



# Unlocking Math Mystery: From Befuddled to Confident!

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# Agenda

The participants will come with resources from different entities of how to sign specific mathematical concepts in ASL and learn about student-centered resources for students using Math. This resource will be included within this workshop to bring to your workplace.

How to make math equitable for Deaf/Hard of Hearing learners?

- Exploring National Council of Teachers of Mathematics
- YouCubed - by Jo Boaler
- Problem Solving activity

# NCTM - National Council of Teachers of Mathematics, 2014

**This came from Common Core Standards for Mathematics - 8 teaching practices:**

- Make sense of problems and persevere in solving them.
  - Reason abstractly and quantitatively.
  - Construct viable arguments and critique the reasoning of others.
  - Model with mathematics.
- Use appropriate tools strategically.
  - Attend to precision.
  - Look for an make use of structure.
  - Look for and express regularity in repeated reasoning.

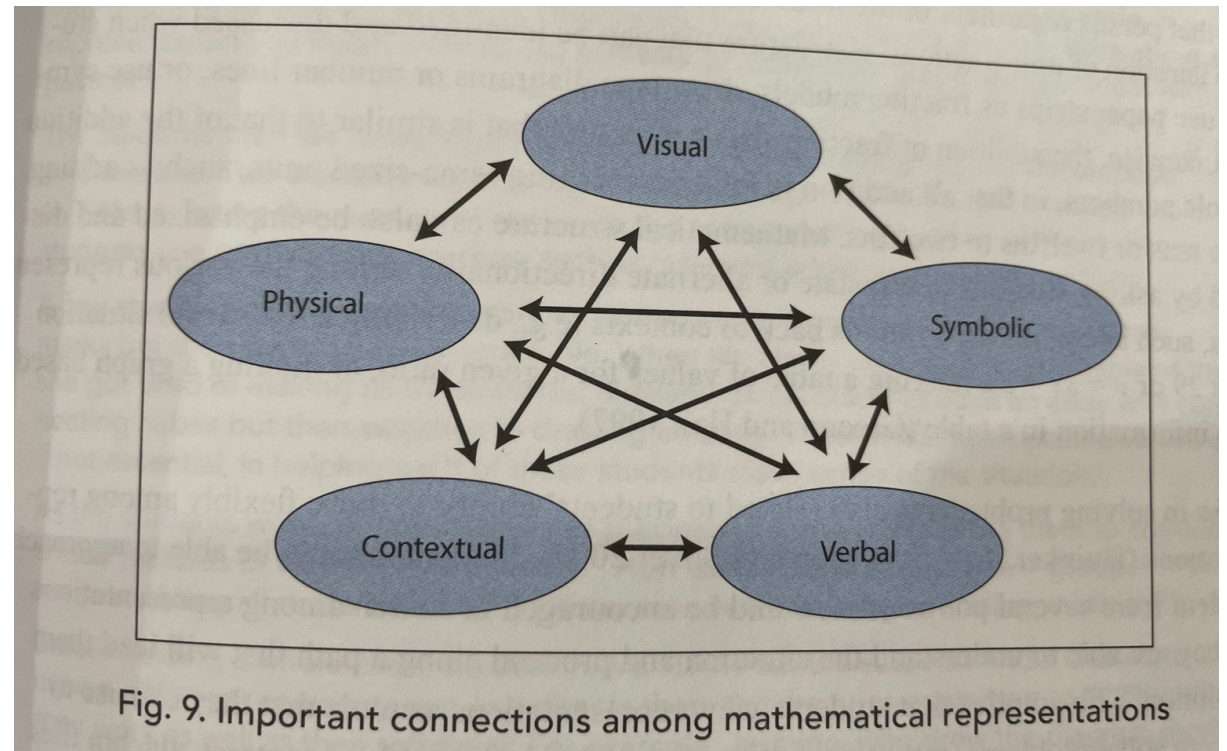
# Connections with Mathematical Representations

Coming from **procedural knowledge** becoming **conceptual knowledge**.

Procedural knowledge is the math facts fluency, memorizing the formula, and regurgitation for tests.

Conceptual knowledge is the deep understanding of the content.

*page 25 NCTM*

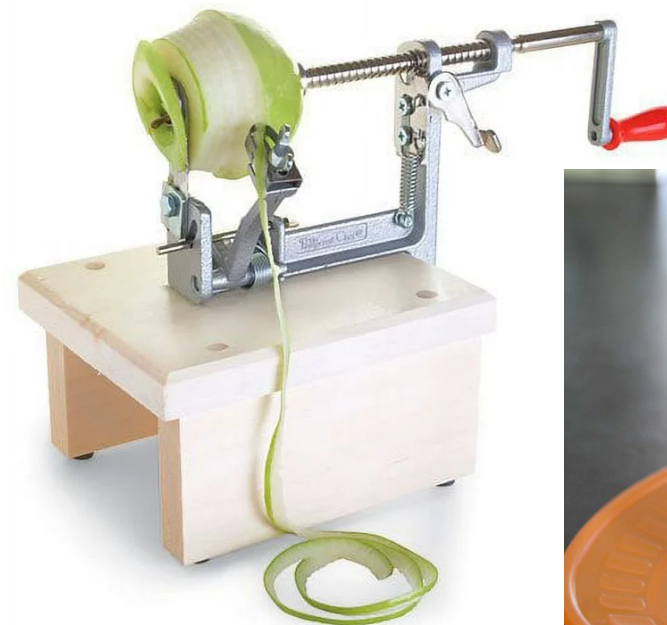


# Timing for Math

## Curriculum Pacing Guide

Teachers who use pacing guide tend to feel rushed and as a result, they often omit rich and challenging problem-solving tasks that are essential for developing deeper mathematical understanding (David and Greene, 2007). [NTCM, 71]

## Curriculum is Spiraled...



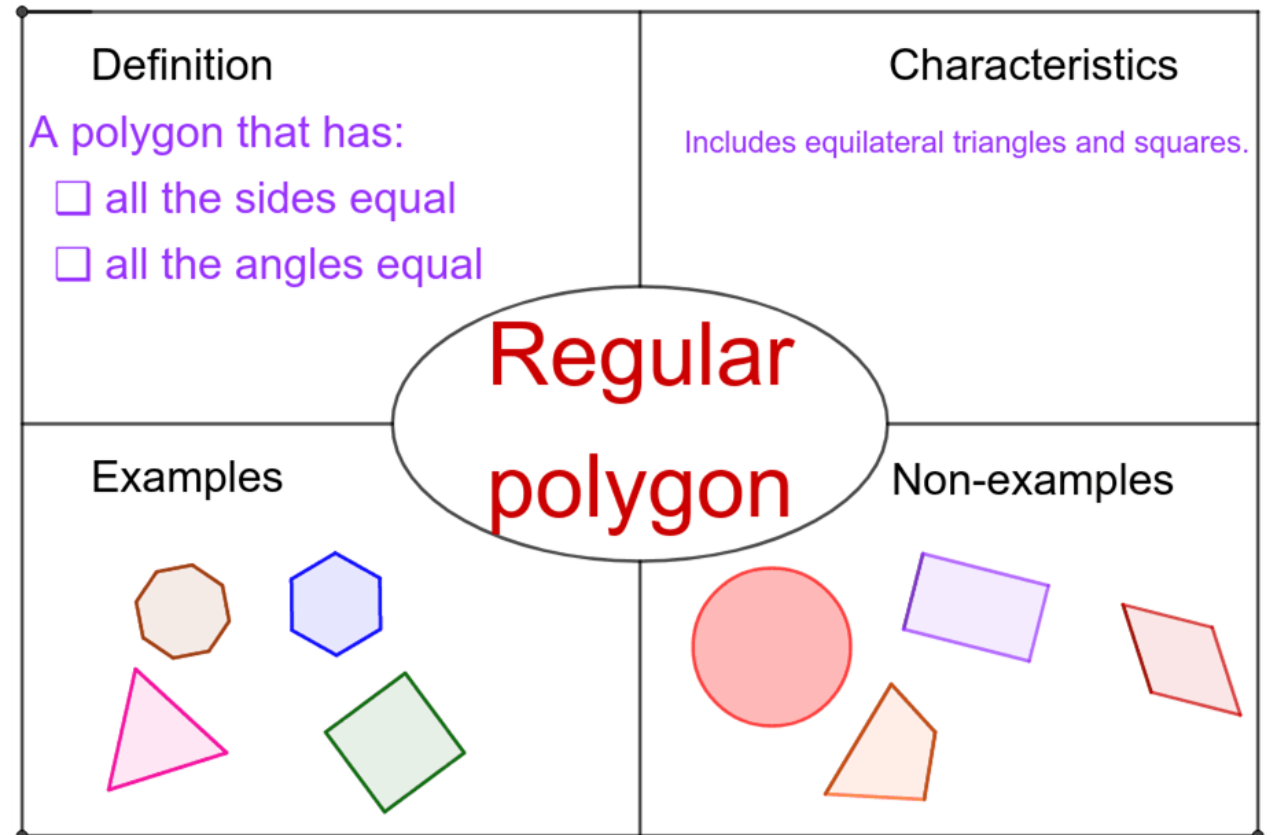
# Visuals - Frayer Model

Can be used for 1:1 to deepen the conceptual understanding.

Rule of Thumb:

To break away from “thinking in English”

- use examples, and nonexamples
- classifiers for characteristics
- fingerspelling of term - and provide sign.



# Visuals - The Real Number System - ASL from Paul Glaser

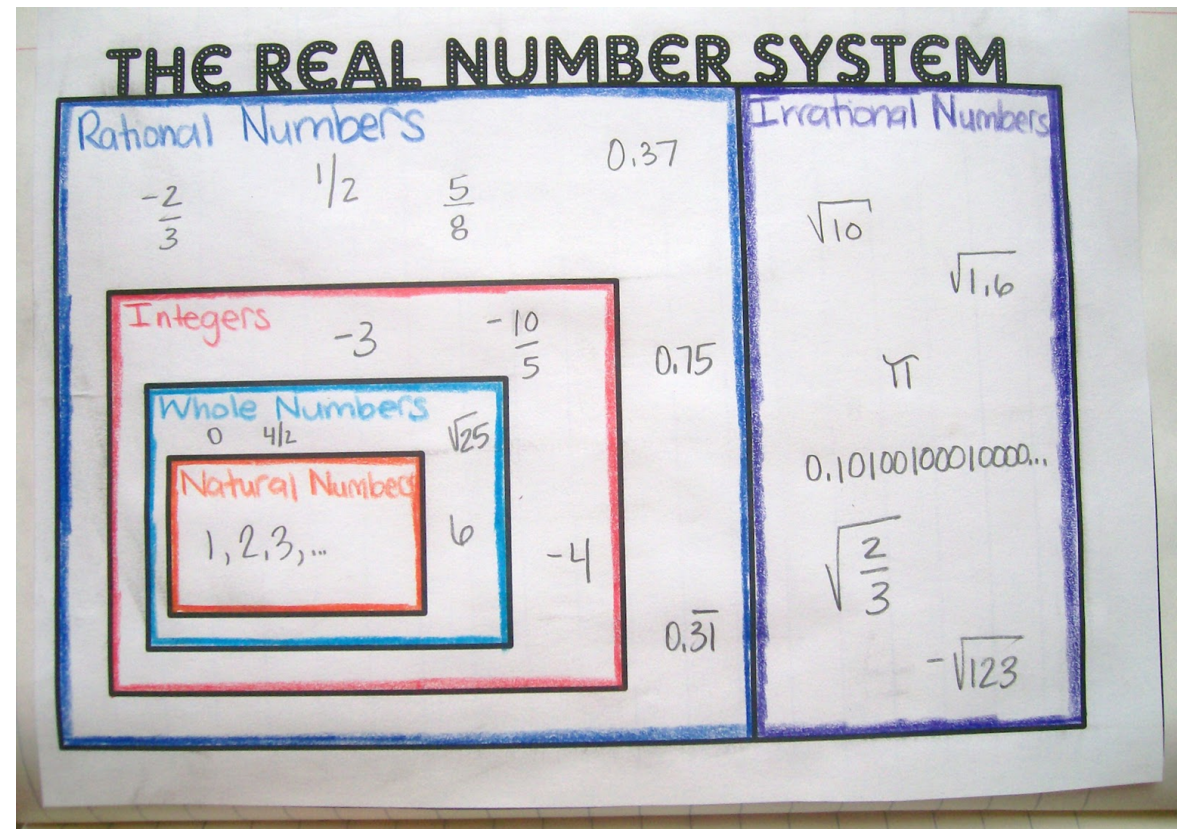
[natural numbers - real number systems - whole concept - ALL NUMBERS - \(not "real real"\) whole numbers \(0:22\) \(YouTube\)](#)

integers - plus or negative

rational - CL:1 like a bar graph -  $\frac{4}{1}$   
(with the image - WL - whole#)

irrational - IR numbers.

Imaginary - "i"



# Math Rabbit Hole -

What is normed for able-bodied people, can be normed for Deaf population given right tools.

- Math is no different. More resource are online for increased consistency in math terms in ASL.
- **Conceptual knowledge** comes first, then **procedural knowledge** cements the knowledge.





# Resource: Bedtime App

The screenshot shows the website [bedtimemath.org/category/daily-math/](http://bedtimemath.org/category/daily-math/). The page features a dark blue header with the Bedtime Math logo (a yellow crescent moon with the number 2 above it and the number 5 below it, and three yellow stars) and navigation links for [Daily Math](#), [Our App](#), [Teacher's Corner](#), and [More](#). Below the header is an orange banner that reads "Category: Daily Math".

The main content area has a heading: "Pick your favorite topic below. Read the opening, then solve the math together!". There are three article cards:

- Getting a Grip on It**: Accompanied by an image of a yellow rubber duck in a bathtub. The text asks, "Have you ever stayed in the bathtub or pool so long that your fingers turned wrinkly? Wonder why that happens? Scientists did some tests to..." and includes a "READ MORE" link.
- From Dishwasher to Fishwasher**: Accompanied by an image of a salmon in a dishwasher. The text says, "A dishwasher is an awesome machine. Just put in your dirty dishes and soap, press some buttons, and it washes and dries everything for you." and includes a "READ MORE" link.
- How to Feed a Shark**: Accompanied by an image of a shark and a person in a yellow raincoat. The text says, "Since it's National Zookeeper Week, we should give a shout-out to aquarists, who take care of the animals at the aquariums. There's lots of math" and includes a "READ MORE" link.

On the right side, there is a search bar with the text "Search..." and a magnifying glass icon. Below it is a section titled "Recent Posts" with a list of links: [Getting a Grip on It](#), [From Dishwasher to Fishwasher](#), [How to Feed a Shark](#), [Invent a Set for Lego!](#), and [Big Bad Bird](#). Below this is a section titled "Pick a Math Skill" with two options: [+ 4-5 Years](#) and [+ 5-6 Years](#).

# Problem Solving Ideas

# Resource: Described and Captioned Media Program

The screenshot displays the website for the Described and Captioned Media Program (DCMP). At the top left is the DCMP logo and the text "Described and Captioned Media Program". To the right are search, browse, and account buttons. Below the header is a navigation menu with "Media Center", "Learning Center", "eLearning", "Partners", and "About DCMP". The main content area features a video player on the left and a details panel on the right. The video player shows a woman in a blue shirt gesturing while speaking, with a video frame on the left showing a math problem involving shirts. The details panel includes a description of the video, media details such as runtime and ratings, and various accessibility and sharing options.

**DCMP** Described and Captioned Media Program

Search  Browse  Account

Media Center  Learning Center  eLearning  Partners  About DCMP

**Video Player:** I have 1 white shirt, 3 blue shirts, 3 striped shirts...

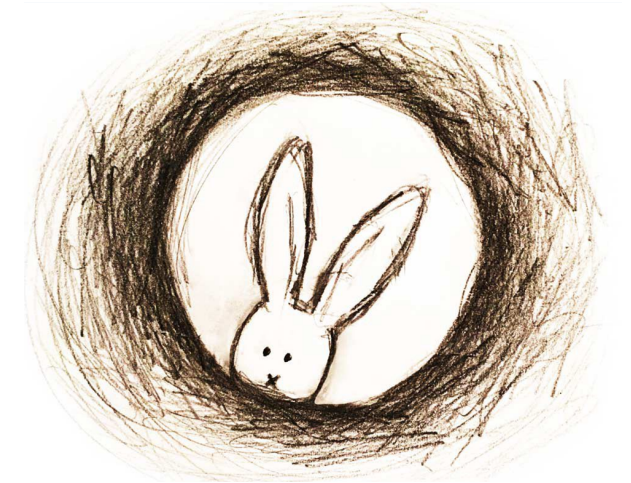
**Media Details**  
Runtime: 15 minutes  
★★★★☆

Topic: [Literature](#), [Mathematics](#)  
Subtopic: [Children's Literature](#), [Mathematics](#)  
Grade/Interest Level: 4 - 7  
Standards: [Meets 4 for MN \( 154 total \)](#)  
Release Year: 2009  
Producer/Distributor: [Weston Woods Studios](#)

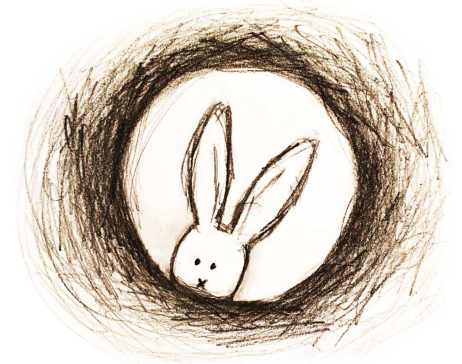
Now Playing As: English with English captions ([change](#))

# Bibliography – enjoy going down the rabbit holes!

- Exploring National Council of Teachers of Mathematics - <https://www.nctm.org/PtA/>
- YouCubed - by Jo Boaler - <https://www.youcubed.org/>
- Problem Solving - Growth Mindset - Angela Duckworth, “Without deliberate practice, you can only maintain your current abilities.”
- Math ASL Dictionaries:
  - <https://signsci.terc.edu/index.html>
  - [https://aslclear.org/categories/math/topics/basic\\_math/lectures/fractions](https://aslclear.org/categories/math/topics/basic_math/lectures/fractions)  
(use on Firefox)



# Bibliography – enjoy going down the rabbit holes! More...



- Math ASL Dictionaries: [Math Concepts in ASL - YouTube](#)
  - Atlanta Area School for the Deaf ASL Math Playlist
- Frayer Model: [6-12 L.VAU Frayer Model.pdf \(wi.gov\)](#)
- [Subtopic: Mathematics](#) - from Described and Captioned Media Program
- [XtraMath](#) - Xtra Math online - ASLized!
- [Daily Math](#) - Bedtime Math

# Activity

Pair up - think of your DHH student, describe the student to your partner: How can you make your thinking accessible for your DHH student?

## Leo the Rabbit

Leo the Rabbit is climbing up a flight of 10 steps. Leo can only hop up 1 or 2 steps each time he hops. He never hops down, only up. How many different ways can Leo hop up the flight of 10 steps? Provide evidence to justify your thinking.





**Thank you!**