## Place Value - A Place for Apples

Brief Overview:


#### Abstract

In this unit students will show an understanding of place value by representing numbers in various ways. The first lesson will focus on counting groups of tens using concrete objects. The second lesson extends the concept of tens and ones by representing numbers using place value models. The last lesson students will apply knowledge of number relationships by identifying a number that is ten more or ten less than a given number.


NCTM Content Standard/National Science Education Standard:

Numbers and Operation

- Understand numbers, ways of representing numbers, relationships among numbers and number systems

Grade/Level:
Grade 2

Duration/Length:

Three 1-hour lessons

## Student Outcomes:

Students will:

- Demonstrate knowledge of numbers and place value by counting groups of tens and ones.
- Demonstrate knowledge of numbers and place value by representing two-digit numbers using base-ten models.
- Apply knowledge of number relationships by identifying a number that is ten more or ten less, one more or one less than a given number.

Materials and Resources:

Day 1

- Envelopes (one per student)
- Teacher Resource 2: Apples (Copy on red paper and precut. Laminate before cutting the apples if possible.)
- Small paper cups (1 stack per table to be used by students if desired)
- Student Resource 1: Apple Count (Cut into 4 response cards.)
- Teacher Resource 1: Assessment Checklist
- Baggies with various amounts of small concrete objects (enough for class to work in pairs and one for the teacher)
- Timer
- Student Resource 2: Groups of Tens
- Student Resource 3: Tens and Ones
- Apple Pigs by Ruth Orbach

Day 2

- Overhead place value models
- Tens and ones work mat transparency
- Baggies of place value models
- Tens and ones and work mats (one per student)
- Chart of an outline of a tree with apple sticky notes for game, Pick An Apple, (two-digit numbers should be written on each apple
- Two bags of apples
- Teacher made chart to resemble Teacher Resource 3: Teacher Facilitation T-Chart Sample
- White boards and markers
- Student Resource 4: Two-Digit Number Models
- Student Resource 5: Making Two-Digit Numbers
- Baggies of concrete objects
- Unifix cubes
- Number cubes (dice)

Day 3

- Baggies of place value models and work mats
- One large teacher-made spinner similar to those on Teacher Resource 4: Game Spinners
- Baggies of concrete objects
- Hundred Chart for each student
- Student resource 6: 10 More, 10 Less, 1 More, 1 Less
- Highlight marker
- Teacher Resource 4: Game Spinners (Prepare as directed on sheet)
- Student Resource 7: Summative Assessment
- Teacher Resource 6: Summative Assessment Answer Key
- Game markers
- Apple with 34 written on it

Days 1-3

- Teacher Resource 5, Answer Key for Student Resources 1-6

Development/Procedures:
Lesson 1
Pre-Assessment -

- Initiate the lesson by telling the students that they will learn how to count large groups of numbers. Read the story Apple Pigs, by Ruth Orbach to start a discussion about counting a large amount of apples. After reading the story, ask students how they would count a large number of apples.
- Distribute Teacher Resource 2, Apples, in envelopes and a stack of paper cups. Place an answer sheet, (Student Resource 1, Apple Count) inside the envelope for students to record their answer.
- Instruct students to count the apples. Tell them that they may or may not use the cups to group the apples when counting.
- Browse to assess students' responses by using Teacher Resource 1, Assessment Checklist, to determine which students are counting by ones and which are grouping tens and counting by tens and ones.

Launch -

- Ask several students to share the number of apples in the envelope. Have students tell if they counted by tens and ones, or if they counted by ones.
- Model counting the apples in an envelope. Count by ones and tell students that this is called counting by ones. Show students how to make groups of tens, and count the apples that way.
- Use the paper cups to count groups of tens. The rest of the apples are not placed in a cup.
- Help students understand that grouping by tens is a faster and easier way to count large groups.
- Review counting by tens.
- Model how to count by tens, then switch to ones.


## Teacher Facilitation -

- Distribute baggies containing various concrete objects (Toothpicks, buttons, paper clips, etc.) to partners. Use group in tens and ones for counting. The cups are used for the groups of tens.
- Model the procedure with a student's assistance to complete this task. Ask the following questions: What is our friendly number? How many will I put in my first group? The questioning continues until all groups of tens are made. Count the objects by tens and ones and write the number on a response sheet.
- Instruct partners to work together making groups of tens and then counting objects by tens and ones. Allow 10 minutes to complete this activity by using a timer. Have students share answers.
- Assist students in trading baggies for more practice. Set timer for 5 minutes. As students write answers, the teacher will assess by using Teacher Resource 1, Assessment Checklist.


## Student Application

- Distribute Student Resource 2, Groups of Ten, and read directions aloud to students. Complete an example on the chalkboard similar to Student Resource 3. Students complete the activity independently.


## Embedded Assessment

- Use students' responses from Student Resource 2, Groups of Ten, to determine if students need reteaching or extension by using the Embedded Assessment Checklist.
Answers can be found on Teacher Resource 5.

Reteaching/Extension

- Gather students who will require reteaching into a small group. Distribute the envelopes of apples and paper cups to each student. Guide students in grouping tens with the apples in the envelopes. Students will record answers on extra sheets of Student Resource 1, Apple Count. Repeat
- Redistribute the baggies of concrete objects, paper cups and Student Resource 3, Tens and Ones. Have students count objects in 4 baggies as an extension activity.

Lesson 2
Pre-Assessment

- Place (more than 10) counters on the overhead projector to review the previous day's lesson. Ask students how many counters there are and how they determined their answers.
- Then display clear place value models (tens rods and ones cubes) and a place value work mat transparency on the overhead. Hold up a rod and ask students if they have seen this model. Students will show thumbs-up or thumbs-down for responses. Discuss the name and value of the rod. Hold up a unit and ask students if they have they seen this model. Students will show thumbs-up or thumbs-down for responses. Discuss the value.

Launch -

- Display two bags of apples. Invite students to recall how we can count large groups. Ask students what is the friendly number.
- Assist students in making groups of tens and then count the apples by tens and ones to write the two-digit number in a place value work mat. Remind students that after the tens have been grouped, count on by ones.
- Distribute the baggies of the place value models (tens and ones) and the place value work mats. Allow students to explore and discuss what they know about the models. Show students that 10 singles lined up beside a rod is the same in length. Help students to understand that 10 singles is the same a rod.
- Invite students to observe the game on the chart, Pick An Apple Game, which is clipped on the chalkboard. Distribute white boards and dry erase markers to continue the game. Model by picking an apple from the tree and reading the number. Use questions to guide students' thinking. Ask students how many tens they need to show 24. Place 2 rods in the tens' place. How many ones? Place 4 singles in the ones' place. Explain that we can write only one digit for each place in a two-digit number.
- Continue the game by allowing students to come up and pick an apple to read the number and show the number using the models. All students will practice showing the number that is picked. The game continues until all apples are picked.
- Browse to assess students' understanding by observing if students use models correctly.

Student Application -

- Distribute Student Resource 4, Two-Digit Number Models. Have students complete this activity independently. After completion, resource sheets are collected and graded in order to determine groups for reteaching or extension. Answers can be found on Teacher Resource 5.
- Instruct students to play Two-Digit Number Roll (see second part of Student Resource 5, Making Two-Digit Numbers, as the teacher completes the assessments.)
- Use responses from Student Resource 4, Two-Digit Number Models, to determine groups for reteaching or extension.


## Reteaching/Extension

- Gather students who will require reteaching into a small group. Distribute baggies of unifix cubes and allow students to make trains of tens. Students will practice counting the trains by tens.
- Model how to count on by tens then ones by picking up 1 train and placing 1 cube next to the train. Count by saying 10, 11. Continue the process by adding another cube until students begin to join in on the counting. This should be done with 2 trains and cubes, 3 trains and cubes and so on. Students should grasp the concept of counting on when starting with a ten.
- Use Teacher Resource 3, Teacher Facilitation T-Chart, and quickly add more apples in the number column. Instruct students to read the next number and show it using the models. Ask the students how many tens are shown. Count aloud as tens are placed. Ask the student how many ones are shown and place the ones in the ones place. Continue until students become more proficient.
- Distribute Student Resource 5, Making Two-Digit Numbers, for the extension group. Answer key can be found on Teacher Resource 5.
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- Distribute baggies of place value models and work mats. (See materials list.) Hold up an apple that shows the number 34 and ask students to show the number with the models.
- Ask students what number is 10 more. Show that number with the models. Observe students responses.
- Ask students to clear mats. Again show the apple with the number 34 and have students show the number. Ask students what number is 10 less. Show that number with the models. Observe students responses.

Launch -

- Have students sit in a circle on the floor with place value models and work mats. Use prepared spinner from Teacher Resource 4, Game Spinners, and place it in the middle of the circle.
- Begin the game by discussing the vocabulary on the wheel. Now point to 10 more on the wheel and ask students the number that would be 10 more. Now display another bag of ten and ask how many objects are there now. Students should count by tens to get the answer of 20. Begin another example by showing two bags of tens and one single object. Identify how many objects. Remind students to count by tens and then count on by ones to determine the number. Students should count 10, 20, 21. Continue the process with all parts of the wheel on the game spinner.


## Teacher Facilitation

- Choose a two-digit number that students should show using place value models and work mats. Have a student spin the wheel and read the directions. Now students will show the new number on their work mats. Discuss changes that need to be made with the models on the work mat.
- Draw students' attention to the Hundred Chart and identify the original number by pointing to it. Point to the new number that is directly under the original number for 10 more. Follow the same procedure for to explain 10 less using the Hundred Chart. Students will identify that counting on is used for 1 more and counting back for 1 less.
- Continue the game until students have practiced with all parts on the wheel. Allow students to tell what happened when making the new numbers after spinning the wheel. Findings should include that a rod is added for 10 more, a rod is taken away for 10 less, a single is added for 1 more and a single is taken away for 1 less.
- Observe to determine students making original model and removing or adding to make the new model. Observe vocabulary used by students when explaining what happened when the new number is made.


## Student Application -

- Distribute Student Resource 6, 10 More, 10 Less, 1 More, 1 Less, for independent practice. Answer key can be found on Teacher Resource 5.


## Embedded Assessment -

- After spot-checking, use responses from Student Resource 6, 10 More, 10 Less, 1 More, 1 Less, to determine students' need for reteaching or extension.
- Gather students who will need reteaching in a small group on the carpet. Students will need place value models, work mat and the classroom Hundred Chart.
- Select a number for students to show on work mats. Point to 1 more on the wheel and have students show the new number. Point to the original number on the Hundred Chart, and highlight the number in the one's place. Have students count on 1 more and also highlight the number in the one's place. Students should note that the highlighted numbers show 1 more. Compare the numbers on the chart with the number on work mats. Continue the process with all parts of the wheel until students have ample practice.
- Distribute Teacher Resource 4, Game Spinners, Hundred Charts and game markers, for extension group to work with partners.


## Summative Assessment:

See Student Resource 7, Summative Assessment
Use Teacher Resource 6, Summative Assessment Answer Key, to check student responses.

Authors:

| Dorothy Henry | Lauren Lipcon |
| :--- | :--- |
| George Washington Elementary | Southwest Baltimore Charter School |
| Baltimore City, MD | Baltimore City, MD |

## Apple Count

Name

## How many apples did you count?

Name
How many apples did you count?

Name $\qquad$
How many apples did you count?

Name

## How many apples did you count?

$\qquad$ Date $\qquad$

## Groups of Ten

Directions: The animals gathered too much fruit to count it all by ones! Help them count their meals faster by circling groups of 10 , then counting by tens and ones.


Name $\qquad$ Date $\qquad$

## Tens and Ones

Directions: Count by tens and ones and draw the objects in groups of tens and ones. Circle the groups of ten. Write the total.

| Object $\qquad$ <br> Draw and write how many. |  |  | Object $\qquad$ <br> Draw and write how many. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
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|  |  |  |  |  |  |  |  |  |
|  | tens | ones |  | tens | ones |
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| Object $\qquad$ <br> Draw and write how many. |  |  | Object $\qquad$ <br> Draw and write how many. |  |  |
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|  | tens | ones |  | tens | ones |
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Name $\qquad$ Date $\qquad$

## Two-Digit Number Models

Directions: Count the tens rods and ones cubes. Write the total:


Directions: Draw a model using pictures of tens rods and ones cubes to show the given quantity:


Name $\qquad$ Date $\qquad$

## Making Two-Digit Numbers

Directions: Use the number words to draw a model. Write the number.


Explain: What changed in your models and in your written numerals when you went from sixteen to twenty-six to thirty-six to forty-six?

## Two-Digit Number Roll!

Directions: Roll two dice. Pick one roll to be the tens digit and the other roll to be


Name $\qquad$ Date $\qquad$

## 10 More, 10 Less, 1 More, 1 Less

Directions: Use your tens rods and ones cubes to make 45. Then follow the path to make and draw a model for each new number.


Explain: What happens to the numbers and your models as you do ten more, ten less, one mo

| tens | ones |
| :--- | :--- |
|  |  |
|  |  |

$\qquad$
$\qquad$
$\qquad$
tens ones

Name $\qquad$ Date $\qquad$

## Summative Assessment

Directions: Circle the groups of 10, then count by tens and ones and write the two-digit number.


Directions: Count the tens rods and ones cubes to tell how many:


Directions: Draw a model using pictures of tens rods and ones cubes to show the given quantity. Fill in the numbers to show 10 more and 10 less:

|  |  | 10 more than 22 |  |
| :--- | :--- | :--- | :--- |
|  |  |  |  |
| tens | ones |  |  |
| 2 | 2 |  |  |

What happens to the tens digit of a number when you add 10 more?

What happens to the ones digit of a number when you add 10 more?

## Assessment Checklist

Directions: Put a check by observable behaviors during the pre-assessment and again during the embedded assessment. During the pre-assessment, under the "grouping?" column, indicate the group size if students are grouping by $\mathbf{2 s}$, by 5 s , by 10 s , etc.

Pre-Assessment Checklist


Embedded Assessment Checklist

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Directions: Place between 11 and 99 in an envelope tor each student.





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$\vdots>$



## Teacher Facilitation T-Chart Sample

Directions: Have students show their numbers and then tell how they built them.
Encourage them to use the vocabulary "tens rods" and "ones cubes". As they explain the composition of their number, teacher draws the corresponding model on teacher-made $\mathbf{t}$ chart similar to sample illustrated below.

| Number | Model |
| :---: | :---: |
| $51$ |  |

## Game Spinners

Directions: Copy on tag board and use a brass fastener and paper clip to make spinners. Use 1 Hundred Chart per pair as the game board, have students place a marker on number 55 . Then they take turns spinning the spinner and moving their marker as indicated. The winner is whoever is on the higher number when time is up (can set a timer or time can be up whenever the math period is over).


## Answer Key

Student Resource 1: Answers will vary.

Student Resource 2:

| Donkey's apples | tens | ones | Bird's berries | tens | ones |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1 | 8 |  | 5 | 6 |
| Monkey's <br> bananas | tens | ones | Bat's oranges | tens | ones |
|  | 2 | 5 |  | 0 | 7 |

Student Resource 3: Answers will vary.

Student Resource 4:

| tens | ones | tens | ones |
| :---: | :---: | :---: | :---: |
| 4 | 3 | 7 | 0 |
| tens | ones | tens | ones |
| 3 | 5 | 1 | 8 |

Drawings will vary.

Student Resource 5:


The tens digit increases by one and one tens rod is added.
Answers will vary.

## Student Resource 6:



The tens digit and the tens rods change by one when you do 10 less and 10 more. The ones digit and the ones cubes change by one when you do 1 less and 1 more.

## Teacher Resource 6 <br> Summative Assessment Answer Key <br> Directions: Circle the groups of 10, then count by tens and ones and write the two-digit number.



Directions: Count the tens rods and ones cubes to tell how many:


Directions: Draw a model using pictures of tens rods and ones cubes to show the given quantity. Fill in the numbers to show 10 more and 10 less:

|  |  | 10 more than 22 |  | 10 less than 22 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Drawings will vary. Check to be sure there are the proper numbers of tens rods and ones cubes. |  |  |  |  |  |  |
| tens | ones | tens | ones |  | tens | ones |
| 2 | 2 | 3 | 2 |  | 1 | 2 |

What happens to the tens digit of a number when you add 10 more?
The tens digit goes up by 1
What happens to the ones digit of a number when you add 10 more?
The ones digit does not change!

