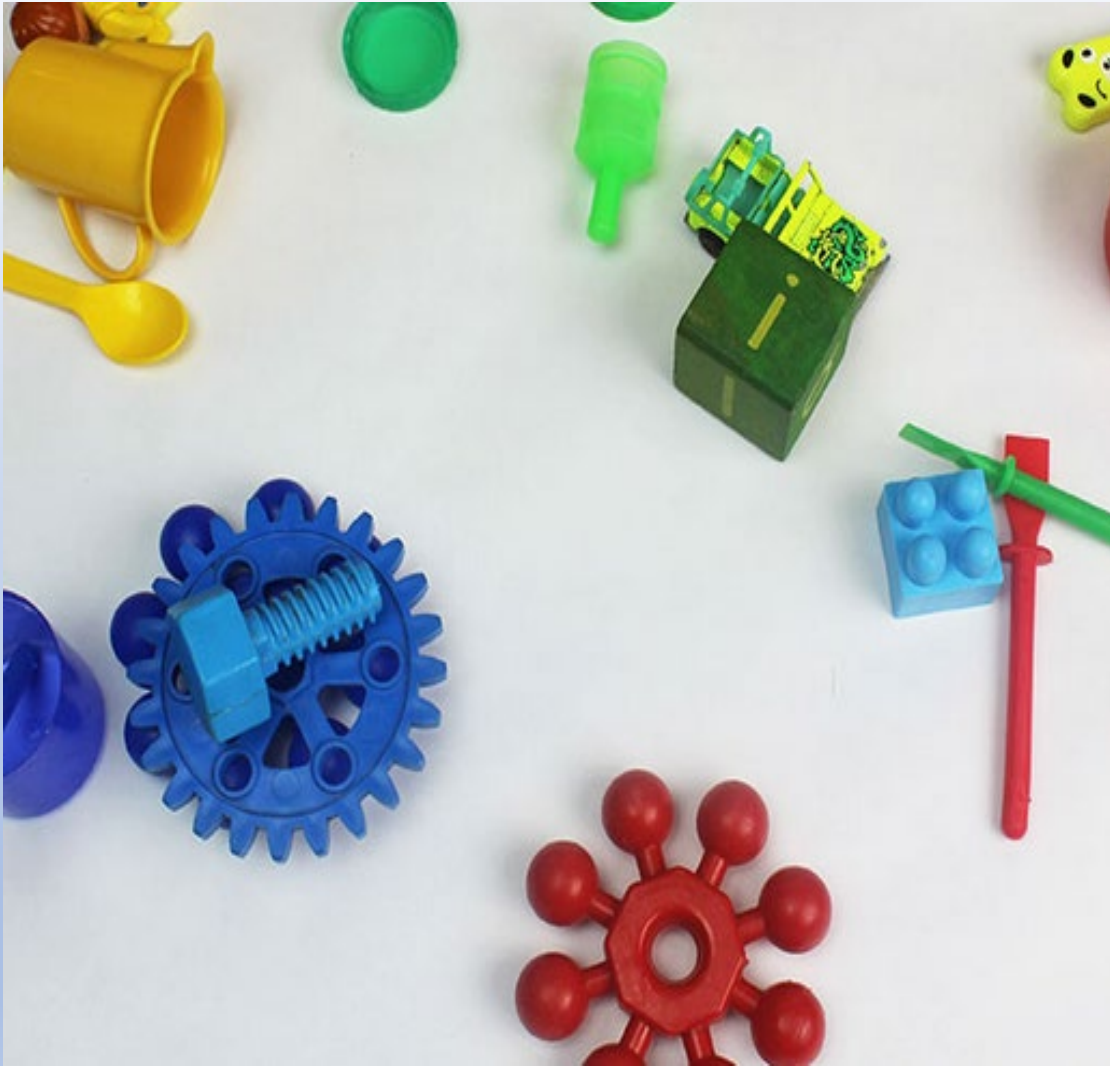


**WEST VIRGINIA  
DEPARTMENT OF EDUCATION**

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# **MATHEMATICS**

**GRADE K**

***Sort and Count***

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**Task Title:** *Sort and Count*

**Grade or Content Area:** Kindergarten

**Toolkit Author:** Brenda Buie, JoAnn Nuzum, and Kelcie Blankenship

**Original Task Creator:** Illustrative Mathematics

**Quarter:** 2

### **Rationale for Lesson and Associated Tasks:**

Students work with a set of several objects as they complete the *Sort and Count* task. The sets of objects consist of a variety of three-dimensional items that can be sorted by shape, type, color, or other attribute as decided by the students. Students decide how they will sort the objects and then carefully examine the items in the set and determine which belong together based on the criteria they decided to use. As students discuss the attributes of the objects and place them into groups, they support their thinking with evidence. When the students have sorted all the objects, they count to determine how many objects are in each group.

The *Sort and Count* task and associated activities provide students with the opportunity to describe attributes and quantity. As students work with the objects and compare attributes, they develop an understanding that one object can have several attributes. When counting to determine the quantity, Kindergarten students gain the understanding that the last number determines the total.

### **Lesson and Associated Tasks Overview**

**Illustrative Mathematics** ([click here](#))

*\*Review all components of the task thoroughly*

For Kindergarten students, this lesson and associated tasks may best be completed in a small group setting with the teacher asking questions designed to further develop their thinking and vocabulary and aid them in the life-skills of taking turns and working with others.

*\*\*This lesson is designed to be completed in one mathematics class session, although it can easily be split into two class sessions.*

*Note:* After the children are comfortable with the task, it can be set up as an independent discovery/learning station.

### **The Lesson:**

1. Introduce the *Sort and Count* task to all students as a group.
2. Using a Think-Pair-Share format, determine how to sort the objects.
3. Model the small group activity using one student as your partner
4. Sort the objects into groups based on the criteria.
5. Count and record the number of objects in each group.
6. Have two students model the activity.
7. Allow students to work with partners on the *Sort and Count* task.
8. In a whole group conversation, encourage students to share some observations that were made during their partner work.

## West Virginia College-and-Career-Readiness State Standard

\*While the entire standard is listed below, the bold format identifies the portion of the standard that is a focus of the task.

M.K.16: **Classify objects into given categories, count the number of objects in each category**, and sort the categories by count. Category counts should be limited to less than or equal to 10. (e.g., Identify coins and sort them into groups of 5s or 10s)

## Mathematical Habits of Mind (MHM)

\*While the lesson addresses several MHM, the MHM in bold font is the focus of the lesson and associated tasks.

MHM3. Construct viable arguments and critique the reasoning of others.

MHM4. Model with mathematics.

**MHM6. Attend to precision.**

## Mathematics Teaching Practices to Support Student Growth

\*While the lesson addresses several mathematics teaching practices, the bold font indicates practices that are the primary focus of the lesson.

- Implement tasks that promote reasoning and problem solving.
- **Use and connect mathematical representations.**
- Facilitate meaningful mathematical discourse.
- **Elicit and use evidence of student thinking.**

## Essential Understandings

- All objects in the real world can be classified by observing their similarities and differences.

## Set-up Phase

### 1. Become an Expert Regarding All Lesson and Associated Task Content

It is essential that the teacher becomes very familiar with the objects being used with this task. The level of student engagement will be determined by how thoroughly the teacher promotes and extends his/her observations. Be prepared to discuss the attributes for each of the objects.

### 2. Establish Small Groups

The *Sort and Count* task promotes both individual and partner thinking. Students will make and share observations with both their partner and the teacher.

Skill level and personality should both be considered when developing the partners for this activity. The ability to think deeply, share ideas, and ask questions will prove helpful in the successful completion of the task. When creating the partners, it is important to eliminate a situation where one student may make all the decisions while the other only observes. For both students to benefit from the task, they must equally share the role of decision making. In the whole group introduction to this task, it will be important to carefully model shared decision making. Prepare responses and comments that students may use as they collaborate to determine categories and sort the objects.

### 3. Develop Open-Ended Questions

Teachers should create a list of open-ended questions designed to support and scaffold the learning for their students. These questions should purposefully direct students toward the learning goals and assist them with using their previously learned content.

These questions may include the following:

- What do you notice about the object?
- How are the objects similar? How are they different?
- How can you show how many are in the set?
- Can you explain your thinking? Explain how you labeled this set.
- Can you tell me more?

### 4. Gather Materials

- One set of objects for each student pair. There should be 10-30 items in each set.
- Recording sheets, clipboards, pencils
- Teacher observation form

### 5. Anticipated Common Student Misconceptions

Teachers should be prepared to address possible misconceptions. By spending time prior to the lesson thinking through possible misconceptions you will have responses prepared. This task is focused on the attributes of the objects. As a result, throughout the task, focus on student reasoning about the attributes of the objects and not their name or use.

Misconceptions may include the following:

- Not realizing that objects are the same color even if the shade is different. (light/dark)
- Not realizing that objects can be sorted into any grouping if the student can explain why. (These buttons are pretty, those are not)

### Explore Phase

Prior to having the students working with partners, it is important that they understand the sort and count task as well as the life skill of collaborating. Sorting and counting objects should be a whole group activity daily for several days prior to having students work independently with a partner.

During whole group time, the objects can be displayed on a table that every child can see. Use the same set of objects for several days. Begin with determining the most obvious attribute, usually color, and sorting the shapes accordingly. Count and record the number of objects in each group. On the second day, determine a different attribute, such as size or use of the objects; and sort the objects accordingly. Count and record the number of objects in each group. Compare the charts from Day 1 and Day 2. Continue with Day 3 or start over with another set of objects.

Each of the math centers/stations during this exploration phase should also allow for the students to spend time exploring attributes of objects and counting sets of items.

Suggestions for stations include, but are not limited to the following:

- Putting a specific number of objects into a group based on one attribute. (e.g., 5 red items or 3 square items)

- Finding items around the room or in pictures based on a specific attribute and counting the objects.
- Putting objects into sets and having a partner determine the criteria.
- Creating a graph to show the number of objects in various sets.

### Prior Instruction/Knowledge

During Pre-K, students use 1-1 correspondence to match quantity to numbers. They also begin to describe attributes of objects and understand more or less in the context of quantity.

During Kindergarten students classify objects building a foundation for collecting data. Counting the number of objects within a set reinforces the skill and understanding of comparing numbers.

**Please review the following:** The information below provides valuable insights into Pre-K pre-requisite skills and Kindergarten student understandings specific to the analysis, comparison, creation, and composition of two-dimensional shapes.

Resource Booklet for Universal Pre-K (page 23): ([click here](#))

Educators Guide for Mathematics Grade K (page 26-27): ([click here](#))

### Prerequisite Skills

- Describe likenesses and differences between and among objects.
- Read and write numerals using one-to-one correspondence to match sets of 11 to 100.

### Supporting Skills

- Describe, compare, and order objects using mathematical vocabulary.
- Sort a set of objects in one or more ways. Explain.
- Compare and order sets and numerals up to 20, including using symbol notation ( $>$ ,  $<$ ,  $=$ ).

### Impending Skills

- Compare and order sets and numerals from 21 to 100 including using symbol notation ( $>$ ,  $<$ ,  $=$ ).
- Answer comparative and quantitative questions about charts and graphs.
- Organize, display, and interpret information in picture graphs and bar graphs using grids.
- Organize, display and interpret information in Venn diagrams (three or fewer sets)

**Source:** *The Quantile Framework for Mathematics*

<https://metametricsinc.com/educators/quantile-for-educators/>

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### Implementation Phase

\*\*This lesson is designed to be completed in one mathematics class session, although it can easily be split into two class sessions.

1. Introduce the *Sort and Count* task to all students as a group. Display a set of 10-30 objects on a table where all the students can see them. Discuss ways the items are the same or different.
2. Use the Think-Pair-Share format; determine a criterion for sorting the objects. List this criterion on chart paper.

3. The teacher will place one object in a specified place based on the determined criterion. (e.g., color: place one object of each color on a separate mat)
4. Have one student at a time choose one object and add it to the correct mat based on the sorting criteria explaining his/her decision.
5. When each student has placed an object on the correct mat, count the objects in each set.
6. Use the Think-Pair-Share format to determine how to represent the labels for the sets and the number of objects in each set. Model how to add this information to the chart paper.
7. Model the small group task using one student as your partner. Demonstrate how both people will determine the sorting criteria and take turns sorting the objects.

For a two-day lesson, end here on day one. For a one-day lesson continue with step #8.

8. Have two students model the activity. Address any issues surrounding how to complete the task and how to work collaboratively with a partner.
9. Allow students to work with partners on the *Sort and Count* task.
10. In a whole group conversation, encourage students to share some observations that were made during their partner work. Prepare a set of questions to prompt the classroom conversation. If these do not occur naturally in student conversations, consider the following:
  - Was there a criterion that was easy to use?
  - Was there a criterion for which an object did not fit?
  - Was there a time when there was only one object in a set? When all the objects fit into one set? When the same number of objects were in each set?

### Teacher Notes

Prior to the day of the task, review the different types of sorting criteria (e.g., color/size/shape/use, etc.).

With Kindergarten students, it is always wise to review content and model expectations prior to the actual task. Before assigning partners and allowing the students to begin the task, it will be important to spend some time as a whole group reviewing some different sorting criteria. Choices for this review should be based on observations from the responses given in the previous days.

When selecting the student to partner with the teacher in introducing and demonstrating the *Sort and Count* task, consider the student's skill at noticing attributes as well as the student's ability to verbalize his/her thoughts and reasoning (See #4, #7). The same should be considered when choosing the two students that will model the task for the whole group (See #8).

Depending on the number of adults in the room, the teacher may wish to have all the students working on this task at the same time or may wish to have some at other math centers working independently while the teacher monitors two or three pairs of students. The number of pairs of students being monitored should be based on the amount of prompting and support they will require.

The student partners must be sitting in such a way that they both have easy access to all the objects being sorted. Sitting at adjacent corners of a table works well.

During the task, the teacher should ask questions in order to deepen the student’s understanding of the attributes of objects. It is important to create a list of higher-order questions (see notes in the Set-up Phase section of this guide). Targeted extensions to the conversation may include questions that ask students to share non-examples of an attribute or explain how an object meets two attributes.

After the task is completed return to a whole group setting. Allow students time to share the discoveries they made during the task. The student comments can be recorded on chart paper or a whiteboard. By recording student findings, the teacher validates the work students did during the task.

Create a recording sheet like the following for students to record their findings:

Attribute:	Attribute:	Attribute:

At the top of each column, students list the sorting criterion, color, size, etc. In the spaces below the specific criterion is listed with the number of objects in the group. For example:

Attribute: Color	Attribute: Shape	Attribute:
Red – 5	Square – 2	
Yellow – 1	Triangle – 3	
Green – 3	Circle – 8	
Orange - 4	Rectangle - 1	
Blue - 1		

With this recording sheet, the students provide concrete evidence of their work. The size of the recording sheet can consist of a whole or half sheet of paper depending on the size of the clipboards available in the classroom.

When the students can determine criteria and sort objects without teacher support, this task can be moved to an independent workstation. Using the recording sheet would add accountability to the task.

Other Extensions of this task can include the following:

- Create bar or picture graphs illustrating the results of a set of objects.
- Room walk: Using one criterion, students walk around the room finding a specific number of items that belong in the set.
- Picture walk: Like a room walk, but students use magazines or books to find items that belong in the set.
- Use two criteria for sorting. Find objects that meet both.



## Share, Discuss, and Analyze Phase

### Essential Understanding:

All objects in the real world can be classified by observing their similarities and differences.

**Share:** This lesson opens with the students sorting three-dimensional objects based on a specific criterion. This format allows the teacher to monitor understanding as the students share their observations about the objects.

**Discuss:** Working with a partner, students are to sort objects based on the pre-determined criterion. The teacher poses higher-order questions that will allow the students to think more deeply about how the objects fit or do not fit in a category. At this stage, it is critical that the teacher addresses any misconceptions so as not to inadvertently promote misunderstandings.

**Analyze:** Students return to a whole group format to share the observations made during the small group task by responding to open-ended questions:

- Was there a criterion easy/difficult to use?
- Which criterion had the most/least objects in the set?
- Was there an object that didn't meet a criterion?

### Task In Action

The video clips below provide a demonstration of the task being implemented in a classroom as it aligns with the Effective Mathematics Teaching Practice indicated. These clips should be used by the teacher to model the implementation of the task in his or her classroom.

- Implement tasks that promote reasoning and problem solving:
  - [Video Clip 1](#)
  - [Video Clip 2](#)
- Use and connect mathematical representations:
  - [Video Clip 1](#)
  - [Video Clip 2](#)
  - [Video Clip 3](#)
  - [Video Clip 4](#)
- Facilitate meaningful mathematical discourse:
  - [Video Clip](#)