

PLACE VALUE PENGUINS: A 1st Grade Unit

TEACHER'S GUIDE

Correlation to NCTM Curriculum Focal Points and Connections to the Focal Points for Grade 1

(CFP) Number and Operations: Developing an understanding of whole number relationships, including grouping in tens and ones.

Children compare and order whole numbers (at least to 100) to develop an understanding of and solve problems involving the relative sizes of these numbers. **They think of whole numbers between 10 and 100 in terms of groups of tens and ones (especially recognizing the numbers 11 to 19 as 1 group of ten and particular numbers of ones).** They understand the sequential order of the counting numbers and their relative magnitudes and represent numbers on a number line.

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 topic addressed in the Unit.

Note: Children begin the cognitive process of understanding place value on the concrete level using many different kinds of manipulatives. In their journey to the symbolic level of using only numbers, there needs to be a transition or connecting process. The purpose of this unit is to support that transition.

Prerequisite Knowledge or Skills

To be successful in this unit, students need to understand how to represent two-digit numbers with objects.

Literature Connection

A Penguin World by Caroline Arnold
Penguins by Gail Gibbons

WARM UP 1 ACTIVITY

Show one grouping of ten at a time. Ask students to explain how they figured out how many units are in the grouping.

Materials: Cut the "Groups of Ten" page (on page 9) into individual sections

Warm Up 1 Activity Suggestions

The goal of this activity is to encourage students to explain how they are "seeing" groupings of ten. The teacher can then introduce the more standard forms for ten (ten frames and base ten pieces) as more examples of ways of "seeing" groupings of ten.

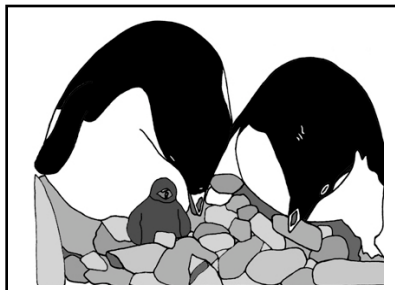
Teacher's Guide: Grade 1

Each unit is correlated to the NCTM Curriculum Focal Points and/or Connections to the Focal Points.

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

WARM UP 2 ACTIVITY

Papa and Mama Penguin had 17 stones in their nest.



Show the value of the number 17 as many ways as you can.

Materials: counters, interlocking cubes, straws, buttons, pebbles and/or beans to glue on to craft sticks, base-10 pieces

Please notice that these items are passed out at different times, as noted in the Suggestions.

Warm Up 2 Suggestions

See penguin facts in unit B.4 Nests of Stone for background information on Adelie penguins. This species uses stones to build nests.

Part A

Read the problem to students. Write the number 17 where all students can easily see it. Have students read the number out loud.

Allow students to experiment and share solutions. Students may choose to use a variety of manipulatives to show the number 17. Be sure to discuss groupings of ten with seven units, as well as other groupings. Some students may group by twos, fives or by using other methods. (Suggestions continue...)

Part B

Now pass out materials that could be used to bundle into tens pieces, such as straws (with rubber bands), beans and small cups, craft sticks with buttons, pebbles or beans that students can glue onto the sticks. Ask students to count out 17 items (straws, beans, etc.) and represent 17 using at least one bundle or group of ten.

Part C

Finally, pass out base-10 pieces. Ask students to show 17 with base-10 pieces. Ask students to compare their arrangements with base-10 pieces to the arrangements that they made in Part B.

To extend this lesson, practice this same sequence with “teen” numbers, and eventually with higher numbers.

Teacher's Guide: Grade 1 (continued)

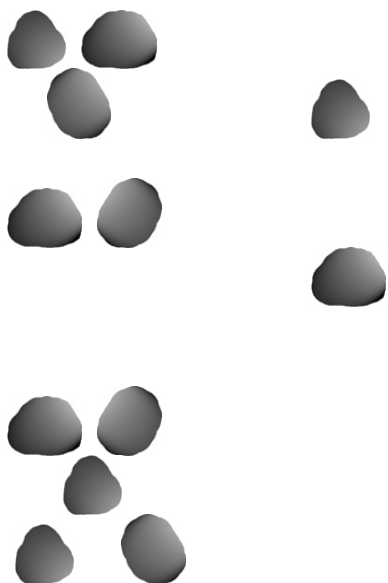
Pages have been reduced in size and/or combined for this sample folder.

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

WARM UP 3 ACTIVITY

Part A

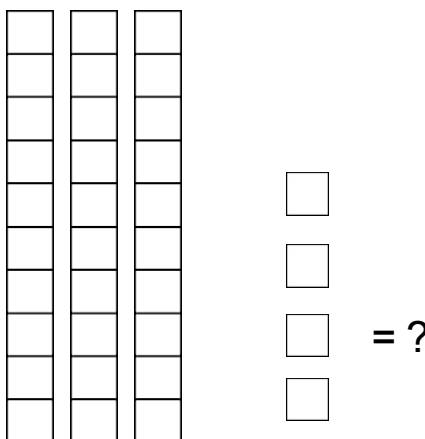
Papa Penguin borrowed this many rocks.



How many rocks? _____

Part B

Now, Papa and Mama have this many rocks.



How many rocks? _____

Part C

Now Papa Penguin's neighbor has 45 rocks.

Show the value of the number 45 without using numbers. Use groupings of 10 in as many ways as you can.

Explain your work.

Materials: counters such as tiles, bears, interlocking cubes; materials that could be used to bundle into tens pieces such as straws (with rubber bands), beans and small cups, popsicle sticks with buttons, pebbles or beans that students can glue onto the sticks; base-10 pieces

Warm Up 3 Activity Suggestions

Show Warm Up 3 on your projector (see Black Line Master on page 11). Read the problem to students, one part at a time.

For each part, ask students to:

- State the problem using their own words.
- Identify what information is needed.

Have suggested manipulatives available.

(Suggestions continue...)

Teacher's Guide: Grade 1 (continued)

The TTT program encourages the use of concrete manipulatives. We have chosen manipulatives that are commonly used in classrooms.

We provide Black Line Masters of any materials that can be duplicated.

PROBLEM SOLVING TASK

The penguin chicks gather in groups for safety while their parents hunt for food. There are 29 chicks. Show two or more ways the parents can count to see if they are all there. Use groupings of ten for at least one of the ways.



Problem Solving Task Suggestions

Have a variety of manipulatives available for student use.

Ask students to:

- State the problem in their own words.
- Identify what information is needed.
- Eliminate any information that is not needed.
- Discuss possible manipulatives and/or the use of a number line to solve this problem.
- Discuss some ideas about how to start to solve this problem.

While they are working, circulate among the students. Look for a variety of different representations of 29 (e.g., twenty-nine straws configured into two bundles of ten and nine units, two towers of ten plus nine cubes, two tens sticks plus nine units, etc.). One of the representations may show 29 as individual items or grouped by twos, threes, etc.

When the class is finished, ask students to:

- Share and explain their work.
- Evaluate whether the work uses the information from the problem.
- Decide whether or not the answer fits the question.
- Compare different ways to show groups of ten.

A Solution

At least one way must show 29 as two groups of ten with nine units.

Teacher's Guide: Grade 1 (continued)

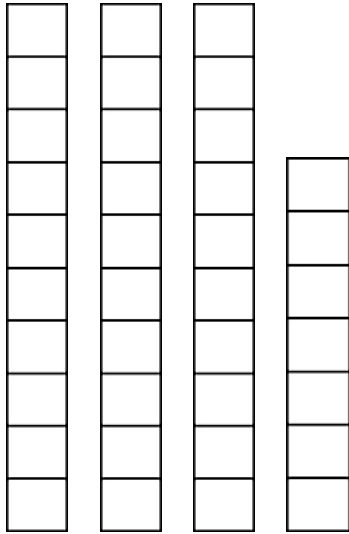
Each book provides more than 65 problems per grade level, including Warm Ups and Extensions.

Specific teaching suggestions throughout each unit facilitate effective instruction.

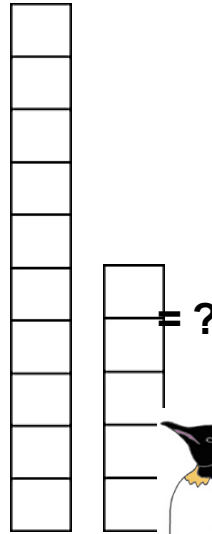
Ideas for group and/or partner work are included throughout the units.

EXTENSION

The number of chicks that hatched on Monday.



The number of chicks that hatched on Tuesday.



+

= ?



How many chicks hatched on Monday and Tuesday?

Teacher's Guide: Grade 1 (continued)

Extension problems are included in each unit for students who are ready for additional challenges.

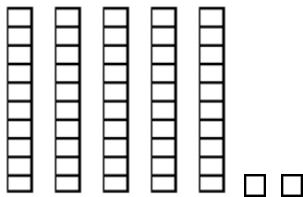
The range of difficulty, from the first Warm Up to the hardest Extension, provides appropriate challenges for students of diverse skill levels.

Extension Suggestions

Have base-10 pieces available.

A Solution

3 tens + 7 units + 1 ten + 5 units = 5 tens + 2 more units (52).



B.5 PLACE VALUE PENGUINS
Sample and Scored Commentary

Sample (S) 4: Partially Effective

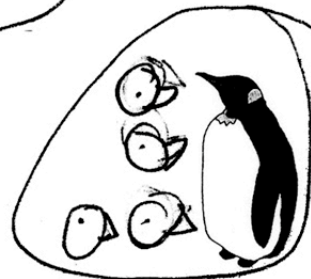
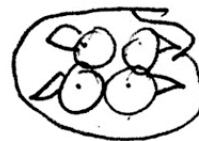
The illustration of a single penguin (printed on the page) is incorporated into one of four groups of five penguins, which is partnered with one group of four (which would total 24). One correct solution is shown with two groups of ten circles and one group of nine circles. It is possible that the simplicity of the circles made the total number more clear.

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Sample (S) #4

PKT

The penguin chicks gather in groups for safety while their parents hunt for food. There are 29 chicks. Show two or more ways the parents can count to see if they are all there. Use groupings of ten for at least one of the ways.



**Teacher's
Guide:
Grade 1
(continued)**

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

Our rubrics reflect the criteria of Understanding, Process/ Reasoning and Communication, which are found in the scoring guides of many states.

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

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
<ul style="list-style-type: none"> 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. 		
<ul style="list-style-type: none"> Encourage visualization of solutions, especially with the use of manipulatives. 		
<ul style="list-style-type: none"> Encourage students to rely on their own and each other's thinking. 		
<ul style="list-style-type: none"> Ask students to reference the criteria of the problem to stimulate discovery of necessary information and/or insight. 		
<ul style="list-style-type: none"> Avoid verbal and non-verbal responses that discourage independent student reasoning and only direct students to the teacher's way of thinking. 		
<ul style="list-style-type: none"> Ask questions to help students clarify and justify their thinking during independent, small group or whole group sessions. 		
<ul style="list-style-type: none"> Design learning tasks and/or questions to help students develop new ways of making sense of a problem when they discover that their old ideas don't fit the data they collect. 		
<ul style="list-style-type: none"> Scaffold the examples of student work to share for discussion, from simpler to more complex thinking. 		
<ul style="list-style-type: none"> Encourage journaling to help students make sense of their math experiences. Read the journals to learn more about student thinking; use that insight to guide future instruction. 		
<ul style="list-style-type: none"> Foster focused student-to-student dialogue. 		
Other:		

Teacher's Guide: Grade 1 (continued)

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