**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 standard NC.K.G.1, its primary goal is for students to recognize that mathematicians listen to and learn from one another.** |

**NC Mathematics Standard(s):**

**Geometry**

**NC.K.G.1** Describe objects in the environment using names of shapes, and describe the relative positions of objects using positional terms.

**Standards for Mathematical Practice:**

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

6. Attend to precision.

**Student Outcomes:**

* I can describe where objects are located using positional words.
* I can listen to and learn from my classmates.

**Math Language**

* Mathematician
* on, in, under, behind, next to, and above
* triangle, square, circle

**Materials:**

* computer, speakers, access to internet
* *Mystery Robot Cards* (one card per pair of students)
* *Shape Cutouts* (one **color** set per pair of students) OR attribute blocks

**Advance Preparation**:

* Locate examples of shapes (triangles, squares, circles, rectangles) in the room and their relative positions to other objects using ***above****,* ***under****,* and ***next to***.
* Print *Mystery Robot Cards*.
* Print (in color) *Shape Cutouts.*  OR, gather attribute blocks.
* Preview the [Where is It? #3](https://youtu.be/5Tf0DLBkkzw) video.

**Directions:**

1. Introduce the idea that mathematicians listen to and learn from each other. Say:
   * *Let’s review things* ***mathematicians*** *do based on our prior lessons.*
   * *Today, we will learn that 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, and 3) sitting quietly.*
   * *As we practice listening to and learning from each other, we will use positional words to tell about the locations of shapes.*
2. Watch video [Where is It? #3](https://youtu.be/5Tf0DLBkkzw) to introduce the positional words. Encourage students to practice listening carefully, like a mathematician.
3. Draw attention to words ***above***, ***next to***, and ***under***. Have students act out these words.
4. Do a quick review of the shape words: triangle, circle, and square. Use positional words to play a brief game of “I Spy Shapes”. For example:
   * I spy a triangle ***above*** the cubbies. (e.g., a flag, picture of a triangular road sign)
   * I spy a circle ***next*** *to* the map. (e.g., a clock, a circle on a poster)
   * I spy a square ***under*** the desk. (e.g., a floor tile, a sticky note)
5. Introduce today’s activity:
   * Say: *Mathematicians, today we’ll practice listening to our partners and learning from them as they tell us how to build a robot from shapes. Partners will use the positional words* ***above****,* ***next to****, and* ***under*** *when telling you where your shapes go.*
   * Partner A is the talker. They get a picture of a shape robot. They must keep it hidden from Partner B.
   * Partner B is the listener. They get a set of shapes to build the robot (either shapes from the *Shape Cutouts Handout* or attribute blocks).
   * Partner B starts by placing the red face in the middle of their space.
   * Partner A tells Partner B the positions of other shapes. For example: *Put a blue triangle above the face. Put a big blue square below the face. Put a small yellow square next to the blue square.*
   * The teacher may need to model being Partner A by giving sample directions. If students do not know the names of shapes, they use other words to describe the pieces of the robot. For example, “Put the pointy hat above the head. Put a blue tummy under the head.”
6. Allow 4-5 minutes for partners to build their robots.
7. Observe and collect formative data:
   * Are students using positional words appropriately?
   * 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?
8. Decide which partners will share during the after completing the activity. Choose partners to share their directions for placing shapes based on their use of the positional words and demonstration of “listening like a mathematician”.

*Note: If several students have difficulty giving clues, the teacher may modify task. At this*

*point, the teacher becomes the talker, and gives the class clues. Partners would work*

*together to build the robots.*

1. Have selected pairs share one or two of their directions. Discuss how each pair used the vocabulary and listened to each other like a mathematician.
2. Discuss examples of when mistakes were made during today’s task. Ask:
   * How did your partner help you?
   * How did listening help you learn?
3. Review the word ***mathematician*** by asking:
   * *What have we learned about mathematicians so far?* Possible responses include: “Mathematicians solve problems,” and “Mathematicians work together”.
   * *How did we behave as mathematicians today?”* Possible response includes, “We worked together.”
4. Summarize lesson: *Mathematicians listen to and learn from each other. Today, we practiced listening to and learning from each other as we worked with positions of shapes.*

**Additional Activities (optional)**

* Find opportunities throughout the school day to identify shapes and describe their positions by playing “I Spy”.
* Show the [Where is It? #2 video](https://youtu.be/uDGwhiwwxXA) to review *on, in*, and *under*.

**Evaluation of Student Understanding**

Informal Evaluation:

* Student correctly identifies the intended shapes in the “I Spy Shapes” game.
* Student correctly follows a directions to place a shape above*, under, or next to* an object.
* Student shows evidence of listening to carefully others by 1) looking at the person speaking, 2) keeping hands still, and 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 naming shapes or using positional words. Continue to provide all students with experiences to build upon the ideas presented in this lesson. Students should build upon the positional words they know throughout the year.

**Extension:**

Find opportunities for students to provide the clues for “I Spy Shapes”. Encourage them to play in different parts of the school and on the playground.

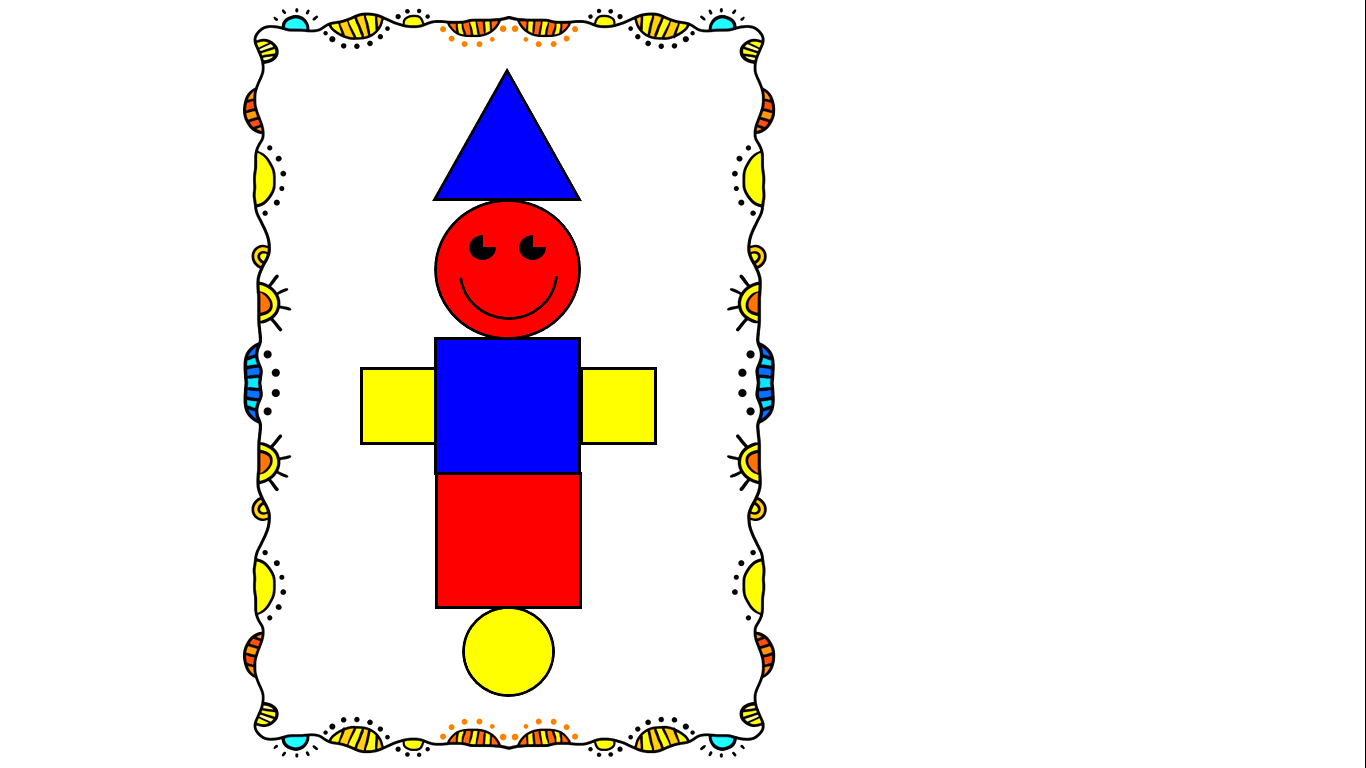
**Possible Misconceptions/Suggestions:**

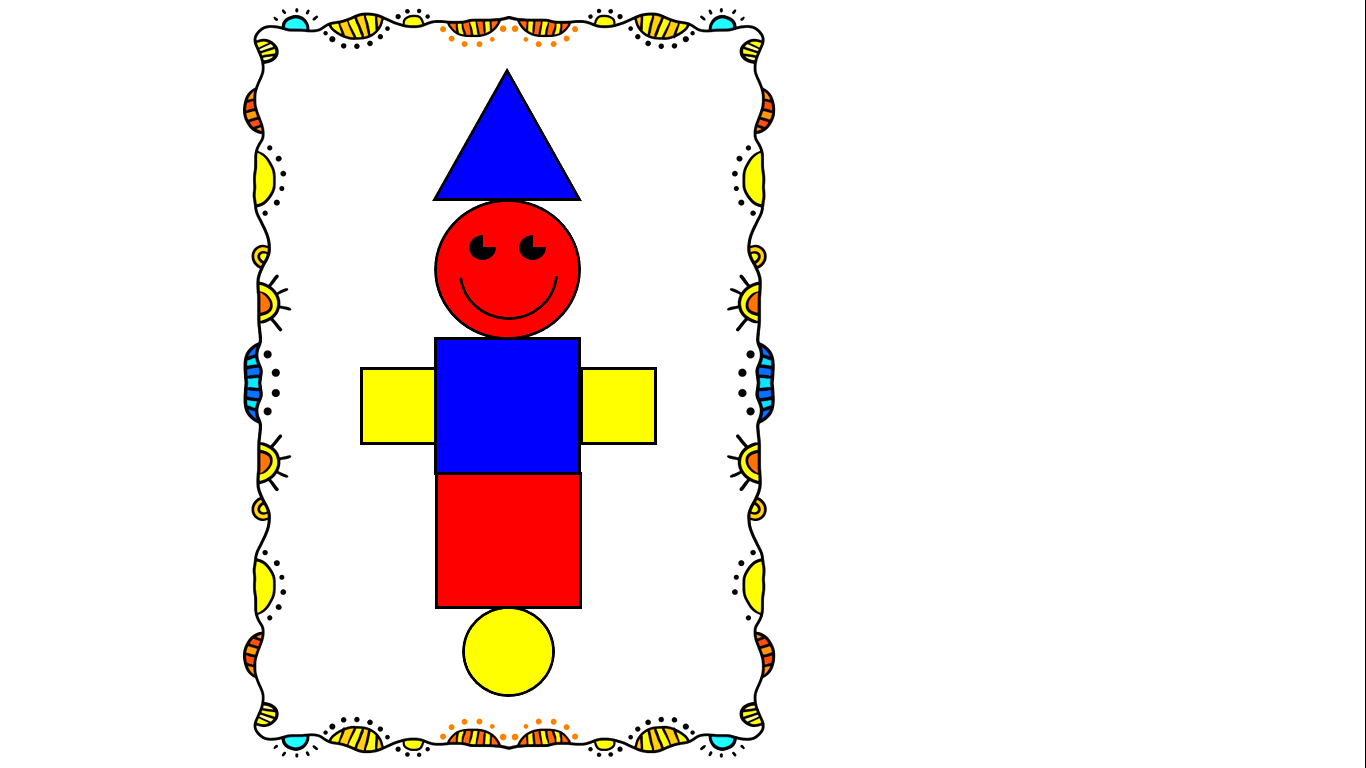
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| **Possible Misconceptions/Errors** | **Suggestions** |
| Student may confuse *next to* and *behind* due to his own position. | Have students stand directly in front of object, then place the shape *next to* or *behind* it. |
| Students may not know names of shapes (triangle, square, and circle). | The main math focus of this lesson is for students to use positional words. Allow students to find other ways to describe the shapes. For example:   * Color words * Size (big/small) * Parts of the robot (hat, arm, belly, wheel) |
| 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 experience, 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 standard should be revisited in a more formal manner later in the year. By the end of the year, students should be able to use many positional words, including: over, under, beside, in front of, above, and below.

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





**Shape Cutouts (for Partner B)**

