Mathematics Teaching in K-5
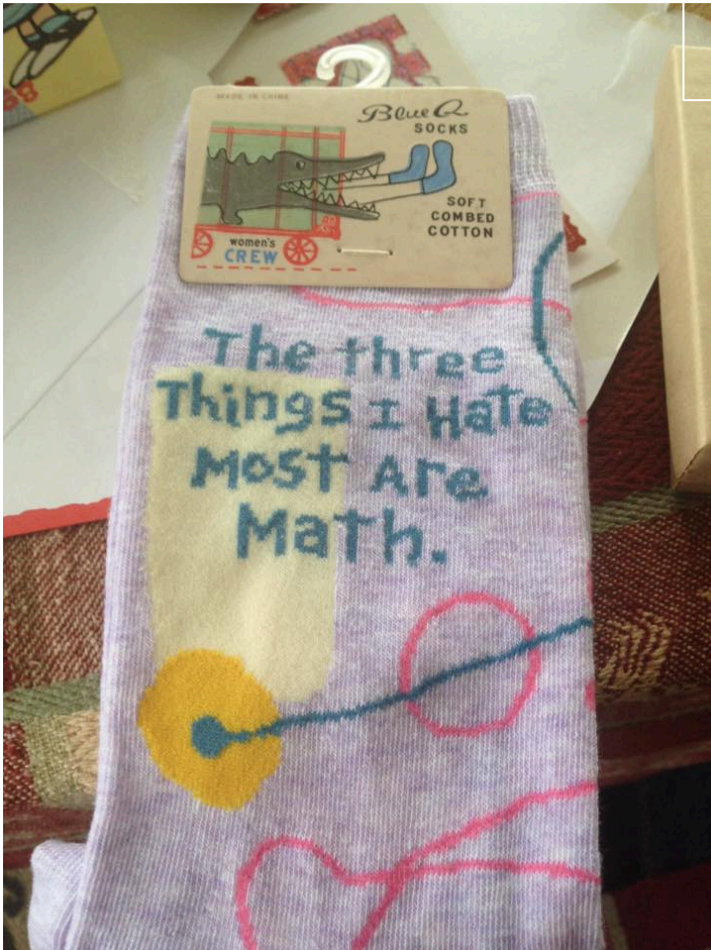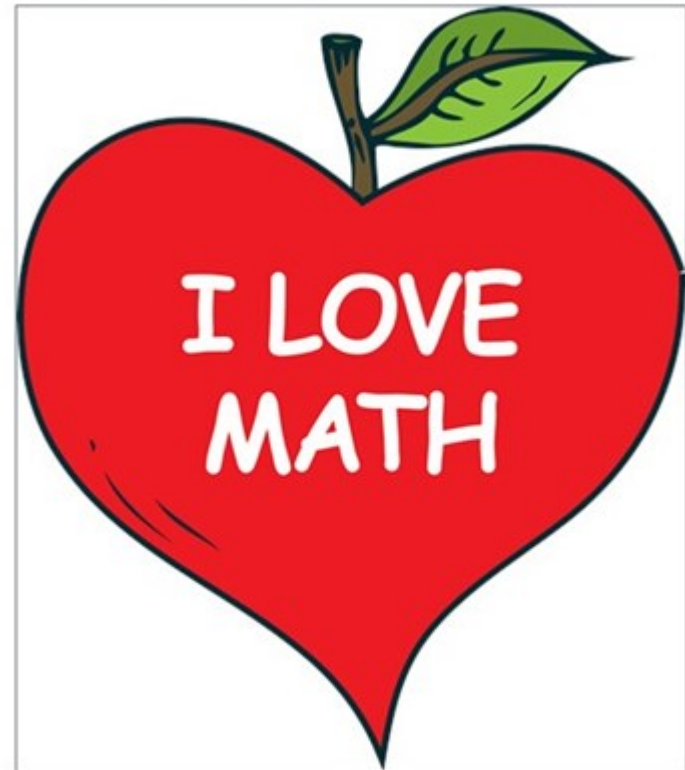
THE OHIO STATE UNIVERSITY

Welcome!

No way!

Share with others at your table your first job in education:

1. Identify something shared with one or more others about that first job.

2. Identify something unique about that first job.

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Introductions:
- **Name**
- **School and District**
- **Role and grade level(s)**
- **The unique thing about your first job in education**

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Our Norms for the Week

At your table discuss and identify at least 5 norms that you would like to suggest for our meeting this week.

Consider

- Participation

- Collaboration

- Other

Post on the wall.

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Possible **Meeting Norms** (Center for Adaptive Schools)

Demonstrate Mutual Respect (Respect people and ideas—such respect does not represent agreement.)

Employ Skillful Listening (Seek first to understand, then to be understood.)

Sufficient Consensus (Each person has an equal voice; the group works to understand all views; distinguish between dialogue and discussion; and 80% agreement of those present constitutes consensus.)

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Our focus for the week:

K-5 mathematics teaching and learning

What Is Mathematics?

What is "mathematics"?

In your group create and represent a definition on chart paper.

- Use words but may also represent graphically or with other visual elements
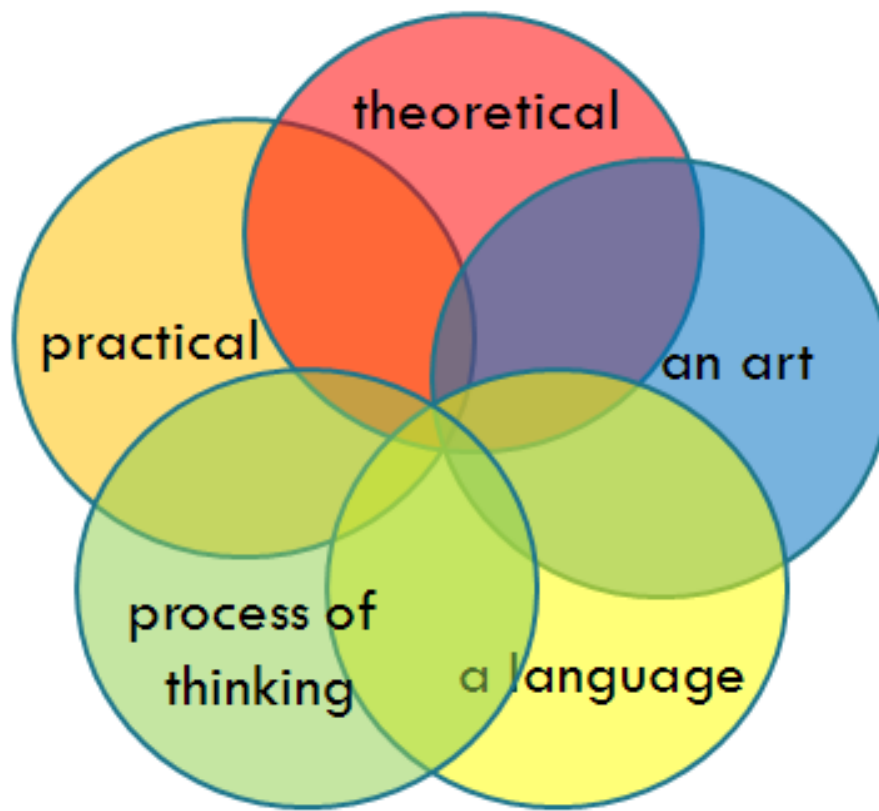
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Here are some definitions:

- "Mathematics is the study of topics such as quantity (numbers),structure, space, and change" (Wikipedia).

- "The science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects" (Encyclopedia Britannica)

- "Mathematics is mental activity which consists in carrying out, one after the other, those mental constructions which are inductive and effective" (intuitionism)

- "Mathematics is the manipulation of the meaningless symbols of a first-order language according to explicit, syntactical rules" (formalism).

- "Mathematics is an aid to representing and attempting to resolve problem situations in all disciplines."

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Mathematics is …

theoretical

practical

an art

process of thinking

a language

Here is some more playful response:
- "The subject in which we never know what we are talking about, nor whether what we are saying is true" (Bertrand Russell).

- "Mathematics is about making up rules and seeing what happens" (Vi Hart).

- "A mathematician is a blind man in a dark room looking for a black cat which isn't there" (Charles Darwin).

- "Mathematics is the art of giving the same name to different things" (Henri Poincaré).

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Why Do We Teach Mathematics in K-3? What are the Goals?

How many of you have encountered someone – maybe a fellow educator, maybe not, who commented about K-5 teaching, "How hard could it be?"?

09/15/common-core-math-education-standards-fluency-column/15693531/

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Richard Button ·
Fort Scott Senior High School

I see no need to make solving a problem more
complicated than it has to be. 10+5=15. Just take 10
add 5 and there's your answer. Why does it have to be
more complicated than that?

Like · Reply · 👍 19 · Sep 16, 2014 7:42am

Doug Larson

yep, that is all that math is, simple second grade
arithmetic

Like · Reply · 👍 24 · Sep 16, 2014 11:04pm

Richard Button ·
Fort Scott Senior High School

Doug Larson Tell me how taking a problem that
should only take 5 seconds to solve and
stretching it out to 30 is beneficial to kids?

Like · Reply · 👍 33 · Sep 16, 2014 11:37pm

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Here are some responses:

•It's important in everyday life and society.

•It's important in other curriculum areas.

•It's important in relation to the learner's intellectual development.

•It's important in developing the child's enjoyment of learning.

•It's distinctive place in human knowledge and culture.

• We do not want our kids lose at the starting line.

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A mathematician, like a painter or poet, is a maker of patterns. If his patterns are more permanent than theirs, it is because they are made with ideas.

- G.H. Hardy

Doing Mathematics

Dan Meyer's "Math Task in 3 Acts"

3 "acts" for mathematical modeling and problem-solving activities.

- We'll do a version today and consider throughout the week about how such a structure might be adapted to elementary mathematics learning experiences.

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Act 1: the video or image of a situation that generates questions that can be answered mathematically.

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"Animated Sierpinski carpet" by KarocksOrkav - Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons - https://commons.wikimedia.org/wiki/File:Animated_Sierpinski_carpet.gif#/media/File:Animated_Sierpinski_carpet.gif

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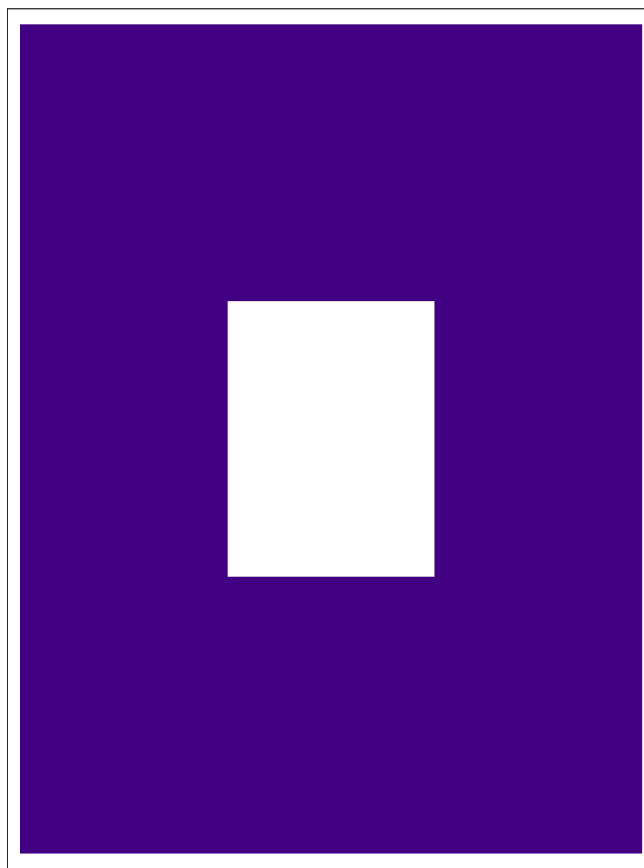
What are your questions from the images? What could be asked?

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Act 2: gives further information that may help answer the question.

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Activity: Making a Menger Sponge

How to Make a Cube for a Menger Sponge

Lay a business card across another, centered and at right angles to the first.

Fold the flaps down as shown.

Separate the cards. Make six for each cube.

Assemble the cards so that all the flaps are on the outside, matching short edges to long edges.

The completed cube.

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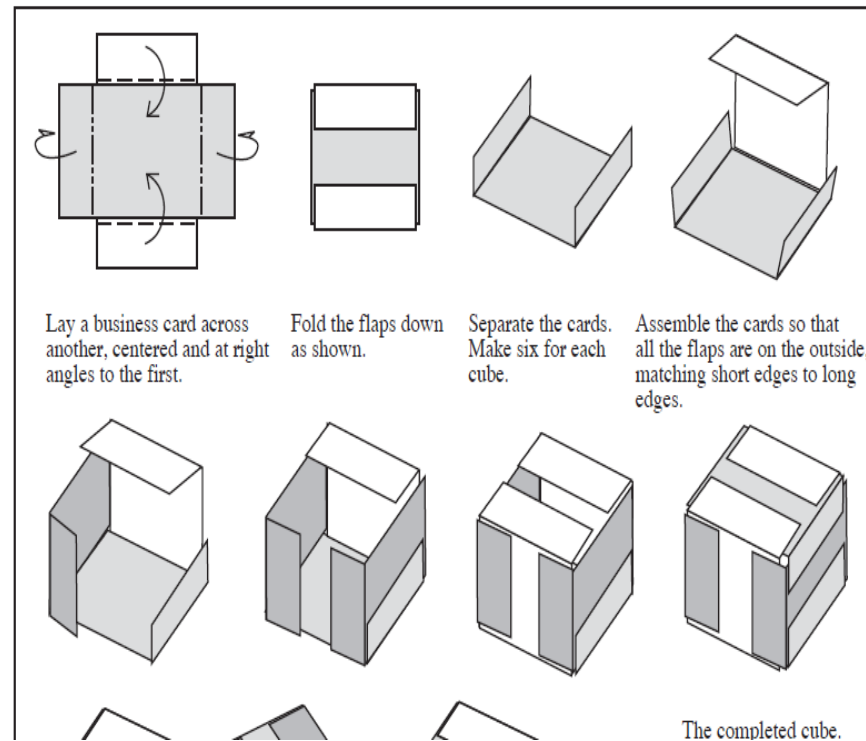
Your predictions for how many cards to make:

- **1 small cube**
- **1 Menger sponge**
- **How many cubes in that Menger sponge?**

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As you build, also ponder how many cubes made out of how many cards would be needed for the next level Menger sponge.

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Act 3: shows a video or image that answers the question.

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Mega Menger Sponge

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Consider the patterns and regularity of the Menger sponge.
- How is this similar to base-ten Place Value?

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In counting and place value, learners need to learn and understand the structure and regularity of the counting system.

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To those who do not know mathematics it is difficult to get across a real feeling as to the beauty, the deepest beauty, of nature... If you want to learn about nature, to appreciate nature, it is necessary to understand the language that she speaks in.

(Richard Feynman)