**Mathematicians Listen to and**

**Learn from Each Other**

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| This is lesson three in a series of six lessons focused around developing a mathematical community at the beginning of the school year. While this lesson addresses standards NC.2.OA.2 and NC.2.NBT.4, the primary goal is for students to recognize that mathematicians listen to and learn from one another. |

**NC Mathematics Standard(s):**

**Operations and Algebraic Thinking**

**NC.2.OA.2** Demonstrate fluency with addition and subtraction, within 20, using mental strategies.

**Number and Operations in Base Ten**

**NC.2.NBT.4** Compare two ~~three-digit~~ numbers based on the value of the ~~hundreds~~, tens, and ones digits, ~~using >, =, and < symbols to record the results of comparisons.~~

**Standards for Mathematical Practice:**

3. Construct viable arguments ~~and critique the reasoning of others~~.

6. Attend to precision.

**Student Outcomes:**

* I can understand number relationships.
* I can listen to and learn from my classmates.

**Math Language**

* mathematician
* greater than, less than
* tens, ones

**Materials:**

* A folded piece of paper with “22” written on the inside and “Mystery Number” written on the outside (The practice Mystery Number is 22. The clues are embedded in the Launch section).
* Scrap paper or sticky notes (2 per student) or white boards and dry erase markers
* Pencils
* *Mystery Number Cards* attached to the end of the lesson (enough copies for one card per pair of students)

**Advance Preparation**:

* Practice Mystery Number with a colleague first to become comfortable with the activity.
* Print and cut apart *Mystery Number Cards*.

**Launch:**

1. Introduce the idea that mathematicians listen to and learn from each other. Say:

* *Let’s review things* ***mathematicians*** *do when working together* (review **Math Partners…** or **Working Together In Math** chart from Lesson 2)*.*
* *Today, we will learn how mathematicians also listen to and learn from each other. In order for mathematicians to learn from each other, they must listen carefully. Mathematicians show each other they are listening by:*

*1) looking at the person speaking*

*2) keeping their hands still*

*3) sitting quietly.*

Optional: Write the listening skills on a chart. You could also have picture clues or movements to help remind the students of the listening skills.

1. Encourage students to practice listening carefully, like a mathematician, as you read the Mystery Number clues.
   * *Say: Today, we are going to practice our listening and learning skills as a group. You are going to try to guess my mystery number. Listen carefully as I read the clues. After each clue, write a number that matches the clue. Each clue is about the same number, so you may have to change your guess after each clue.*
   * Give each student a scrap piece of paper, sticky note or white board with dry erase markers
   * Say: *Your first clue is:* ***This number is a two-digit number.***
   * Give students a chance to write down their number.
   * Say: *Your next clue is:* ***This number is less than 30.***
   * Say: *Look at your guess. Does it match both clues? If it does not, cross it out and write a new number that matches both clues. If it does match both clues, write the number again.* This is a time that you could ask students to share their number and as a class discuss if it matches both clues.
   * Say: ***This number is more than 20.***
   * Say: *Look at your guess now. Does it match all three clues? If it does not, cross it out and write a new number that matches all three clues. If it does match all of the clues, write the number again.*
   * Say: ***This number has the same digit in the ones place and the tens place.***
   * Say: *Look at your guess now. Does it match all four clues? If it does not, cross it out and write a new number that matches all four clues. If it does match all of the clues, write the number again.*
   * Ask the students to share what they believe the Mystery Number may be. Ask them to describe how they knew what to write.
   * Reveal the answer (22) and go through each clue showing how the answer matches each clue.
2. Say: *You practiced your listening skills while I read the clues. Then we learned from each other as we talked about how the clues matched the Mystery Number. Mathematicians, today we’ll continue to practice listening to and learning from our partners as we give clues to guess another mystery number.*

**Explore:**

1. Pair the students. Partner A is the speaker. Partner A gets a list of clues to read one by one to Partner B. Partner B will need a scrap piece of paper (or sticky note or white board) to write the guesses for the mystery number. Partner B is the listener. After each clue, Partner B will keep or revise the guess for the Mystery Number. Remind Partner B that they have to write down an actual number. Be sure Partner A understands to stop after each clue so that Partner B has a chance to change their guess.
2. Allow 4-5 minutes for partners to read clues and write guesses. Once a group has determined their Mystery Number, encourage them to talk about how they can check to see if their guess matches each clue.
3. If a student group finishes early, they can switch clues with another group, and switch roles.
4. Observe and collect formative data:

* Are students making reasonable adjustments to their guesses after hearing a new clue?
* Do students show evidence of listening carefully to each other by 1) looking at the person talking, 2) keeping their hands still, and 3) sitting quietly?
* Decide which partners will share during the “Discuss” section of the lesson. Choose partners to share their clues and their list of guesses and demonstration of “listening like a mathematician”.
* If a group is struggling with the procedure of the task, the teacher may need to model being Partner B by writing and revising the guess, as a student acting as Partner A reads a set of clues.

**Discuss:**

1. Have selected pairs share one or two of their clues and guesses. Discuss how each pair used the clues and listened to each other like a mathematician.
2. Ask for other examples of good listening:

* *How did your partner help you?*
* *How did listening help you?*
* *What did you learn from your partner?*

1. Review the word ***mathematician*** by asking:

* Say: *What have we learned about mathematicians so far?* Possible responses include: “Mathematicians solve problems,” and “Mathematicians work together”.
* Say: *How did we behave as mathematicians today?”* Possible response includes, “We worked together,” and “We listened to each other.”

1. Summarize lesson: Say: *Mathematicians listen to and learn from each other. Today, we practiced listening to and learning from each other as we worked with Mystery Numbers.*
   * Can refer back to listening skills poster again to remind students what listening looks like in math.

**Additional Activities (optional)**

* To continue practicing listening and learning skills and to learn new things about the students, have students “interview” each other. They could ask:
  + *What’s your favorite color?*
  + *What’s your favorite food?*
  + *When is your birthday?*
  + *What’s your favorite animal?*
* Partners would then introduce each other to the class and share what they learned about their partner.

**Evaluation of Student Understanding**

Informal Evaluation:

* Student correctly changes the guess to meet the requirements of previous and new clues.
* Student shows evidence of listening to carefully others by 1) looking at the person speaking, 2) keeping hands still 3) sitting quietly.

**Meeting the Needs of the Range of Learners**

**Intervention:** As this was an introductory lesson, it is not expected that students are proficient with using the number clues to revise their guess. Clarify the procedures and help students to identify and correct misconceptions as they work and during the discuss portion of the lesson.

**Extension:**

Find opportunities for students to write their own Mystery Number clue sets. They may find that it is hard to create a set of clues that lead to just one number.

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions/Errors** | **Suggestions** |
| Student may be confusedby a number clue. | Let partners work together to make sense of each clue or offer examples and non-examples to help make sense of a clue.  Give students an erasable hundred chart and a dry erase marker to cross off numbers that don’t match the number clues. This gives them a visual support. |
| Student may have difficulty making eye contact when listening to peers. | There are many reasons students have difficulty making eye-contact (e.g., cultural differences, lack of social experiences, or physiological reasons). Therefore, this social skill may be extremely difficult to acquire.   * Patiently encourage eye contact and point out when others are making eye contact in conversation. * Continue to focus efforts on other active listening strategies: keeping hands still and sitting quietly. |

**Special Notes:**

* The main purpose of this lesson is to have students engage in speaking and listening to build a mathematical community. The mathematical standards should be revisited again later in the year.
* Feel free to direct students back to the listening skills list as you move through the lesson. Point out students who are following the listening skills during the lesson. Remind students of the listening skills if they need it.

**Mystery Number Cards (for Partner A)**

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| * This number is less than 30. * This number is greater than 10. * This number has a 9 in the ones place. * This number has 2 tens.   *What is this Mystery Number?* | * This number is less than 40. * This number has one ten. * This number is greater than 11. * This number is the number of eggs in a dozen.   *What is this Mystery Number?* |
| * This number is greater than 10. * This number has a 5 in the ones place. * This number is less than 28. * This number is the value of one quarter.   *What is this Mystery Number?* | * This number is a two-digit number. * This number is greater than 30. * This number is less than 40. * This number has a 7 in the ones place.   *What is this Mystery Number?* |
| * This number is a one-digit number. * This number is greater than 2. * This number is less than 9. * This number is the number of legs on a spider.   *What is this Mystery Number?* | * This number is greater than 20. * This number is less than 50. * This number has 4 tens. * This number has a no ones.   *What is this Mystery Number?* |