

Hunting for "Measured" Treasure

Summary

In these activities, students will compare and order objects according to length.

Main Core Tie

Mathematics Kindergarten

[Strand: MEASUREMENT AND DATA \(K.MD\) Standard K.MD.2](#)

Additional Core Ties

Mathematics Kindergarten

[Strand: MEASUREMENT AND DATA \(K.MD\) Standard K.MD.1](#)

Materials

Longest Straw: Center 1

- Three shoeboxes

- Various lengths of straws, or sticks.

- Three place mats

Hunting for Measured Treasure: Center 2

- Yarn

- Masking tape

Animal Trails: Center 3

- [Animal Trail animals](#)

- [Animal Trails recording sheet](#)

- Masking tape

- Blue construction paper

- Brown construction paper

Place Your Order: Center 4

- Various items e.g.: straws, ribbons, popsicle sticks, toothpicks, pencils, crayons, paper strips, or pieces of string or yarn.

- A place mat with a Wikki Stix baseline for each pair of students

Additional Resources

Books

- *Bigger and Smaller*

- , by Robert Proman

- *Pancakes, Pancakes*

- , by Eric Carle

- *The Apple Bird*

- , by Brian Wildsmith

- *The Carrot Seed*

- , by Ruth Krauss

- *The Little Red Hen*

- , by Paul Galdone

- *The Story of Ferdinand*

- , by Munro Leaf

- *50 Math Activities for your Kindergarten Classroom*

- , by Scholastic Books; ISBN 0-590-32773-9

- *The Three Billy Goats Gruff*

, by Paul Galdone

References

Coombs, B., Harcourt, L., & Young, S. (1993). *Explorations 1 in Math*. New York: Addison-Wesley Publishing Co.

Schwartz, S.L. (1995). Developing power in linear measurement. *Teaching Children Mathematics*, Mar 1995, 412-16.

Background for Teachers

Measurement is a skill which children and adults use daily to organize and understand their surroundings. The focus of this lesson is on making comparisons.

In these activities, the children will compare and order objects according to length. The children will be learning to conserve length, meaning that the length of an object is not altered by a change in its spatial position, even though it may appear to look longer or shorter than before. When measuring, children need to place items on a base line when making comparisons and/or ordering objects according to length. Transitivity is the ability to infer, for example, that length A is longer than length C if direct comparison shows that A is longer than an intermediate length B and that B is longer than C. Piaget found that young children judge length in terms of end points only. Children also judge a line segment and a bent path with the same end points to have the same length.

Intended Learning Outcomes

5. Understand and use basic concepts and skills.

6. Communicate clearly in oral, artistic, written, and nonverbal form.

Instructional Procedures

Invitation to Learn

Have students sit in a circle or semi-circle around the teacher. Display an ordering mat (see example) for the children. Ask, "Where is the starting line? Whenever we are trying to determine which of two objects is shortest or longest, we have to put the objects on a starting line." The teacher should run her finger along the starting line. "The starting line provides each object with a fair chance, just like the starting line for runners in a race."

"On the starting line are two characters. What character is the shortest? Which character is the tallest?"

Display two similar items such as yarn or straws cut to different lengths. Show the children how you will hide the length of the objects by placing them in your closed hand so that only a portion is revealed.

Invite two students to come forward, pick an item from your closed hand, and tell whether they think they have the longer or the shorter object. Have one child place his/her yarn on the base line or starting line. Then have the second student place his/her yarn. Ask the class to determine whose yarn was longest and shortest. Continue until the concept is familiar to the students.

Instructional Procedures

In advance, invite three parent volunteers to come and assist you on the day this concept will be introduced to the students. Plan to have the volunteers stay for one hour for the math centers activity.

Explain to the students that they are about to visit four measurement centers. In each center, they will be comparing items and deciding if they are longer or shorter. As they visit each center, remind students to make sure that they place the objects that they work with on the starting line at the bottom of their place mat.

The children will now begin math centers. Four center activities will be placed at numbered

tables in the classroom. The teacher will divide students into four groups. Preferably, each group will only have six students. Group 1 will go to Table 1, Group 2 will visit Table 2 and so on. Invite the parent volunteers as they arrive to sit at one of the four centers. A brief description of what the volunteers will be teaching will be at the center. The centers will last approximately 10-12 minutes each. When a bell rings two times, children will clean up their materials, and stand by their chair until the signal is given to move to the next center.

Longest Straw: Center 1

This center will reinforce the concept that the length of an object can be described by using another object in direct comparison.

Procedure: The children who visit this center will be placed in pairs. Each child draws one straw from the box. The children lay the straws on the baseline of the place mat to determine whose straw is the longest. By prior agreement, the child who has the longest, or shortest straw keeps both straws. If the straws are the same length, they are returned to the box or the children can choose to make a rule to handle this situation, like placing the identical straws in a tray on the table. The game is over when all the straws are removed from the box.

An extension of this activity would be to have the children tally how many draws are required to match all the pairs.

Hunting for Measured Treasure: Center 2

Procedure: Show the pieces of yarn or adding machine tape to the groups and ask each child to choose a piece to use on a "Measure Hunt". Ask children to look around the classroom and find one object that is the same size as their piece of yarn or tape.

Have the parent volunteer model how to use the yarn for measuring by choosing a piece and inviting children to follow her around the room as she holds up yarn to different items, making sure that the end of the yarn touches the ending point of the object. This will help children conceptualize a "baseline". The volunteer can then determine if the yarn and the object are the same length, or if one is shorter or longer.

The volunteer may now encourage the students to take their piece of yarn and search the room to find objects the same length as their yarn pieces. Encourage students to "hunt" in quiet and courteous way, so as not to disturb the other centers.

Now ask children to exchange their piece of yarn for one of a different length. Before they measure new objects, invite them to measure objects that matched their previous yarn length. How does it compare? Encourage the students to find objects that are longer than their piece of yarn. Next, encourage them to find objects that are shorter than their piece of yarn.

As an extension, ask the children in the group if they will order their pieces of yarn, from shortest to longest. Provide a piece of masking tape on the floor as a base line. This will give them experience and practice in order and seriation.

Animal Trails: Center 3

Make four paths of different lengths on the floor using colored masking tape in an open area of the classroom.

Path #1: At the head of this path, place a picture of a duck and at the end of the path, place a pond, and cut from blue construction paper.

Path #2: At the head of this path, place a picture of a cow and at the end of the path; place a picture of a barn, or a toy barn.

Path #3: At the head of this path, place a picture of a pig and at the end of the path, place a picture of mud, or an oval cut from brown construction paper.

Path#4: At the head of this path, place a picture of a hen and at the end of the path; place a picture of a nest.

Procedure: On the [Animal Trails recording sheet](#), have children guess how many of their steps it would take to walk each path. Then have them walk each path, making sure to put their heel at

the end of the path and placing their heel next to their toe as they count the steps of the path.

Have them record the number of steps each path takes.

On their recording sheets, have the students circle the longest path, and place an "X" next to the shortest path.

Place Your Order: Center 4

Procedure: At this station, children will be divided into partners. Have each pair of children take a bin of materials and a place mat.

One child chooses three objects from the bin and orders them on the place mat using the baseline at the bottom. The parent volunteer should direct the child to read aloud the order created. Have the child choose one more object from the bin and challenge his/her partner to place it in order on the mat.

If the partner does not place it in the appropriate position, the child should try again before trading roles with his or her partner.

Variation: One child places an object on the ordering mat. The child then challenges the partner to choose 2 objects to place on the mat. The partner then needs to order the objects from shortest to longest. After the partner orders the items, he or she may then offer a new challenge.

Extensions

Curriculum Extensions/Adaptations/ Integration

Using connecting cubes, have students work in groups of three.

Have one student in the group make a train of connecting cubes.

Have the second student make a train that is shorter.

Have the third student make a train that is longer.

Have the children repeat the activity until everyone has a chance to make the first train.

Encourage them to make their trains, using different pattern combinations.

Family Connections

Invite parents to help their child gather together several items at home that are longer than they are wide such as a pencil, crayon, piece of chalk, ruler, paintbrush, screw driver, etc. Have parents encourage their child to arrange objects from shortest to longest by placing them side by side aligned evenly at the bottom.

Assessment Plan

It is important that children use the base line properly when comparing and ordering objects by length. Circulate among the students while they are involved in the activities to make sure that they are placing objects on the base line.

These questions can form the basis of discussions as you observe children at work:

Which is longer/shorter? Show me.

Show me something longer/shorter than this object.

Where does this belong in the order?

Read the order aloud.

To determine which children compare and order objects by length, have them complete a simple task. Provide each child with a mat that has a base line at the bottom and two items to compare according to length. Place a green dot at the bottom left on the base line to indicate where to begin. Say, "Show me the object you think is shorter/longer." Ask, "How could you check your guesses? Show me. What object is shorter? Longer?" Give another object to the child and ask him/her to place it on their mat in the correct order. Say, "Show me the longest. Now show me the shortest." Repeat the activity as needed.

Bibliography

Hiebert J. (1981). Cognitive development and learning linear measurement. *Journal for Research in Mathematics Education*, 12(3), 197-211.

Researchers found that the children do not seem to use the prerequisite knowledge of conservation and transitivity when they solve measurement tasks. Simple skills or techniques allow children to bypass the logical structure of many measurement tasks.

Hiebert J. (March, 1984). Why do some children have trouble learning measurement concepts? *Arithmetic Teacher*, 19-24.

In this study, researchers found that "a number of the [1st grade] children considered the length of an object to be determined only by the position of its endpoint rather than the distance between the beginning point and the endpoint."

Authors

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