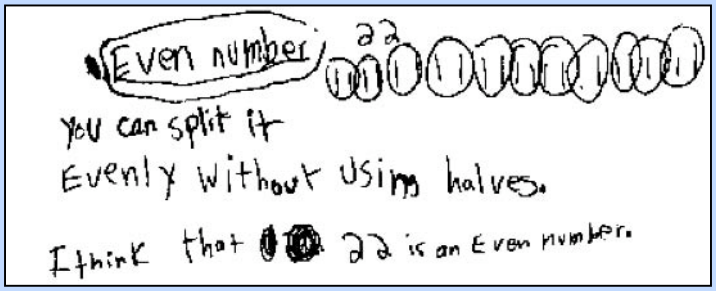
The Role of Mathematics in Learning to Participate in a Diverse Democracy



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The Claim of Tonight's Lecture

Mathematics has special role to play in preparing people with the habits, skills, and dispositions central to learning to participate in a diverse and democratic society.

This requires weaving

respect for **individuals**

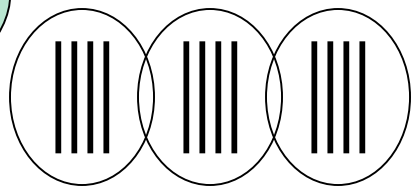
together with

efforts to work toward **collective** ends

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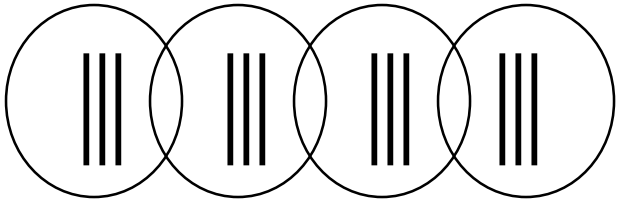
How much is three-fourths of a dozen?

Shouldn't one fourth have **four** in it?



$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

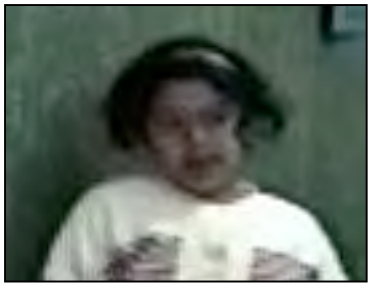
Here's **four** groups, so one of these is **one-fourth.**



$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

There's only three groups, so one of these makes **one third.**

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Rania:

I still disagree. . . I want to say something. This is what I think three-fourths is— I'm saying that <u>three-fourths is like three groups of four</u>.



Kevin:

I think she disagrees because she think like—she thinks one—the reason she thinks one fourth should have four is because of the four in the bottom number.

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Shea:
Can we vote?

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Equity , Diversity, and Social Justice and School Mathematics

1. Some practices of "good teaching" require **emphasis** in order to reduce the wide gaps in access,opportunity, and outcomes.
2. Some practices of "good teaching" **impede** equitable teaching: they may serve to reproduce inequality.
3. Mathematics offers special resources for the development of a **diverse democratic society**.

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The Claim of Tonight's Lecture

Mathematics has special role to play in preparing people with the habits, skills, and dispositions central to learning to participate in a diverse and democratic society.

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Three Possible Arguments in Support of the Claim

1. **Cultural diversity:** Mathematics is the creation of human beings across time in many settings and cultures. Rich mathematics is the basis for a diverse array of cultural practices.
2. **Political activism:** Mathematics offers tools for examining critically the unequal distribution of resources, power, and opportunities.
3. **Use of difference as a resource:** Mathematics offers shared experience with understanding, respecting, and using difference for productive collective work.

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The Basic Argument for the Claim

Mathematics is about problem solving.

Solving mathematics problems in school can provide a context in which:

- difference is a resource for solving problems
- the use of difference is structured and supported by common disciplinary language, norms, and practices

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Disciplinary Mathematics Can Be a Resource

What does it take to make mathematics work in school a setting for the cultivation of skills and values for a diverse democracy?

- The choice of instructional tasks
- The cultivation of attention to and respect for others' ideas
- The development of skills, habits, and norms of collective work

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Choosing Instructional Tasks

Use the numbers 9, 1, and 2 once on each line to make 6 different numbers. The first one is done for you:

1 9 2 _ _ _

_ _ _ _ _ _

_ _ _ _ _ _

Today's date is **9/12.**

- How many three-digit numbers can you make using 9, 1, and 2?
- How can you be sure that you have all the possibilities?

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Task: What is three-fourths of 12?

Context: Students' first work with fractions

- Can be represented in different ways
- Involves developing shared understanding of the meaning of "three-fourths" — public mathematical knowledge
- No set context for interpreting $\frac{3}{4}$

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a) 

b) 

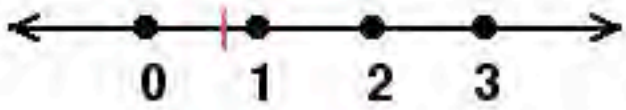
c) 

d) How many 4's are there in 3?

e) 18 crayons out of a box of 24

f) .75

g) I want to share 3 bottles of soda equally among 4 people. How much will each person get?

h) 

i) 

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Features of Instructional Tasks That Contribute to Using Difference as a Resource for Collective Work

- Develop common skills, language, and practices
- Can be represented in a variety of ways
- Do not depend unfairly on unevenly distributed experience or knowledge
- Profit from others' interpretations

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Investigating Mathematics in School as a Context for Using Difference

- Same third grade class, four months earlier
- Working on even and odd numbers, their precise definitions, and conjectures involving them
- Learning how to decide whether something is true or valid in mathematics

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I was just thinking about 6 . . .
I'm thinking it can be an odd number, too
. . .that it could be an odd *and* an even number—



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Viewing Focus

- What do you notice that might be relevant to learning to participate in a diverse democracy?
- In particular, what do you notice about:
  - The task
  - The ways in which students treat one another's ideas
  - The ways in which the students work as a collective, any practices, skills, norms in use

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Cultivating Attention to and Respect for One Another's Ideas

- Civility focused on ideas
- Learning to listen carefully to what others say, check for meaning before disagreeing
- Referring to others' ideas by name (giving credit)
- Critiquing others' ideas, not the individuals themselves, using tools and practices of the discipline

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Developing Skills, Norms, and Practices of Collective Work

- Use of shared experience, past agreements about meaning
- Using and contributing to one another's ideas
- Seeking agreements on meanings and solutions

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What Are Other Experiences with Difference that Students Can Have in School?
The Unique Contributions of Different School Subjects

- Political decision making
- Interpreting texts
- Writing and commenting on others' writing
- Understanding the past
- Using scientific theory to interpret phenomena
- Appreciating art or music

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Mathematics as Context for Experiences with Difference

- Imperative to reach consensus
- Norms and tools for agreement and reconciling disagreements, for deciding what is right or valid
- Ideas and solutions can be proposed and tested by students—common work

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Slides will be available at:

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