Professional Learning

Knowing and Valuing Every Learner: Culturally Responsive Mathematics Teaching

Adapted from *Reimagining the Mathematics Classroom*, coauthored by Dr. Mark Ellis

Mark Ellis, Ph.D.
Dr. Ellis is a Professor of Education at California State University, Fullerton and a highly regarded scholar and teacher of K–12 mathematics education. He is best known for his collaborative work with educators in developing strategies that help students understand mathematics concepts, supporting instruction around new standards, and addressing issues of equity in mathematics education.

Culturally Responsive Mathematics Teaching

The idea of culturally responsive mathematics teaching (CRMT) is premised on creating a learning environment focused on mathematical sense-making in which students feel valued for who they are, for their ways of engaging in mathematical reasoning, and for their contributions.

Four Dimensions of Culturally Responsive Mathematics Teaching

CRMT requires teachers to think about their classrooms and how well they reflect these four dimensions:

- developing students' proficiency with important mathematical concepts, relationships, and skills
- engaging students' identities
- sharing mathematical authority with students
- connecting mathematics to the investigation of authentic contexts and issues

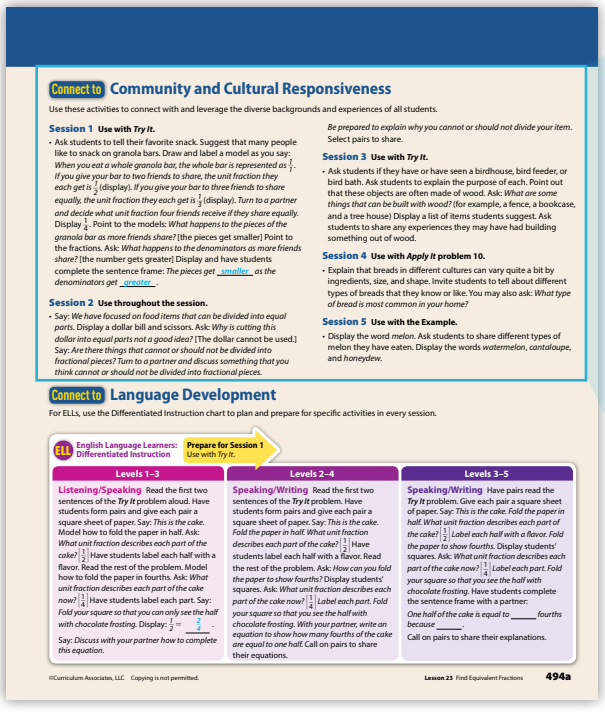
Aims of Culturally Responsive Mathematics Teaching

- Promote deep, meaningful mathematics learning.
- Value students' sense of identity.
- Build on students' cultural assets.
- Expand students' sense of possibility.
- Empower students to analyze issues and generate solutions.

Connect to Community and Cultural Responsiveness

This feature at the beginning of each lesson in the Teacher's Guide provides suggestions for some of the elements of CRMT, such as:

- valuing students' identities
- connecting mathematics to the investigation of authentic contexts and issues



Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all students.

Session 1 Use with *Try It*.

- Ask students to tell their favorite snack. Suggest that many people like to snack on granola bars. Draw and label a model as you say: *When you eat a whole granola bar, the whole bar is represented as* $\frac{1}{1}$. *If you give your bar to two friends to share, the unit fraction they each get is* $\frac{1}{2}$ (display). *If you give your bar to three friends to share equally, the unit fraction they each get is* $\frac{1}{3}$ (display). *Turn to a partner and decide what unit fraction four friends receive if they share equally.* Display $\frac{1}{4}$. Point to the models: *What happens to the pieces of the granola bar as more friends share?* [the pieces get smaller] Point to the fractions. Ask: *What happens to the denominators as more friends share?* [the number gets greater] Display and have students complete the sentence frame: *The pieces get* smaller *as the denominators get* greater .

Session 2 Use throughout the session.

- Say: *We have focused on food items that can be divided into equal parts.* Display a dollar bill and scissors. Ask: *Why is cutting this dollar into equal parts not a good idea?* [The dollar cannot be used.] Say: *Are there things that cannot or should not be divided into fractional pieces? Turn to a partner and discuss something that you think cannot or should not be divided into fractional pieces.*

Be prepared to explain why you cannot or should not divide your item. Select pairs to share.

Session 3 Use with *Try It*.

- Ask students if they have or have seen a birdhouse, bird feeder, or bird bath. Ask students to explain the purpose of each. Point out that these objects are often made of wood. Ask: *What are some things that can be built with wood?* (for example, a fence, a bookcase, and a tree house) Display a list of items students suggest. Ask students to share any experiences they may have had building something out of wood.

Session 4 Use with *Apply It* problem 10.

- Explain that breads in different cultures can vary quite a bit by ingredients, size, and shape. Invite students to tell about different types of breads that they know or like. You may also ask: *What type of bread is most common in your home?*

Session 5 Use with the Example.

- Display the word *melon*. Ask students to share different types of melon they have eaten. Display the words *watermelon*, *cantaloupe*, and *honeydew*.

Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

ELL English Language Learners: Differentiated Instruction — Prepare for Session 1 Use with *Try It*.

Levels 1–3	Levels 2–4	Levels 3–5
Listening/Speaking Read the first two sentences of the *Try It* problem aloud. Have students form pairs and give each pair a square sheet of paper. Say: *This is the cake.* Model how to fold the paper in half. Ask: *What unit fraction describes each part of the cake?* $\frac{1}{2}$ Have students label each half with a flavor. Read the rest of the problem. Model how to fold the paper in fourths. Ask: *What unit fraction describes each part of the cake now?* $\frac{1}{4}$ Have students label each part. Say: *Fold your square so that you can only see the half with chocolate frosting.* Display: $\frac{1}{2} = \frac{2}{4}$. Say: *Discuss with your partner how to complete this equation.*	**Speaking/Writing** Read the first two sentences of the *Try It* problem. Have students form pairs and give each pair a square sheet of paper. Say: *This is the cake. Fold the paper in half. What unit fraction describes each part of the cake?* $\frac{1}{2}$ Have students label each half with a flavor. Read the rest of the problem. Ask: *How can you fold the paper to show fourths?* Display students' squares. Ask: *What unit fraction describes each part of the cake now?* $\frac{1}{4}$ *Label each part. Fold your square so that you see the half with chocolate frosting. With your partner, write an equation to show how many fourths of the cake are equal to one half.* Call on pairs to share their equations.	**Speaking/Writing** Have pairs read the *Try It* problem. Give each pair a square sheet of paper. Say: *This is the cake. Fold the paper in half. What unit fraction describes each part of the cake?* $\frac{1}{2}$ *Label each half with a flavor. Fold the paper to show fourths.* Display students' squares. Ask: *What unit fraction describes each part of the cake now?* $\frac{1}{4}$ *Label each part. Fold your square so that you see the half with chocolate frosting.* Have students complete the sentence frame with a partner: *One half of the cake is equal to* _____ *fourths because* _____. Call on pairs to share their explanations.

©Curriculum Associates, LLC Copying is not permitted. Lesson 23 Find Equivalent Fractions 494a

Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all students.

Session 1 Use with *Try It*.

- Ask students to tell their favorite snack. Suggest that many people like to snack on granola bars. Draw and label a model as you say: *When you eat a whole granola bar, the whole bar is represented as* $\frac{1}{1}$. *If you give your bar to two friends to share, the unit fraction they each get is* $\frac{1}{2}$ (display). *If you give your bar to three friends to share equally, the unit fraction they each get is* $\frac{1}{3}$ (display). *Turn to a partner and decide what unit fraction four friends receive if they share equally.* Display $\frac{1}{4}$. Point to the models: *What happens to the pieces of the granola bar as more friends share?* [the pieces get smaller] Point to the fractions. Ask: *What happens to the denominators as more friends share?* [the number gets greater] Display and have students complete the sentence frame: *The pieces get* smaller *as the denominators get* greater .

Session 2 Use throughout the session.

- Say: *We have focused on food items that can be divided into equal parts.* Display a dollar bill and scissors. Ask: *Why is cutting this dollar into equal parts not a good idea?* [The dollar cannot be used.] Say: *Are there things that cannot or should not be divided into fractional pieces? Turn to a partner and discuss something that you think cannot or should not be divided into fractional pieces.*

Be prepared to explain why you cannot or should not divide your item. Select pairs to share.

Session 3 Use with *Try It*.

- Ask students if they have or have seen a birdhouse, bird feeder, or bird bath. Ask students to explain the purpose of each. Point out that these objects are often made of wood. Ask: *What are some things that can be built with wood?* (for example, a fence, a bookcase, and a tree house) Display a list of items students suggest. Ask students to share any experiences they may have had building something out of wood.

Session 4 Use with *Apply It* problem 10.

- Explain that breads in different cultures can vary quite a bit by ingredients, size, and shape. Invite students to tell about different types of breads that they know or like. You may also ask: *What type of bread is most common in your home?*

Session 5 Use with the Example.

- Display the word *melon*. Ask students to share different types of melon they have eaten. Display the words *watermelon*, *cantaloupe*, and *honeydew*.

Use these activities to connect with and leverage the diverse backgrounds and experiences of your students.