NUMBER HAS ITS PLACE: A 2nd Grade Unit

TEACHER'S GUIDE

Correlation to NCTM Curriculum Focal Points and Connections to the Focal Points for Grade 2

(CFP) Number and Operations: Developing an understanding of the base-ten numeration system and place-value concepts.

Children develop an understanding of the base-ten numeration system and place-value concepts (at least to 1000). **Their understanding of base-ten numeration includes ideas of counting in units and multiples of hundreds, tens, and ones, as well as a grasp of number relationships**, which they demonstrate in a variety of ways, including comparing and ordering numbers. **They understand multidigit numbers in terms of place value, recognizing that place-value notation is a shorthand for the sums of the multiples of powers of 10** (e.g., 853 as 8 hundreds + 5 tens +3 ones).

♦♦♦♦♦

It is essential that these focal points be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations.

Bold print in the description of the focal point identifies the topics addressed in the unit.

Prerequisite Knowledge or Skills

In order to be successful in this lesson, students will need to have had various counting experiences (grouping sets).

Suggested Materials

- Interlocking cubes
- Tub in which to place interlocking cubes
- Record sheet
- Base-ten pieces
- Various collections of small items (e.g., buttons, keys, small rocks, plastic lids, beads, etc.)

Literature Connection

Two of Everything by Toy Hong
What Comes in 2's, 3's and 4's? by Suzanne Aker

Literature Connection Note

Young children naturally gravitate towards literature, both fiction and non-fiction. Literature provides the connection that makes problem solving practical. It integrates mathematics with other content areas providing a real world context. Children can see the links between their lives and mathematics. It is also a fun way of having students remember mathematical terms and concepts. (Note continues…)

Teacher's Guide: Grade 2

Each unit is correlated to the NCTM Curriculum Focal Points and/or the Connections to the Focal Points. Look for correlations to your state on the TTT website.

Each unit includes one or more Warm Up Problems, a Problem Solving Task and one or more Extension Problems.

This TTT program encourages visual solutions.

Possible solutions are included when one answer is appropriate.

WARM UP 1 ACTIVITY (Part A)

Part A
Pass around a tub of interlocking cubes or other counters, allowing children to take two handfuls (about 20 to 40). Say to students: "Estimate how many cubes you have. Record it in your journal. Now, count your cubes."

Ask students to record their method of counting in their journals.

When students are finished, encourage them to explain and share their system of counting. Demonstrations can be shown by using a projector or by having the children sit in a circle.

Warm Up Activity 1 (Part A) Suggestions

Prior to this task, demonstrate how to pass a tub of interlocking cubes, how to take handfuls and how to collect the cubes. Allow time for free exploration of the manipulatives needed for this Warm Up. While students work, circulate around the room to see how individual students are counting.

(Suggestions continue…)

WARM UP ACTIVITY 1 (Part B)

Part B
Ask the class: "How can we count the number of cubes in all of our handfuls in the classroom? Since you each took two handfuls, we don't know how many each student has." Give time for thoughtful responses. Then ask: "What would be the fastest way to group our cubes so we could count them quickly?"

Warm Up Activity 1 (Part B) Suggestions

This second-grade focal point emphasizes developing an understanding of base-ten numeration. This includes ideas of counting units in multiples of hundreds, tens and ones.

(Suggestions continue…)

WARM UP ACTIVITY 2

Place containers of base-10 pieces—tens strips and units (ones pieces)—and containers of small tiles or other counters on the tables for students. Tell students to take out 12 tiles or other counters. Then tell them to select the fewest number of base-10 pieces that would represent 12 tiles. Have students record the number of tens and the number of ones in their journals.

Repeat the process with other numbers between 15 and 35.

Teacher's Guide: Grade 2 (continued)

Pages have been reduced in size and combined for this sample folder.

Each unit includes black line masters of all problems with permission for one classroom teacher to make copies for his/her students.

PROBLEM SOLVING TASK

Part A
Take several handfuls of small items from the bin. Estimate how many items you have.

Estimate		Count	
Tens	Ones	Tens	Ones

Part B
Show how you counted your items.

Part C
Draw a picture of the base-10 pieces to show the number of items you counted. Show how many tens and how many ones you have.

Then write that number: _____

Problem Solving Task Directions and Suggestions

To begin this task:
Pass out handfuls of interlocking cubes or other small counters as you did in the Warm Up Activities, allowing students to take handfuls that will yield about 25-40 total pieces. Have students estimate and record their estimate of the number of pieces and then count the actual number of pieces. (Suggestions continue…)

EXTENSION ACTIVITY

Begin to work with hundreds. The entire class can count the total number of counters that were used in the Problem Solving Task. Record that number on the board for students to see.

Hand out journals and base-10 pieces, this time using hundreds, tens and ones. Ask students to draw and write that number (e.g., 563 shown as five hundreds, six tens and three ones).

Extension Suggestions

If base-10 pieces are new to students, allow time to explore using the hundreds pieces with the tens pieces and units before presenting this problem. (Suggestions continue…)

Teacher's Guide: Grade 2 (continued)

The range of difficulty, from the first Warm Up to the hardest Extension, provides appropriate challenge for students of diverse skill levels.

Extension problems are included in each unit for students who need additional challenge.

Sample (S) 2: Score 2

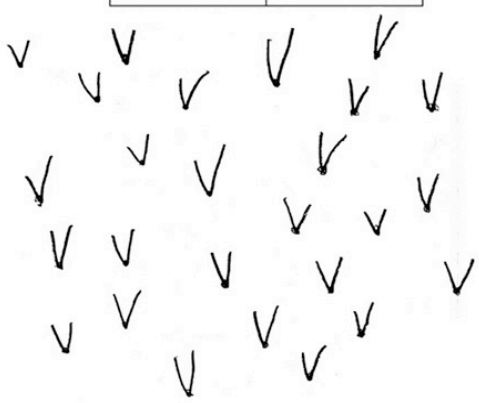
The response shows an attempt to organize the counters into a pattern, but the arrangement is not helpful for counting. The response then appears to show the base-ten pieces matching the number of counters selected. However, the total number of birds shown in the photograph is 24, while the drawing shows 26 and the number recorded is 23. An understanding of the base-ten model is demonstrated for the number recorded (23) because the base-ten pieces also show 23.

Sample (S) # 2 PTQRB

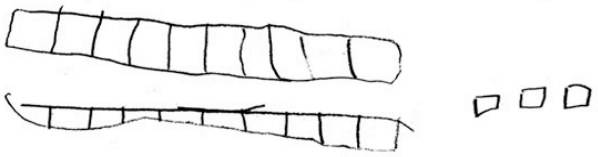
Part A
Estimate how many items you have.

Tens	Ones
2	5

Part B
Show how you counted your items.



Part C
Draw a picture of the base-10 pieces to show the number of items you counted. Show how many tens and how many ones.



Then write that number. 23

Teacher's Guide: Grade 2 (continued)

Each Problem Solving Task has several samples with scored commentaries based on an individual rubric.

The samples, commentaries and individual rubrics assist teachers in evaluating the work of their students.

The scored samples and commentaries also help students learn how to evaluate their own work on Problem Solving Tasks.

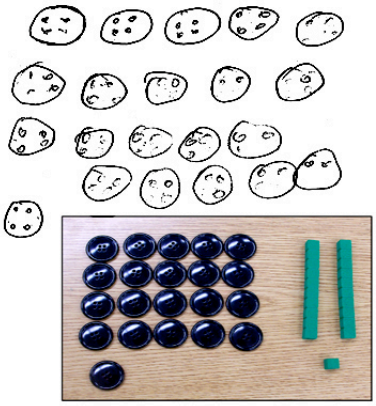
"FIX IT!"
C.1 NUMBER HAS ITS PLACE

DIRECTIONS: CHANGE OR ADD TO THE WORK BELOW TO IMPROVE THE FINAL SCORE.
PTQRB

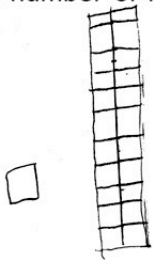
Part A
Estimate how many items you have.

Tens	Ones
1	8

Part B
Show how you counted your items.



Part C
Draw a picture of the base-10 pieces to show the number of items you counted. Show how many tens and how many ones.



Then write that number. 23

TEACHER SELF-EVALUATION FORM
Check the strategies you used in this unit and note what you said or did.

WAYS TO HELP STUDENTS MAKE SENSE OF PROBLEM SOLVING	√	WHAT I SAID OR DID
• Be aware of the mathematics embedded in each unit—Warm Up(s), Task and Extension(s)—so you can engage students in discussions that will deepen mathematical understanding.		
• Encourage visualization of solutions, especially with the use of manipulatives.		
• Encourage students to rely on their own and each other's thinking.		
• Ask students to reference the criteria of the problem to stimulate discovery of necessary information and/or insight.		

(Form continues…)

Teacher's Guide: Grade 2 (continued)

After a class has completed a unit, the "FIX-IT" activity can give students practice in revising and improving a work sample.

The job of the student in these exercises is to analyze what makes sense in the sample and what needs changing, and then to fix and complete the solution.

The Teacher Self-Evaluation Form is included at the end of each unit. It can assist teachers as they learn to incorporate these instructional strategies into their daily problem-solving lessons.