have to graph parabolas or solve systems of equations in the Army. I thought about crafting a clever way to explain how math skills could be used by members of the military, but I knew that such a response wouldn't resonate with him, since I had no credibility when it came to being a soldier.

I knew that my response needed to be authentic if I expected to reach him.

my story (continued)

Instead of sharing a phony response with Corey, I chose to engage in a conversation with him that went like this:

Me: *Corey, how much weight can you bench press?*

Corey: *Almost 275 pounds, but what does that have to do with anything?*

Me: *Man, that's a ton of weight! But why do you bother doing the bench press? It's not likely that you would ever find yourself lying on your back with a massive amount of weight on your chest in a football game or in real life.*

Corey: *Because it's one of the best exercises for making your upper body stronger. The stronger you are, the better you perform.*

Me: *I gotcha'. Well think about practicing math like doing bench press. You may or may not ever need to replicate the actual procedure of what you are doing, but the practice itself makes you stronger. In the case of math, it makes you a stronger thinker and problem solver. Once you develop those skills, you can apply them everywhere.*

Corey: *Ok, I can roll with that!*

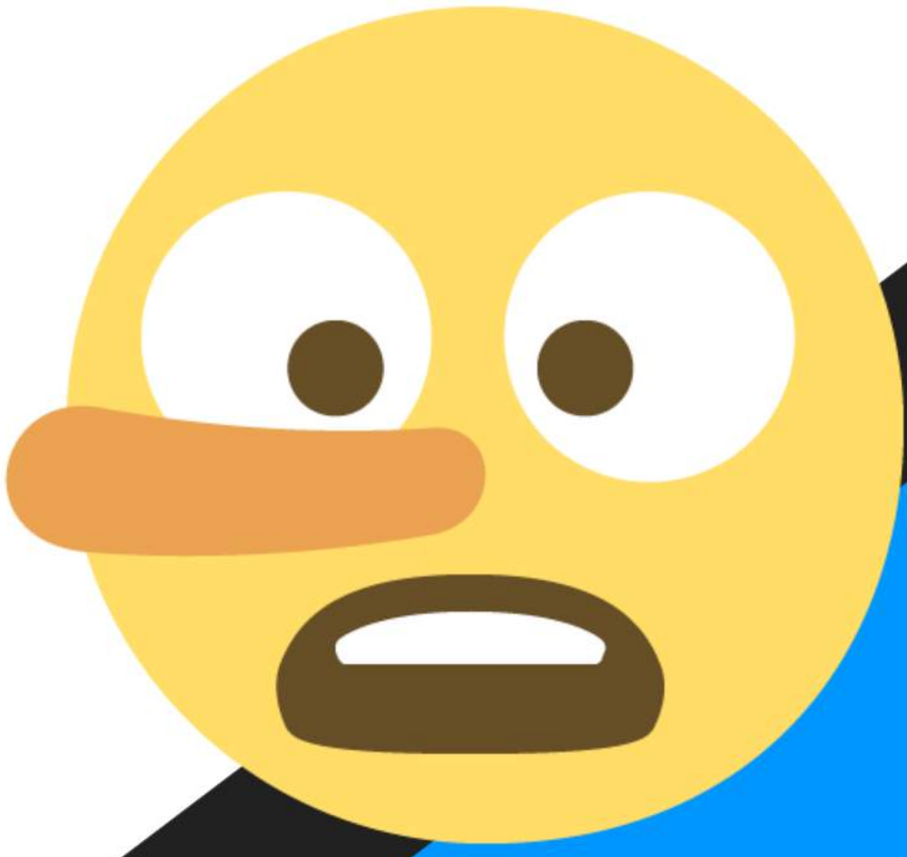
The truth about math…

Most likely, you'll never use the specific skills that you learn in class in real life!

But that does not mean that learning math is a waste of time! In fact, it's one of the most valuable things that you can do!

As we learned from the bench press story, learning math is about developing problem solving skills and persevering through difficulty.

π



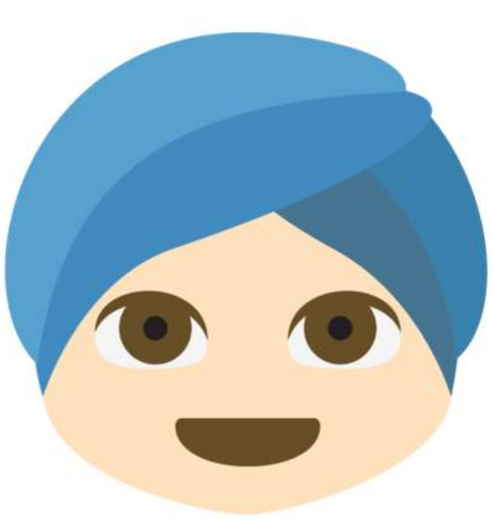
Although it's impossible to say when you will use the problem solving skills developed while learning math, it's certain that you will encounter problems in your life…and they will only grow more complex over time.

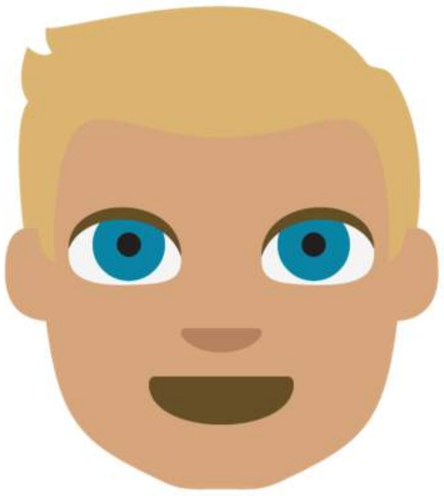
Learning math gives you the mental tools to take on these problems and find creative solutions to them, thus improving the world for yourself, your family and friends, and the entire global community.

WHY?

With these ideas in mind, let's explore why:

- ✓ Mathematical proficiency is a valuable and applicable skill for any career field.
- ✓ Math skills can improve your personal life, your community, and your world.
- ✓ With hard work and the right mindset, every student is capable of learning math.





CHAPTER ONE

MATH IS A

BASIC LIFE SKILL

Somehow it's O.K. for people to chuckle about not being good at math. Yet if I said, 'I never learned to read,' they would say that I was an illiterate dolt.

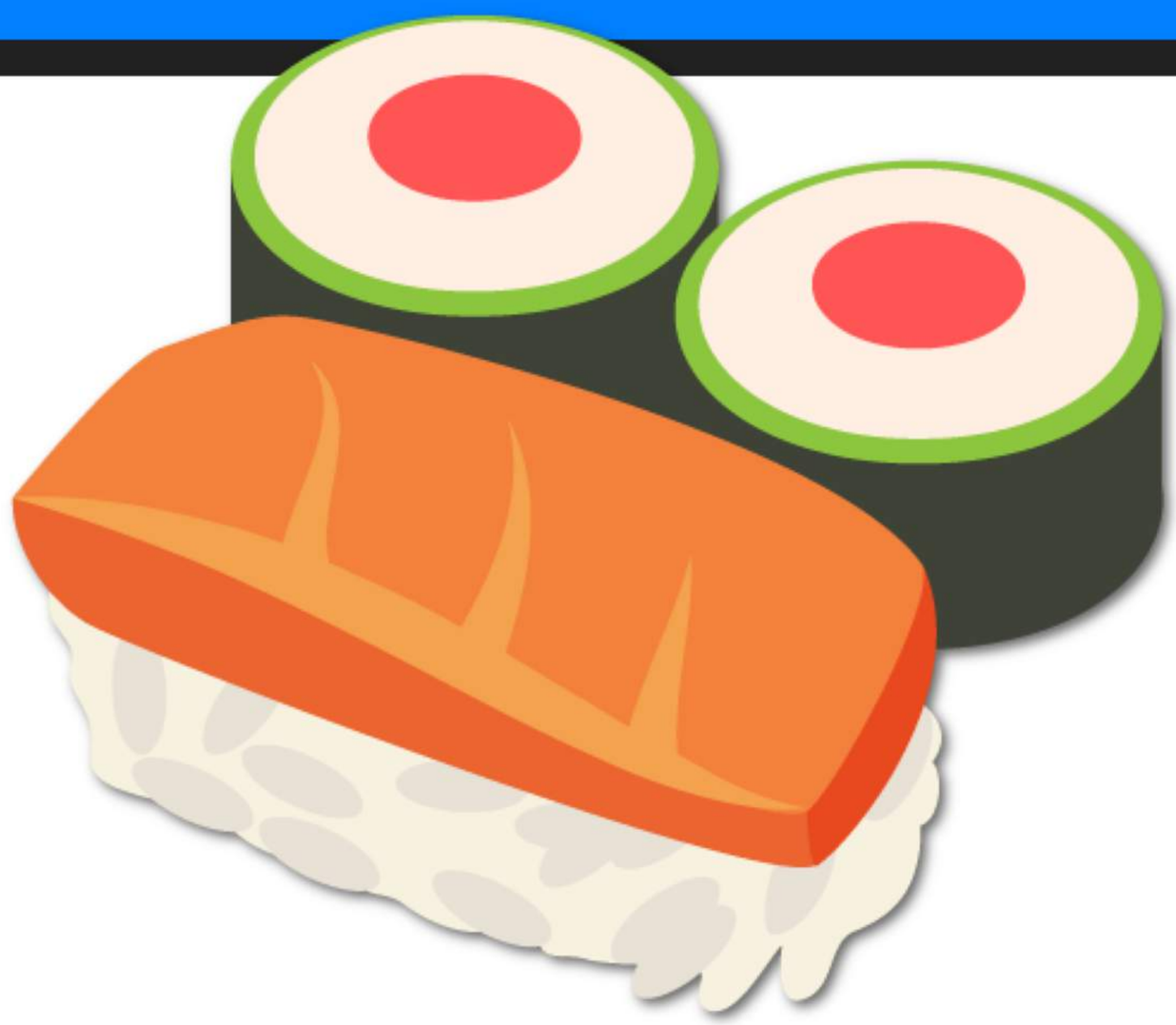
-Neil deGrasse Tyson

People need a degree of mathematical proficiency and critical thinking skills just to get by in our 21st Century society.

➤ Math is more than a collection of random facts, formulas, and funny looking symbols that do not apply to the real world.

You use math in every day life more than you think! Whether you're calculating sale prices while shopping, modifying portions in a recipe while cooking dinner, or predicting the amount of time it will take you to walk to school, math is everywhere!

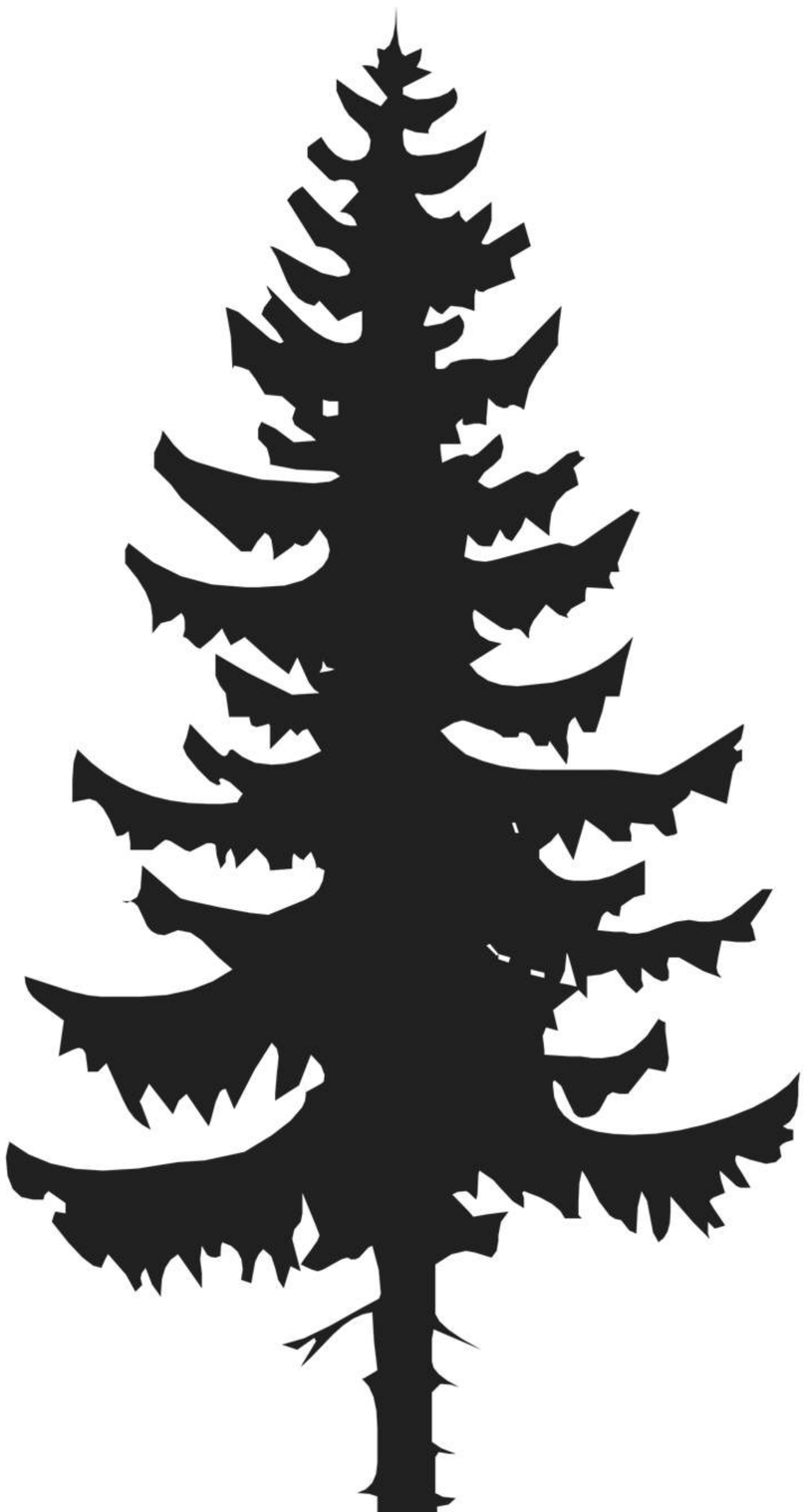
Do you really want to be the person who can't calculate 15-20% of their restaurant bill to leave a proper tip?



CHAPTER ONE

Can you see yourself building a tree house for your kids or a dog house for your pet?

You won't be able to without math skills.



CHAPTER ONE

In the real world,

the ability to read and to do math are considered basic life skills. Without them, you could be left behind.

> ***Without math literacy, career opportunities shrink and you become easy prey for credit card companies, payday lenders,and the lottery.***
>
> -Dan Finkel

CHAPTER TWO:

LEARNING MATH

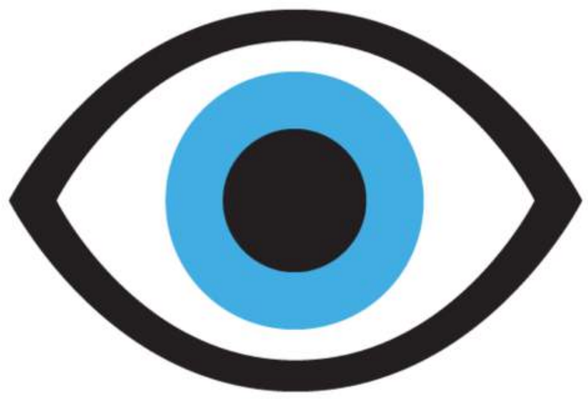
BUILDS YOUR BRAIN

"A comfort zone is a beautiful place, but nothing grows there.

-Anonymous

Learning math teaches you to solve problems and to think critically. One day you will identify a problem that you are passionate about solving. Will you be prepared for the challenge?

CHAPTER TWO



According to BrainFacts.org

- **Your brain has a unique ability to change and increase the strength of communication between neurons and synapses.**

- *The brain is made up of distributed networks and practicing math causes these networks to communicate with each other and strengthen over time!*

Practicing math helps you to deepen your curiosity and strengthen your observation skills.

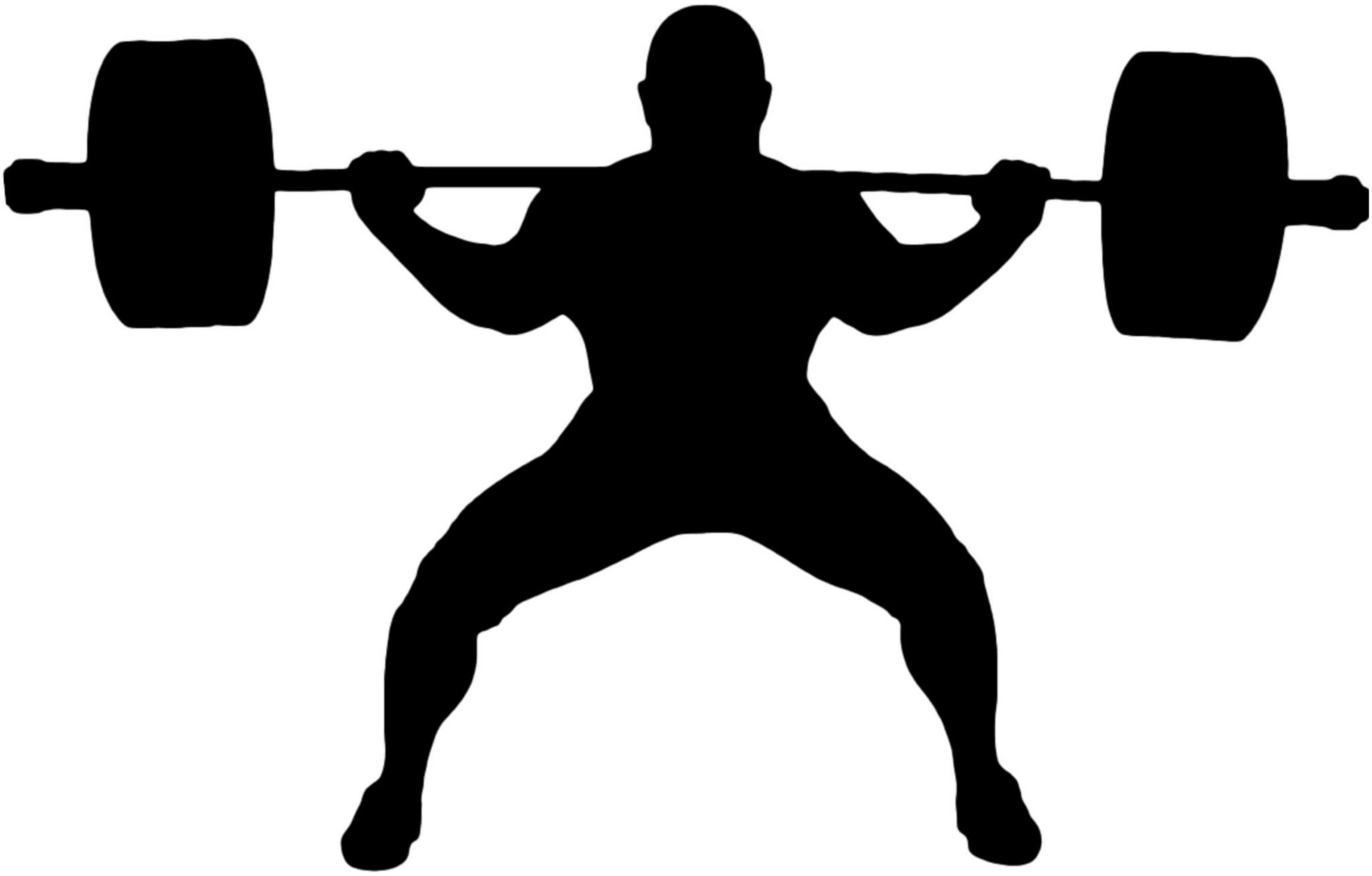
"Every thought that one permits through his mind leaves its trace. Thoughts are things. Our lives are ruled a great deal by our thoughts.

-S.W. Kimball

CHAPTER TWO

“Math is like going to the gym for your brain. It sharpens your mind.

-Danica McKellar



CHAPTER TWO

When a challenge arises, will you be ready for it?

Even if you never have to apply specific math skills in the real world, practicing it gives you experience with simplifying and finding solutions to complex problems.

…because you need problem-solving skills to survive in the real world!

- ***Learning math gives you the critical thinking skills to take on the problems that you are passionate about solving.***

- **And you can't become a good problem solver if you don't learn how to define it, identify the key information and details, and create and follow an effective strategy for finding a solution.**

Instead of focusing on what career you want to pursue, think about the problems that you are most interested in solving!

CHAPTER THREE:

MATH CAN

OPEN DOORS FOR YOU

> *Believe it or not, lots of people change their majors and abandon their dreams just to avoid a couple of math classes in college.*
>
> ***-Danica McKellar***

It's a simple fact that the majority of high-profile and highly lucrative careers require a high level of math proficiency and problem solving skills.

CHAPTER THREE

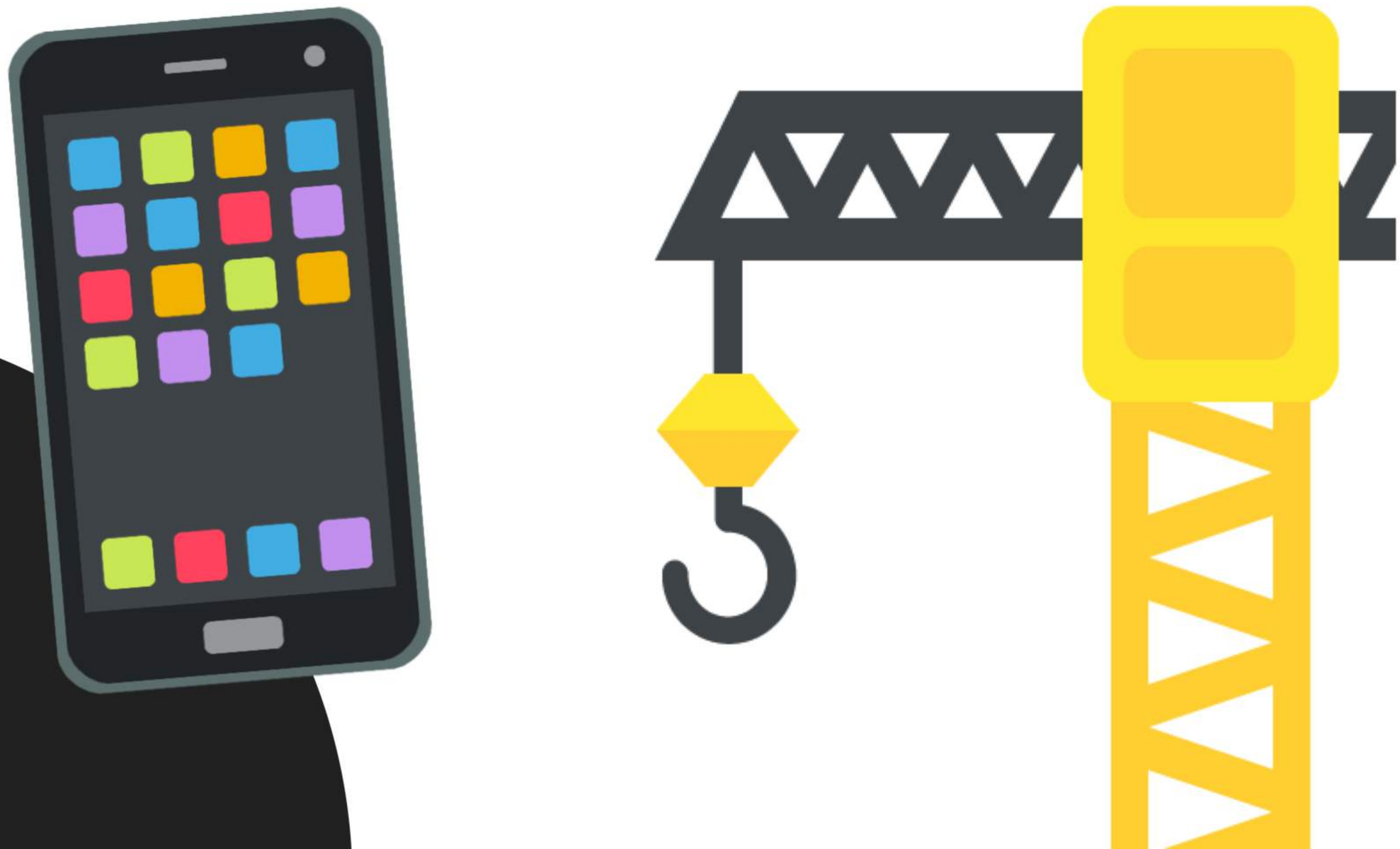
According to www.withmathican.org:

- **In the 21st Century, jobs across the country and around the world require a higher degree of math fluency.**

- *Careers in STEM (science, technology, engineering and math) are the fastest growing sector of jobs!*

FACT:

Math skills are an integral piece of your future success in any field or job.

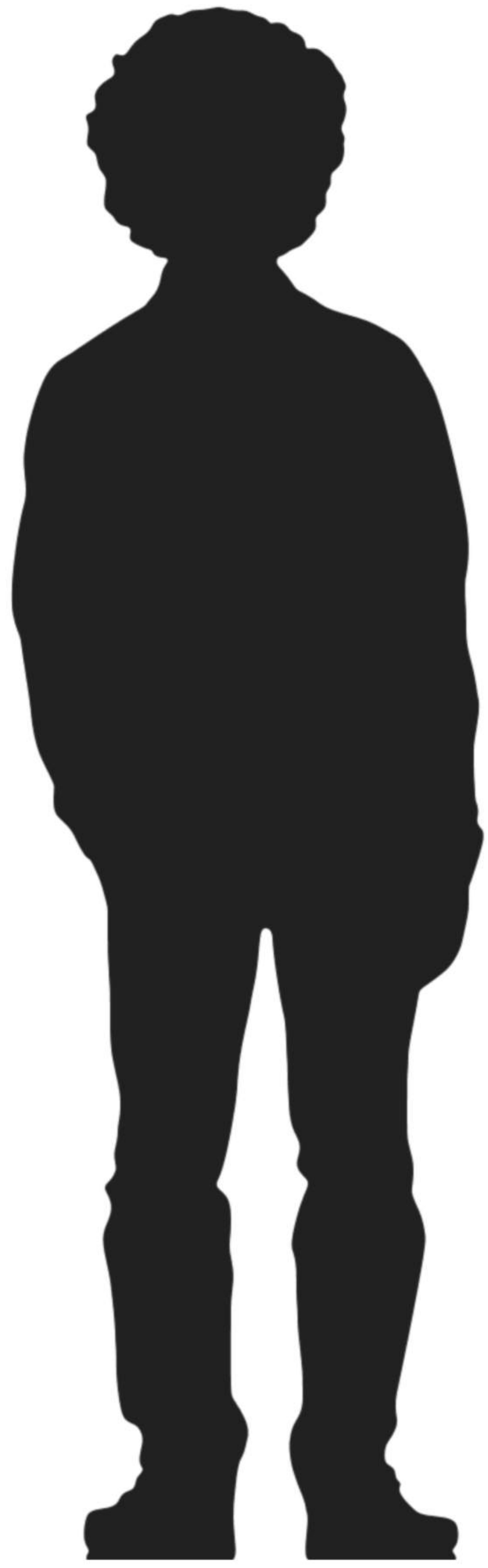


CHAPTER THREE

Most high-profile and desirable careers require a high degree of math proficiency and comfort.

Such careers include:

Computer Coder
Photographer
Graphic Designer
Architect
Sports Agent
Engineer
Air Traffic Controller
Doctor or Nurse
Airline Pilot
Marine Biologist
App Developer
Video Game Developer



CHAPTER THREE

Without mathematics, there's nothing you can do. Everything around you is mathematics. Everything around you is numbers.

-Shakuntala Devi

CHAPTER FOUR:

MORE THAN EVER,

THE WORLD NEEDS MATH

> *For the future, primarily, we must educate people in science, engineering, technology and math.*
>
> ***-Buzz Aldrin***

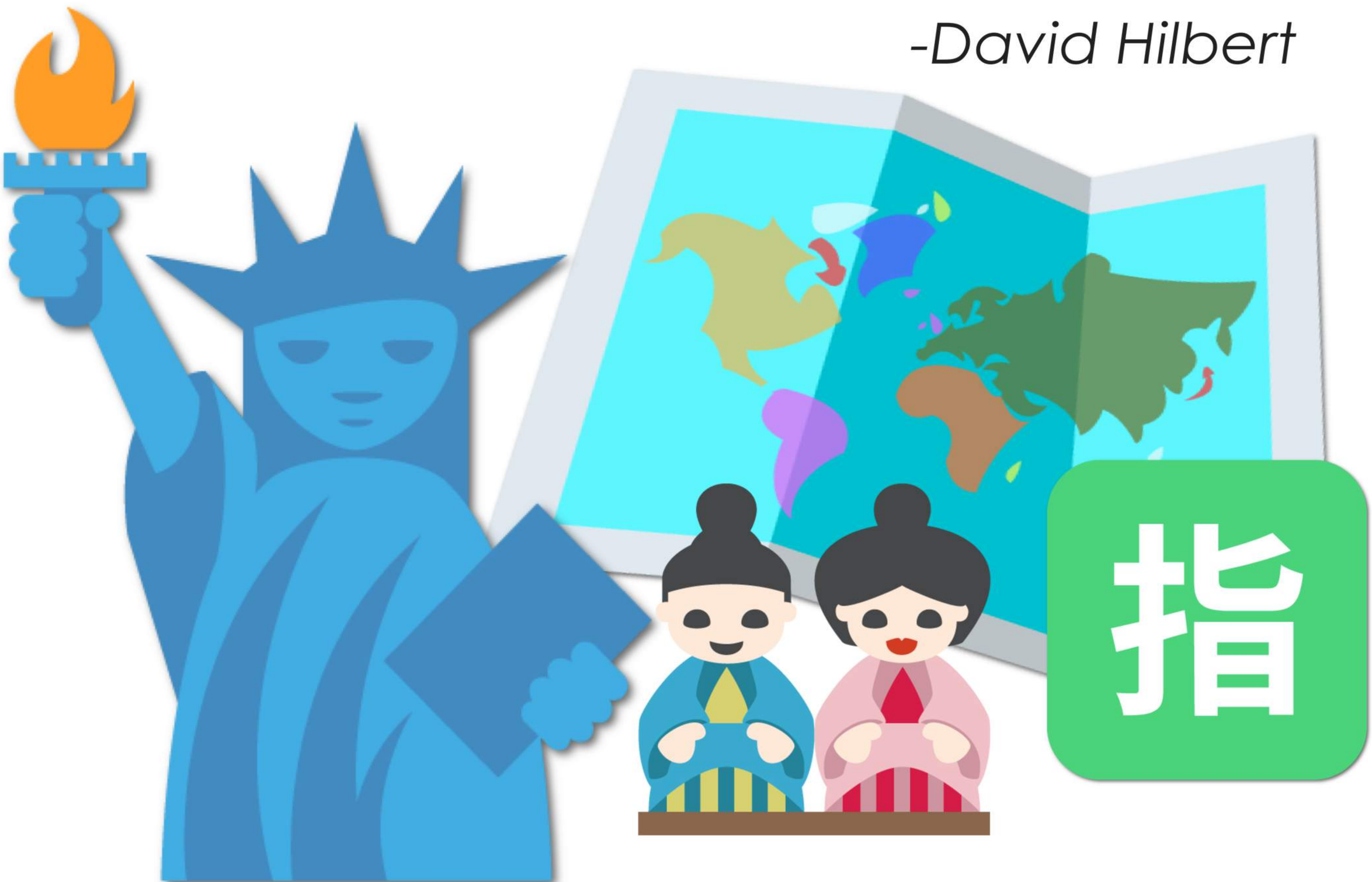
As the problems of the world become more complex, we need critical thinkers and creative problem solvers more than ever.

➤ Math is the only language all human beings share.

Math underlies what we do and what we understand about the world around us.

"Math knows no races or geographic boundaries; for mathematics, the cultural world is one country."

-David Hilbert



CHAPTER FOUR

Mathematical models help us to take care of our environment and ease the effects of climate change by calculating things like how much plastic we can save by using refillable containers instead of plastic bottles.

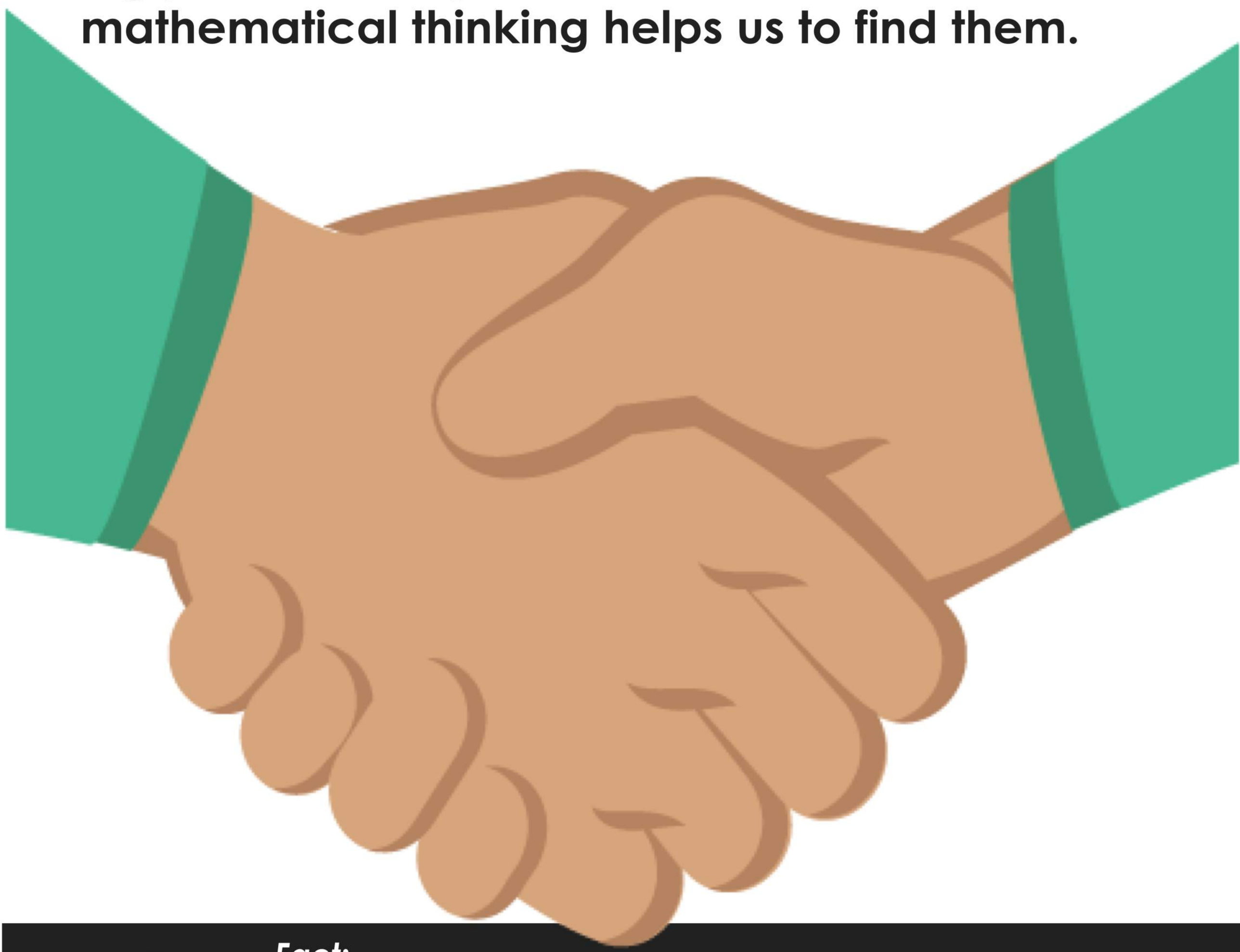
Example:

Scientists can use mathematical models to eradicate diseases like Ebola and Zika.

CHAPTER FOUR

As the world

continues to develop into a global community, our problems continue to grow more complex. Big problems require creative solutions and mathematical thinking helps us to find them.



Fact:

Students in the U.S. are falling behind in math, which will hinder their ability to compete for jobs in the global marketplace. *(via www.withmathican.org)*

CHAPTER FOUR

Mathematical models allow us to:

- **Analyze and predict financial markets, population growth, and healthcare trends.**
- ***Learn to take smart risks.***
- **Make intelligent predictions about the future, which allows us to create a better world!**

CHAPTER FIVE

MATHEMATICS

EQUAL$ MONEY

If you stop at general math, you're only going to make general math money.

-Snoop Dogg

You cannot accumulate, manage, and maintain significant wealth without a high level of proficiency in mathematics.

- According to a recent study*, all of the top 10 best paying college majors have a significant math component.

- Having strong math skills allows you to avoid making bad deals and to prevent yourself from going into debt!

Without strong computation skills, you won't be able to negotiate good deals in a financial setting!

CHAPTER FIVE

Can you envision yourself owning a house one day?

If so, you'll need strong math skills to ensure that you can manage such a large financial undertaking.

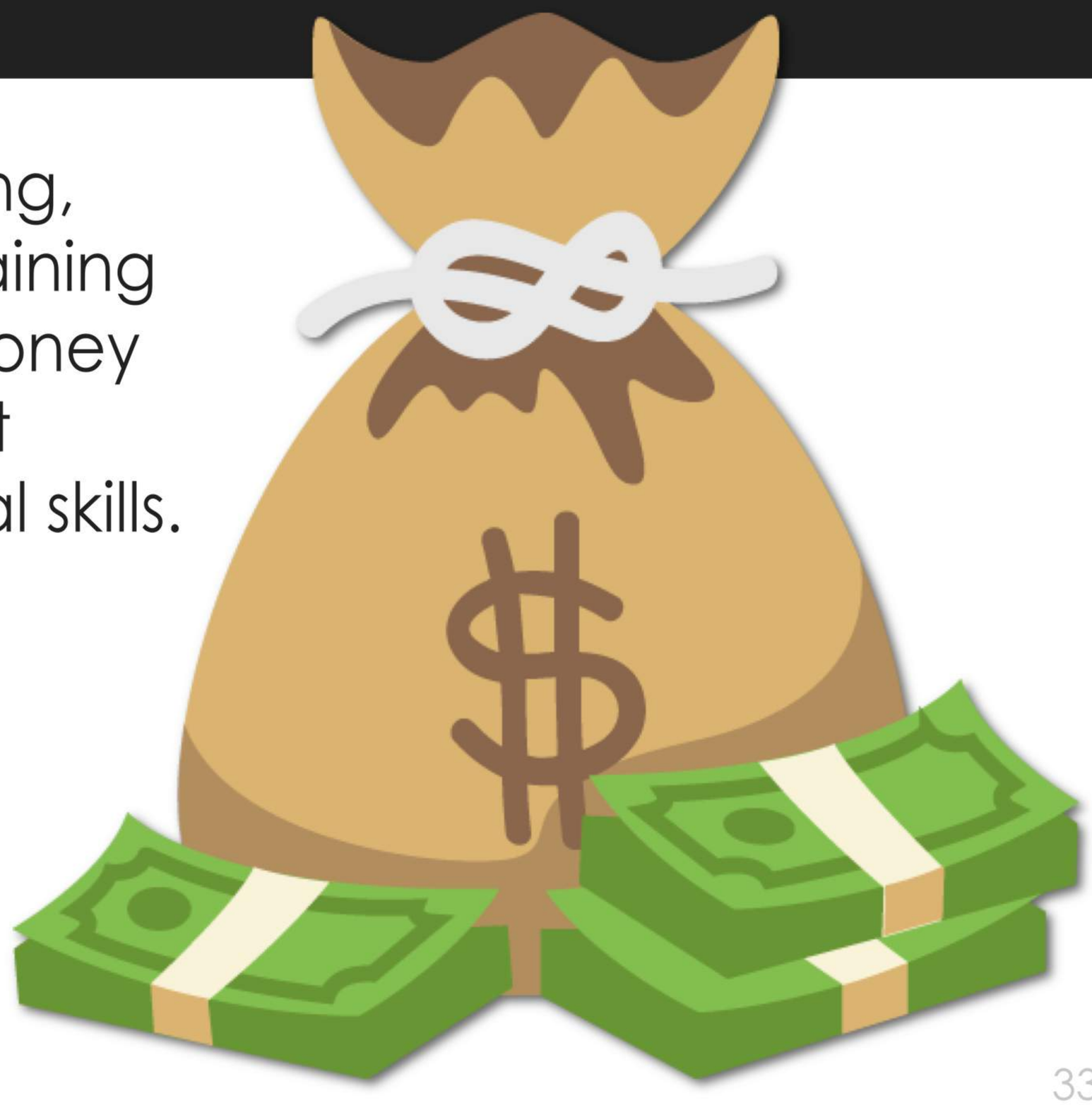
A surprisingly high percentage

of Americans think that the most practical way for them to accumulate several hundred thousand dollars is to win the lottery, despite the fact that the odds of winning are astronomically small.

According to a study by the Consumer Federation of America.

44% of those who have ever won large lottery prizes were broke within five years, according to a 2015 Camelot Group study?

Collecting, managing, and actually maintaining large amounts of money isn't possible without strong mathematical skills.



CHAPTER SIX

DATA AND STATISTICS

DRIVE EVERYTHING

> *Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding.*
>
> ***-William Paul Thurston***

Numbers tell a story and high stakes decisions in the 21st Century are dependent on collecting and analyzing massive amounts of data.

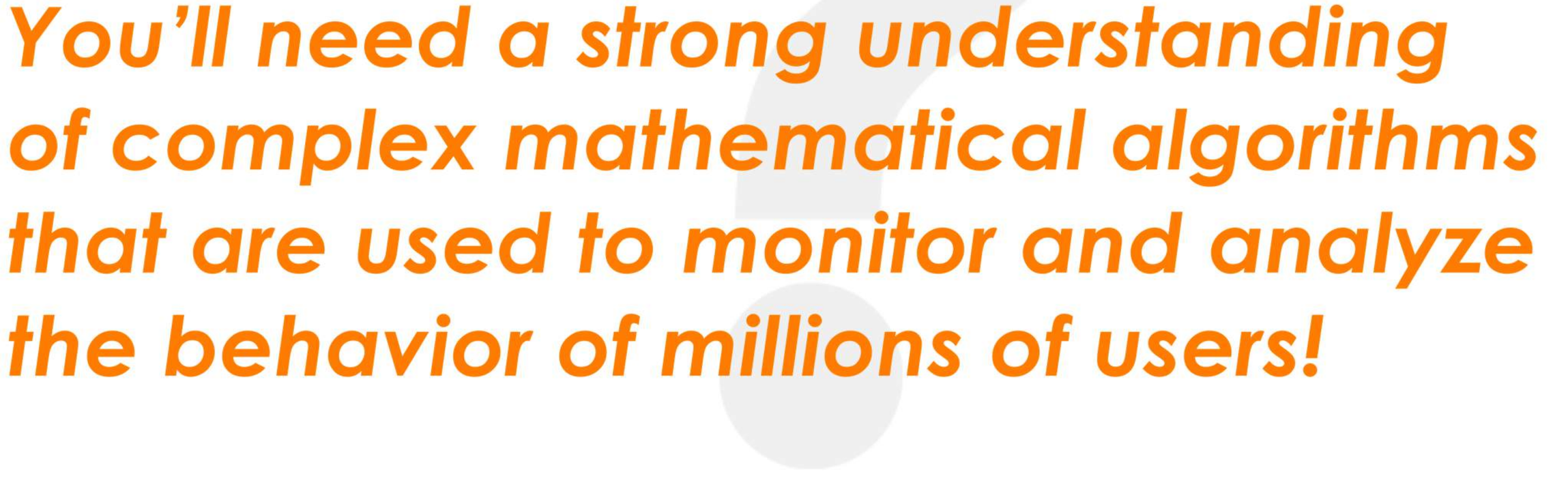
***In the 21st Century,* we constantly use math to model and understand our world. Critical decisions are based on collecting and analyzing large amounts of data.**

Understanding how to model, interpret, and apply mathematical data allows us to make better decisions and to live in a smarter world!

CHAPTER SIX

Want a career in social media?

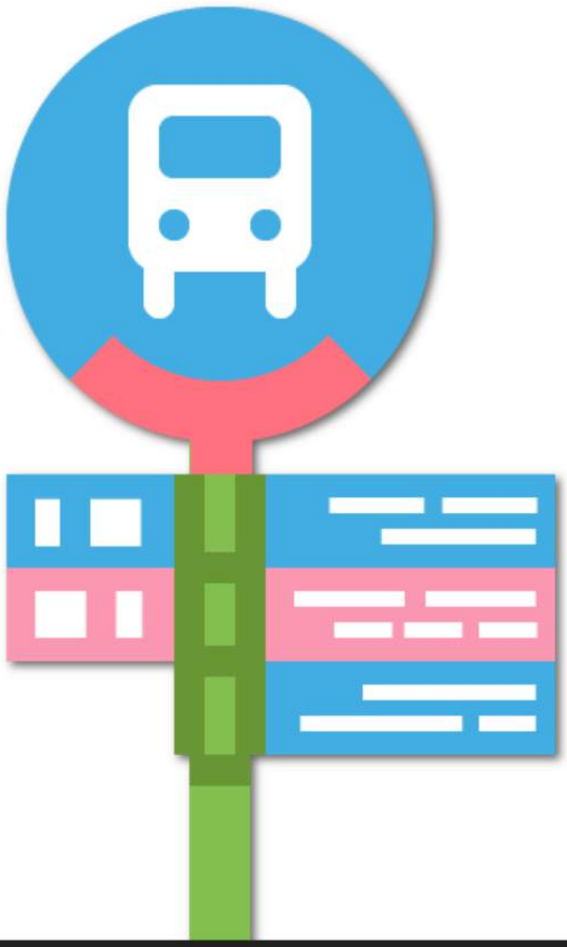
You'll need a strong understanding of complex mathematical algorithms that are used to monitor and analyze the behavior of millions of users!



Why is data so important?

- Complex data systems are used to catch criminals, optimize traffic patterns, and sell concert tickets.

- Data is used to analyze financial stock trends so you can invest in the next big company before anyone else does!



> ***In the end you should only measure and look at the numbers that drive action, meaning that the data tells you what you should do next.***
>
> *-Alex Peiniger*
> ***CEO, quintly***

CHAPTER SIX

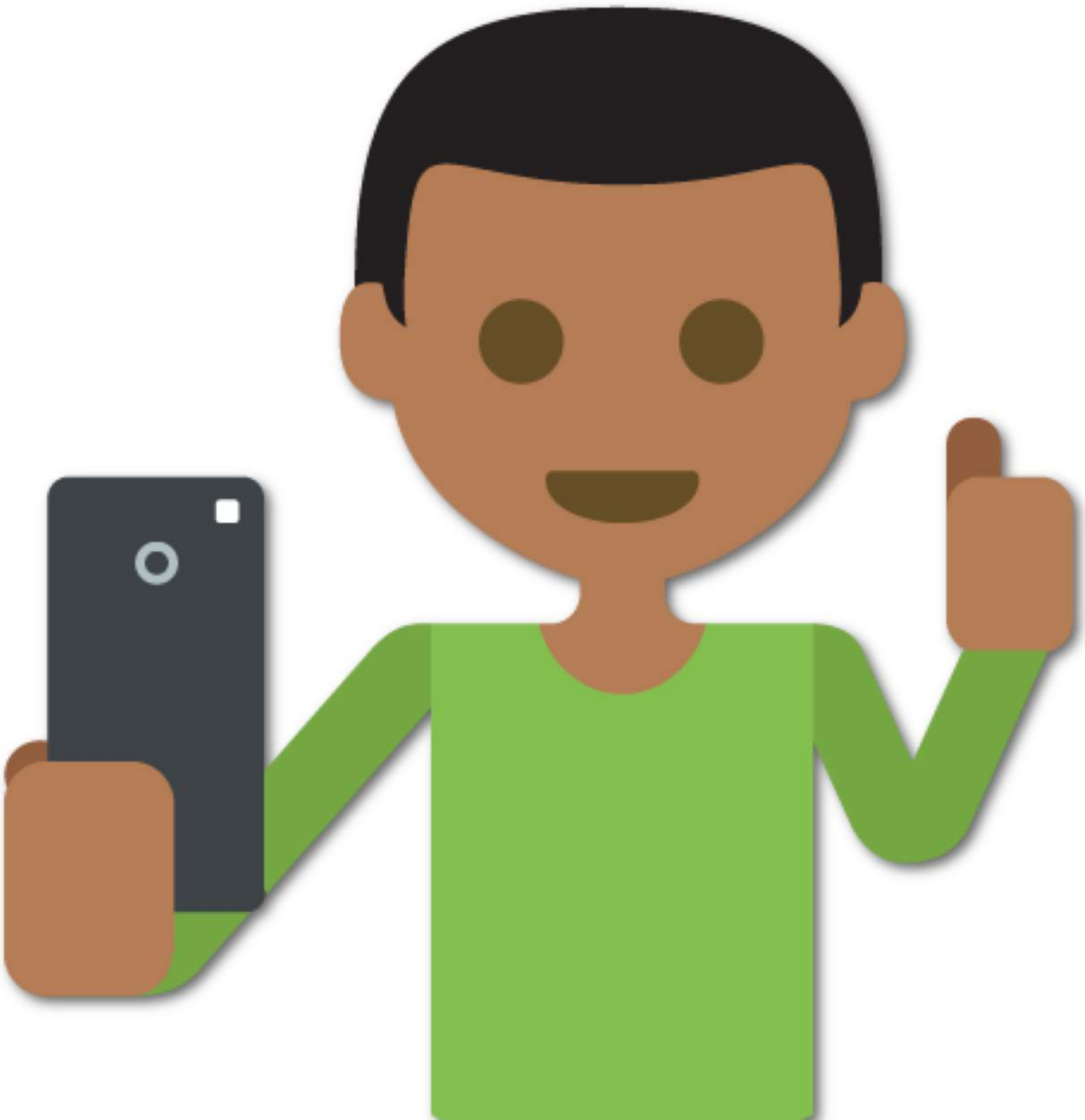
Health and Wellness

You can use data to make smarter decisions about fitness and nutrition, such as:

❤️ *Identifying and reaching your target heart rate during aerobic exercise.*

🏋️ *Tracking your strength training gains and muscular growth during CrossFit training.*

🥝 *Monitoring your daily caloric intake to ensure that you can maintain a healthy body weight.*



CHAPTER SEVEN

MATH CAN SUPPORT A

GROWTH MINDSET

> *I can accept failure, everyone fails at something. But I can't accept not trying again.*
>
> ***-Michael Jordan***

Exploring mathematics teaches you to be tenacious and courageous as you learn from mistakes and persevere through challenges.

CHAPTER SEVEN

Learning math is challenging, but challenging ourselves allows us to grow.

According to Stanford Psychologist, Carol Dweck:

In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work—brains and talent are just the starting point. This view creates a love of learning and a resilience that is essential for great accomplishment.

Learning math is about challenging yourself to step outside of your comfort zone and persisting through difficult tasks, while learning from mistakes along the way.

CHAPTER SEVEN

grit

grit, n.

- *courage and resolve; strength of character*
- *mental toughness and courage*

Are you able to make sense of problems and persevere in finding solutions to them?

Many math students are afraid of making a mistake and falsely believe that they are not capable of learning math.

Practicing math can help you to develop a growth mindset, which is an optimistic outlook that your intelligence can grow by making mistakes and learning from them.

With a growth mindset, mistakes are not feared, they are celebrated. When you learn to use mistakes as learning opportunities, you can grow!

CHAPTER SEVEN

Mindsets: Growth vs. Fixed

The following graphic from www.withmathican.org shows the differences between a growth and fixed mindset.

Students with a growth mindset are committed to:

1

Celebrating my mistakes as opportunities to learn and grow.

2

Being confident and sharing my thinking without fear of being wrong.

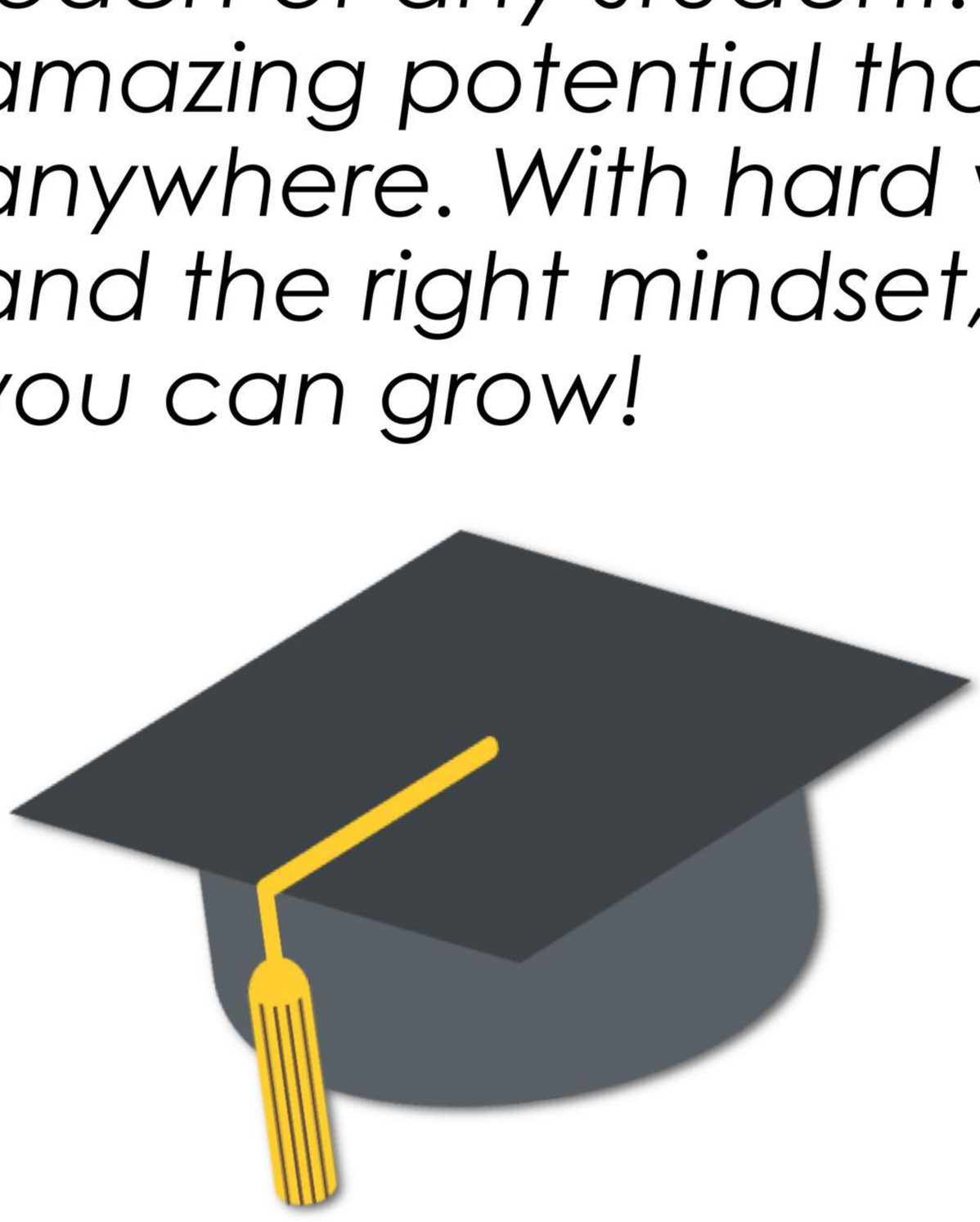
3

Challenging myself and persevering through difficult problems.

CHAPTER SEVEN

There is no such thing as a ‘math person.’

Learning math is not beyond the reach of any student. We all have amazing potential that can take us anywhere. With hard work and the right mindset, you can grow!



“Struggling in math is not the enemy anymore than sweating is in basketball. It’s a clear sign you are in the game.”

-Kim Sutton

CHAPTER EIGHT

LEARNING FOR THE

WRONG REASONS

“What makes a child gifted and talented may not always be good grades in school, but a different way of looking at the world and learning.

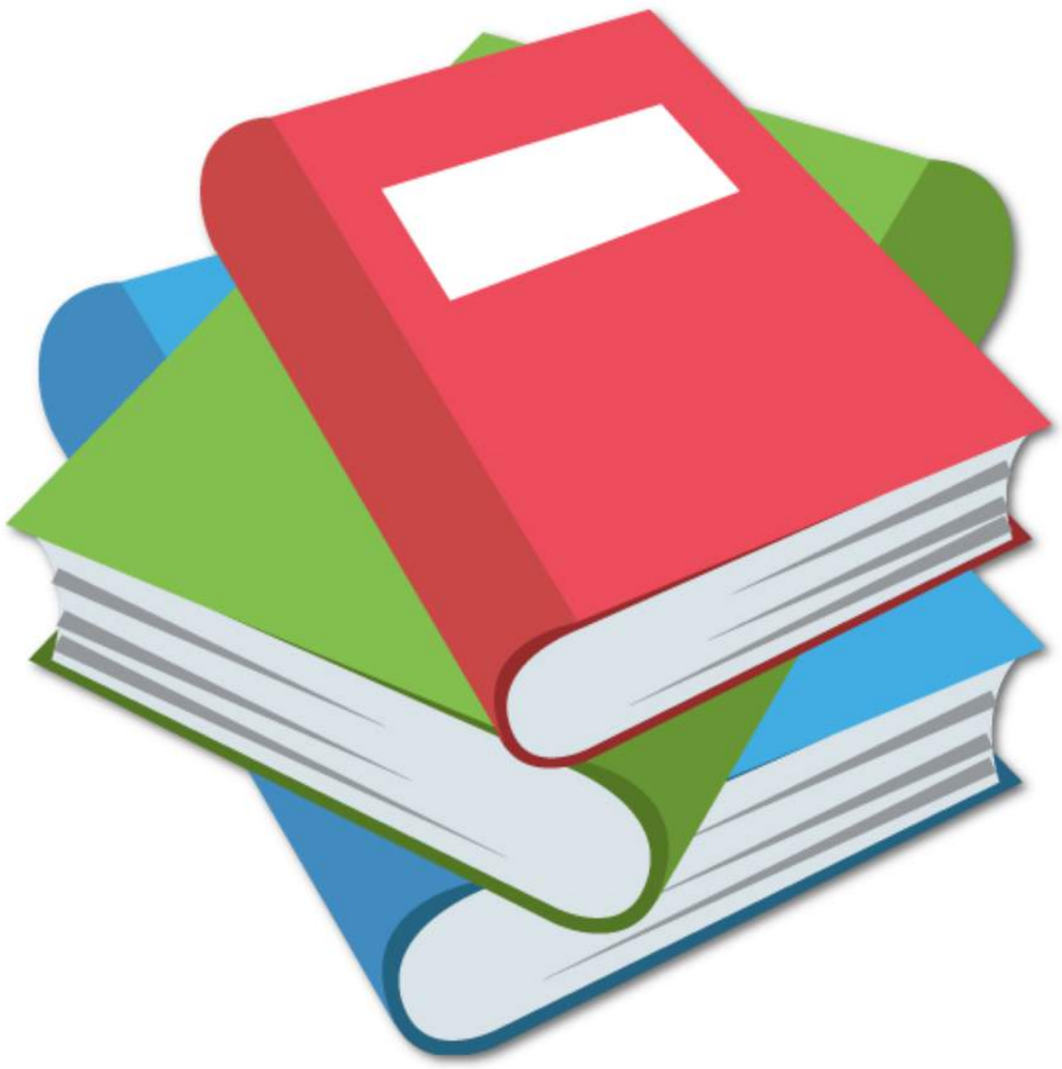
-Chuck Grassley

Learning math is not about getting high grades or passing exams; it is about developing your critical thinking and problem solving skills!

- **Many students view math education as a practice in memorizing formulas, theorems, and procedures that have little application to real life.**

When students are only motivated by earning grades and performing on exams, they become uninterested in developing mathematical fluency.

The truth is that you will probably never have to use Algebra in the real world, but that doesn't mean that developing as a mathematical thinker is not a valuable and applicable skill.



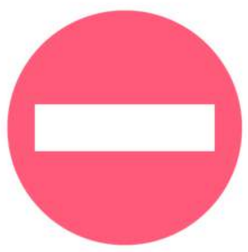
CHAPTER EIGHT

Great math teachers are inspired and inspiring!

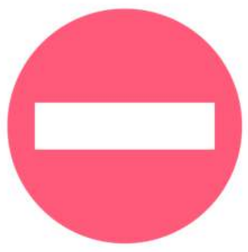
When faced with the question:

Why do I have to learn math?

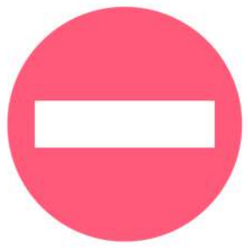
They NEVER respond by saying things like:



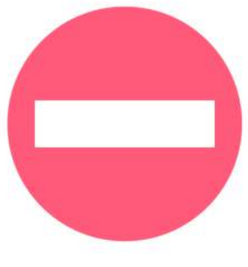
"Because I said so!"



"Because you have to pass this class in order to graduate!"



"Because it looks good on your college resume'!"



"Because you need to know it to pass a standardized exam!"

CHAPTER EIGHT

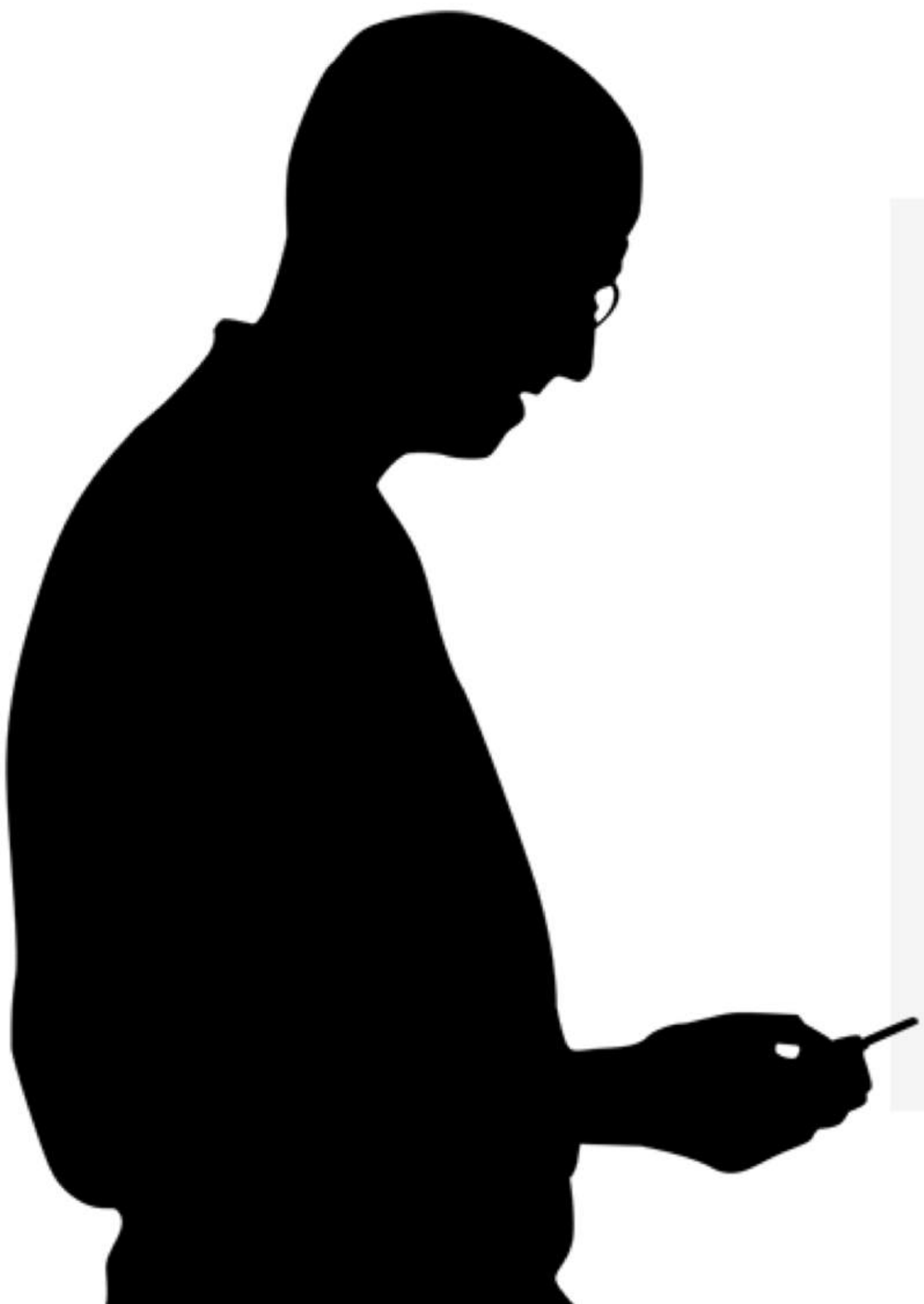
Test scores and measures of achievement tell you where a student is, but they don't tell you where she could end up.

-Carol Dweck

Closing Thoughts

“You can’t connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future. You have to trust in something — your gut, destiny, life, karma, whatever. This approach has never let me down, and it has made all the difference in my life.

-Steve Jobs

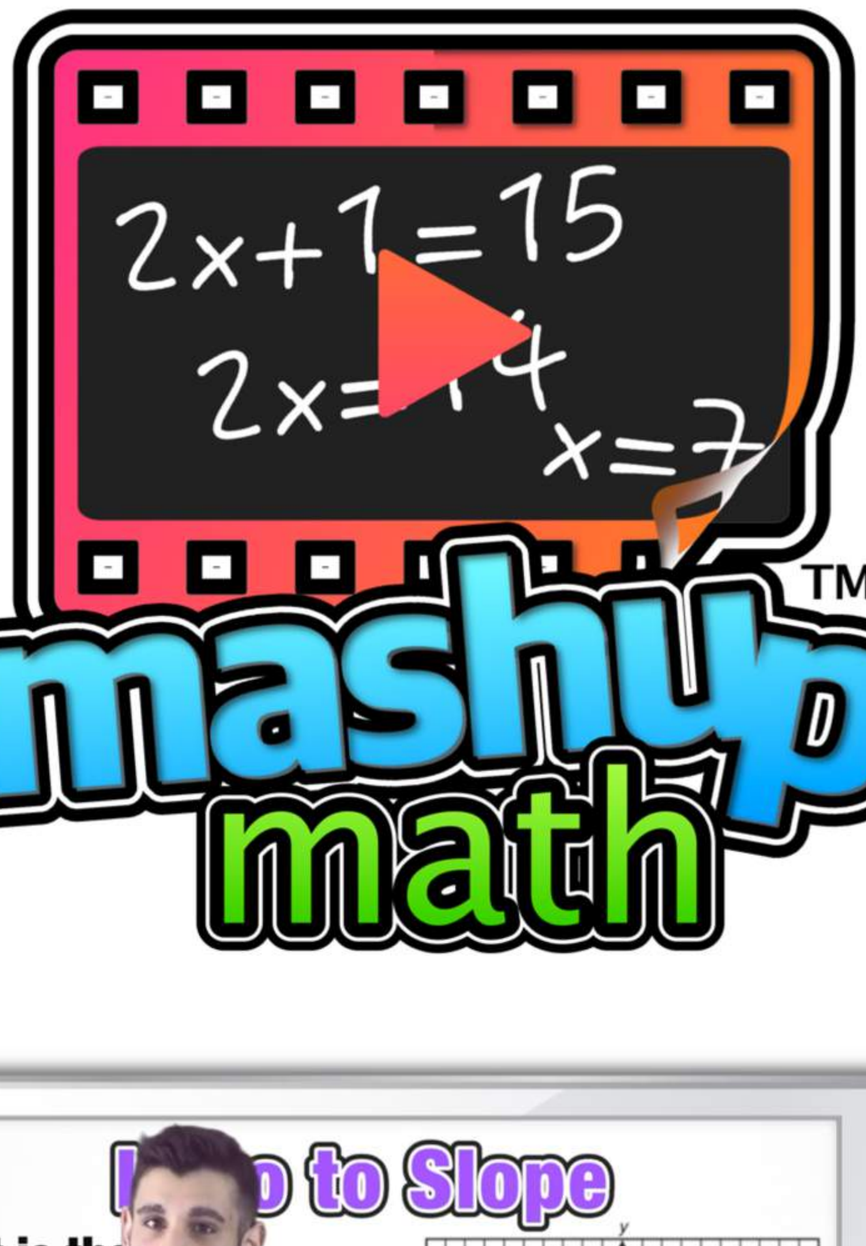


Although it’s impossible to say where your future will take you, it is certain that you will face difficult tasks and challenges.

Learning math gives you the skills to overcome these challenges, live a better life and build a smarter world!

about the AUTHOR

Anthony Persico is the chief content creator and founder of YouTube's MashUp Math. With a B.A. in elementary and secondary mathematics education and an M.A. in special education, Anthony has taught hundreds of students across the U.S. and around the globe via YouTube. In addition to teaching, Anthony is an education blogger, social media specialist, and advisor to Amazon Education's 'With Math I Can' campaign.



YouTube CERTIFIED PARTNER

You can access the complete library of over 100 free K-12 animated math lessons at www.youtube.com/mashupmath.

REFERENCES

INFORMATION AND DATA

http://www.brainfacts.org

http://www.consumerfed.org

http://www.mindsetonline.com

http://www.thinkadvisor.com

http://www.withmathican.org

QUOTES VIA

http://www.brainyquote.com

http://www.goodreads.com

EMOJIS

provided free by http://emojione.com