Big Idea(s):

Use numbers to represent quantities.

Essential Question(s):

How can numbers help us in everyday life?

Content Standard(s):

Write numbers from 0 to 20. Represent a number of objects with a written numeral 0 to 20 (with 0 representing a count of no objects).

Mathematical Practice and/or Process Standards:

Construct viable arguments and critique the reasoning of others.

Attend to precision.

Learning Intention(s):

Mathematics Learning Intentions

We are learning to
* Understand that a written number represents how many are in a group of objects by
    o Recording or writing numbers after we count groups of objects
    o Making a group of objects to match a number we see

Language Learning Intentions

* Write or record numbers 0 to 20 after hearing the number called by our teacher or classmate.
* Use mathematical words like *subitize*, *group*, *set*, *match*, and *record*.

Social Learning Intentions

* Listen to each other count.
* Ask questions about each other's counting.
* Explain how we know that a group of objects matches a number we see or hear.

Success Criteria (written in student voice):

I know that I am successful when I can:
* Write a number I hear (even when not counted in order).
* Count a group of objects and record or write the number I counted.
* Write the number 0 for when there is no group of objects.
* Match a collection of objects with a subitized set.
* See a number and make a group of objects that matches that number.
* Match a group of objects to a number.

Standards for Mathematical Practice Success Criteria:

* Stick with a problem even when I am not sure at first how to solve it.
* Listen to my classmates' explanations about place value and ask questions that show I understand place value.

Purpose:

☑ Conceptual Understanding ☐ Procedural Fluency ☐ Transfer

Task:

How Many Insects?

The insects are crawling all over the leaves! We need to find out how many insects are on each leaf. How can we find out?
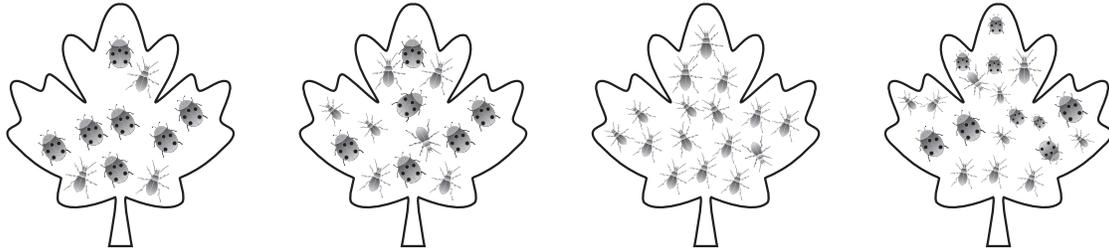
Note: The downloadable student worksheets contain 11 leaves representing numbers 10 to 20.

Materials (representations, manipulatives, other):

Two-color counters

Misconceptions or Common Errors:

Students may count every dot without subitizing.

Students cannot decompose teen numbers.

Students may struggle with one-to-one correspondence.

Students read teen numbers like 11 as onety-one or one-one.

Format:

☐ Four-Part Lesson   ☐ Game Format   ☐ Small-Group Instruction

☑ Pairs   ☐ Other_____

Formative Assessment:

Use observation checklist to observe the following:

- One-to-one correspondence
- Grouping of tens and some ones
- Counting technique
- Conservation

Launch:

Number Talk:

First, "flash" the ten-frame cards to the students in a series. Ask the students to show how many dots they see using their fingers or numeral cards. Then post all the ten-frame cards on the board. Pose these questions:

- What do you see?
- What do you notice about the ten-frame cards?

Anticipate:

Some students will still need extra time to mentally count the dots on the cards.

Some students will instantly see how many dots are on the cards.

Some students may need to see how the dots can fill in the spaces.

Questions to help the students make the connection:

- Do you notice anything about the arrangement of the dots that will help you find out how many dots are on the ten-frame card?
- Is there a way you can figure out how many dots are there without counting all the dots?

Facilitate:

Include plans for mathematical discourse and questions.

Present students with the *How Many Insects?* problem and visual.

1. Conduct a Notice and Wonder (see lesson launch chapter) with the students, and record their notices and wonders.
2. Connect the notices and wonders and ask, "How can we find out how many insects are on the leaves?"
3. Ask the students to write an estimate on a sticky note and post the estimates in order from least to greatest.
4. Elicit from the students that they can count the insects on the leaves.
5. Ask the students,
   - What tools might be helpful to keep track of your counting?
   - How can we find out if there is a group of ten insects on the leaves?
6. Explain that this lesson will include the following success criteria:
   - Count a group of objects and record or write the number I counted.
   - Stick with a problem even when I am not sure at first how to solve it.
   - Listen to my classmates' explanations about counting and ask questions that show I understand counting.

7. Arrange the students in pairs to use counters, ten-frames cards, and the recording sheet to decompose the number of insects on the leaves (give pairs different amounts). Monitor the students as they work, and ask questions like, "How did you figure out how many tens? How many leftovers? How did you organize your counting? Did you and your partner count the same way? How did you keep track of the insects you counted on the leaf?"

8. Encourage the students to explain their thinking by asking questions.

9. Have the students record the number of ten ones and some more ones on the recording sheet and explain how they figured it out.

10. Have student pairs post their work and conduct a gallery walk. Give students a sticky dot and ask them to post a sticky dot on students' work that is interesting.

11. Select three student pairs to share how they counted, decomposed, and used the blank ten-frame card to find out how many insects were on the leaf. Have student pairs share based on clarity of examples. As the pairs share, encourage them to comment on each other's ideas. Ask, "How was your strategy alike or different than _____?"

12. Ask, "What do you notice about all the leaves?" Elicit from the students that every leaf has ten ones and some more ones.

13. Use students' work to highlight the pattern. For example, begin with ten. Each time, highlight student work to reveal the pattern. Ask students to Turn and Talk about the patterns they are noticing.

    10 = 1 group of ten insects and 0 more

    11 = 1 group of ten insects and 1 more

    12 = 1 group of ten insects and 2 more

    13 = 1 group of ten insects and 3 more

    14 = 1 group of ten insects and 4 more

    15 = 1 group of ten insects and 5 more

    16 = 1 group of ten insects and 6 more

    17 = 1 group of ten insects and 7 more

    18 = 1 group of ten insects and 8 more

    19 = 1 group of ten insects and 9 more

14. Ask the students, "What do you notice about the teen numbers? How many groups of ten are in all the teen numbers? What do you notice about the *some more* part?"

15. Close by asking the students to Turn and Talk about the patterns in the teen numbers. "What do you notice about all the numbers that had a ten and some more ones?"

16. Connect back to the sticky-note estimates. Ask the students to Turn and Talk. "What do you notice about your estimates and the actual number of insects?"

Anticipating student responses:

Some students will need organizational help. Encourage them to use a ten-frame organizer and other tools to help them keep track.

Some students will want to work independently rather than collaboratively. Give pairs one sheet of large chart paper to encourage them to work together. Call attention to pairs and groups that work together and remind them what working together means. Connect their struggle to the success criteria.

Pairs and groups will work at different rates. Organize the pairs and small groups to reflect differing learning needs to support each other's learning.

Monitoring the students' productive struggle:

Scaffold as needed by identifying mini-goals for some students. For example, ask students to find one leaf first and then check in with the teacher. Reward the students' "stick with it" behavior by calling attention to their perseverance.

Closure:

Exit task: Give each student a baggie that contains 17 cubes. Students write down the number of ten cubes and leftover cubes:

_____ group of tens

_____ leftover