



KINDERGARTEN SUPPLEMENT

Set D3 Measurement: Capacity

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Skills & Concepts

- ★ compare and order containers according to capacity

Bridges in Mathematics Kindergarten Supplement

Set D3 Measurement: Capacity

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set D3 ★ Activity 1



ACTIVITY

Fill & Compare

Overview

Students compare the capacity of various containers.

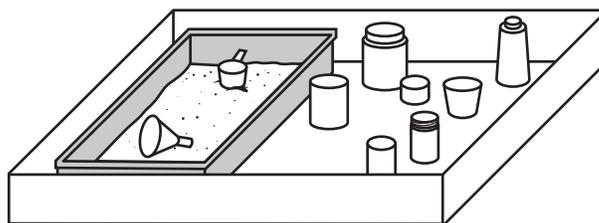
Skills & Concepts

- ★ compare and order containers according to capacity

You'll need

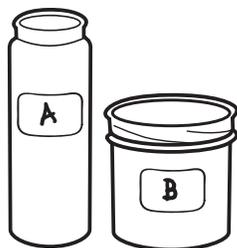
- ★ 6–8 empty, washed clear or translucent plastic jars of various sizes and shapes, each labeled with a letter of the alphabet
- ★ 5 pounds of rice in a dishpan or plastic tub with a lid
- ★ the top of a very large cardboard carton
- ★ a plastic scoop
- ★ a funnel
- ★ a dustpan and whiskbroom

Advance Preparation Place 5 pounds of rice in a dishpan-sized plastic tub that comes with a lid (to prevent mice and other classroom pests from discovering the rice when it's not in use). Set the plastic tub of rice into the top of a large cardboard carton (or a small wading pool if you prefer). This will serve to catch spills, and if it's large enough to hold the jars as well as the tub of rice, you can reasonably ask that children do their measuring experiments directly over the lid. Place the entire set-up on a table if possible, and keep a dustpan and whiskbroom handy so children can clean up any spills. Add a plastic scoop, a funnel, and 6–8 clear plastic jars to complete the set-up. (A recycled laundry soap scoop is perfect. A funnel made by cutting off the bottom $\frac{3}{4}$ of a plastic quart or liter bottle and using the top that remains is very effective and inexpensive. Try to collect 6–8 plastic jars that vary widely in size and shape, such as the ones that hold juice, oil, salad dressing, mayonnaise, and so on. Mark each with a different letter of the alphabet using a permanent ink marker or a stick-on label.)



Instructions for Fill & Compare

1. Place the entire rice set-up in the middle of your discussion area, and ask the children to join you, forming a circle around the materials. Show children the rice, the jars, the funnel, the scoop, the dustpan, and the whiskbroom, and establish any rules you need to about using the materials (when, how many students at one time, clean-up procedures, and so on).
2. Choose 2 of the jars, perhaps one that's short and wide and another that's tall and skinny. Ask students which of the two they think will hold more rice. Have them whisper their ideas to their neighbors and then ask volunteers to share their thinking with the group.

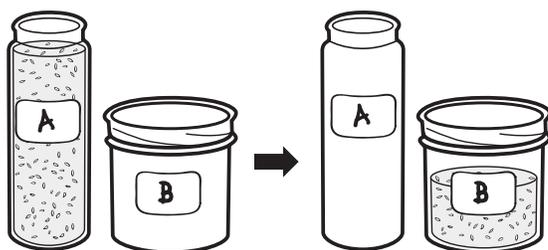
Activity 1 Fill & Compare (cont.)

Students *The tall one is bigger because it's more tall.*

Yep, the tall one for sure.

Maybe they're the same, but it's probably the tall one.

3. As students watch, fill one of the two jars to the top with rice, using the scoop and the funnel. Then pour the rice from the first jar into the second and ask students to comment. Did things turn out the way they expected? Were they surprised at the results? Which jar holds more? How do they know?



Students *The rice doesn't come up to the top!*

The little jar didn't get filled up.

Maybe some rice got spilled when you poured it.

Do it again!

Teacher *Which jar holds more?*

Students *The tall one 'cause it's bigger!*

But Teacher filled up that one and then poured it, and it didn't fill up the short one.

Maybe the short one holds more 'cause it's fatter around.

4. Pour the rice from the second jar back into the first and invite student comments again.

5. Repeat steps 3 and 4 with another pair of jars. Invite students to select the two jars this time.

Extensions

- Make the rice set-up available to individuals and pairs of students during Work Places and/or choosing time. Some may need time just to enjoy scooping and pouring, but students who have used similar materials in pre-school should be challenged to actively compare the capacities of the jars as they work.
- Some students may be interested in trying to determine which of the jars in the collection holds most, and which holds least.
- You can keep student interest high by adding more jars to the collection, or putting some away and substituting others. Look for plastic jars with particularly interesting shapes when you go shopping, and ask families to contribute to the collection as well.

Set D3 ★ Activity 2



ACTIVITY

The Measuring Jar

Overview

Students compare the capacity of various plastic jars to a calibrated measuring jar.

Skills & Concepts

- ★ compare and order containers according to capacity

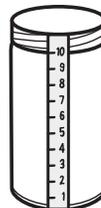
Recommended Timing

Anytime after Set D3 Activity 1

You'll need

- ★ The Measuring Jar Record Sheet (page D3.6, class set plus a few extra, see Advance Preparation)
- ★ the rice set-up described in Set D3 Activity 1
- ★ an empty, washed, clear or translucent 12–18 oz. plastic jar with straight sides (see Advance Preparation)
- ★ a crayon for each student

Advance Preparation Run a strip of masking tape from the bottom to the top of a plastic jar with straight sides. Mark the tape at even intervals from 1–10. Follow the instructions at the top of the blackline on page D3.6 to make a class set of recording mini-booklets, plus one for yourself and some extras for use during Work Places.

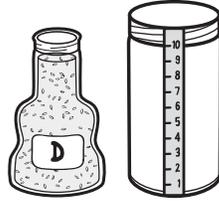


Instructions for The Measuring Jar

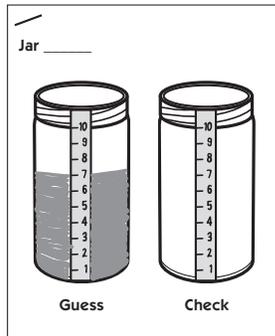
1. Place the rice set-up in the middle of your discussion area, and ask the children to join you, forming a circle around the materials. Show children the new Measuring Jar, and explain that you're going to use it to measure how much rice some of the other jars in the collection hold. Give each child a Measuring Jar Record Sheet booklet and a crayon, and take one of each for yourself.
2. Choose one jar from the collection and fill it to the top with rice. Tell the children you're going to pour the rice from the jar you just filled into the Measuring Jar. Ask them to predict how full the Measuring Jar will be by coloring in the "guess" side of their record sheet. Model the procedure by coloring the 'guess' side of the first page in your own recording mini-booklet.

Teacher *How high will the measuring jar fill when I pour in the rice from Jar D?*

Activity 2 The Measuring Jar (cont.)



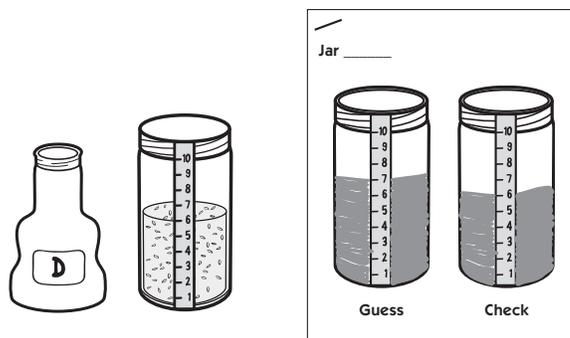
Yolanda *I think it'll come up to line number 7. That's how I'm going to color my guess.*



Billy *I think it'll come up to the 10. I'm going to color the whole jar.*

3. When all the children have colored in a guess, pour the rice from the first jar into the Measuring Jar. Have everyone color the jar on the right-hand side of the first page of the booklet to show what actually happened. Then ask them to identify which of the two jars—the one you originally filled or the Measuring Jar—holds more rice. How do they know?

Teacher *The first jar filled the Measuring Jar to line 6. Which jar holds more?*



Students *The Measuring Jar!*

Teacher *How do you know?*

Students *Because the rice from the first jar didn't fill it up all the way.*

Because the Measuring Jar is taller!

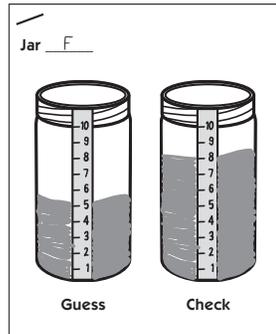
Because it only came up to number 6 when you poured.

4. Repeat this activity several times. Have the children record their guesses and what really happened each time. If one or more of the jars should fill the Measuring Jar to overflowing, work with students to develop a way to record what happened. Let them take their record booklets home to share with their families.

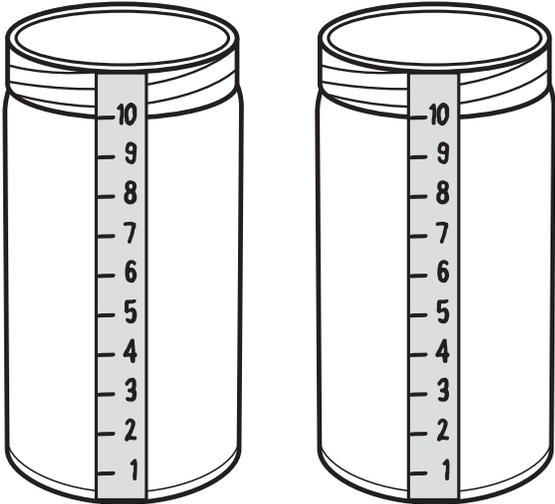
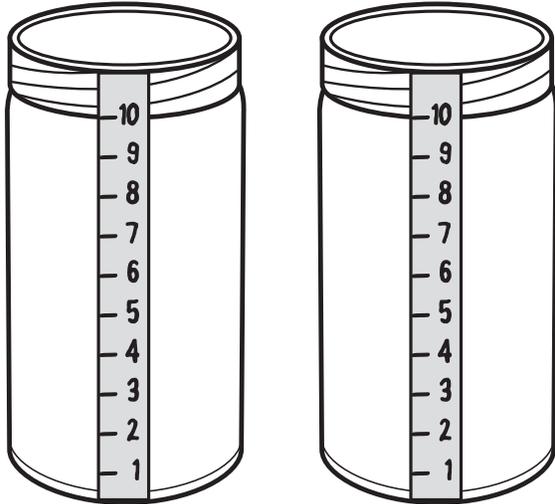
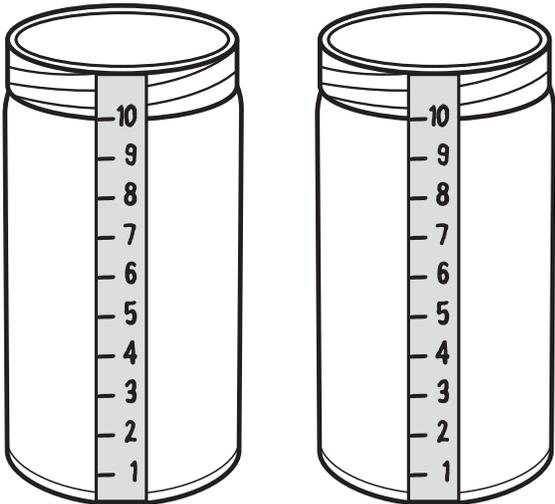
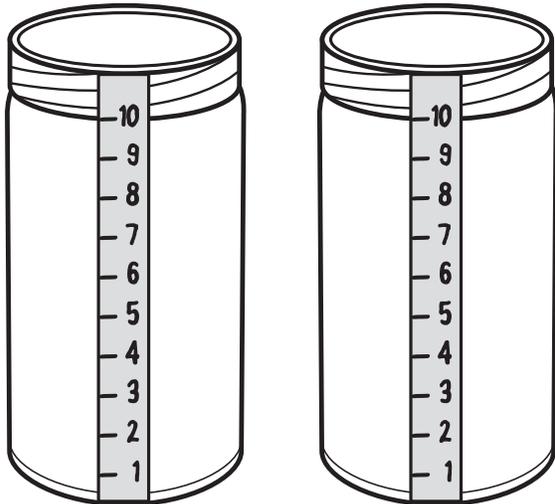
Activity 2 The Measuring Jar (cont.)

Extensions

- Add the Measuring Jar and some copies of the recording booklet to your rice set-up, and encourage students to repeat the experiment with other jars during choosing time or Work Places.
- Encourage interested students to record the letter of each pouring jar they use in the top left-hand corner of each record sheet booklet.



The Measuring Jar Record Sheet

<p>NAME _____</p> <p>Jar _____</p>  <p>Guess Check</p>	<p>Jar _____</p>  <p>Guess Check</p>
<p>Jar _____</p>  <p>Guess Check</p>	<p>Jar _____</p>  <p>Guess Check</p>

Set D3 ★ Activity 3



ACTIVITY

Applesauce for Uncle Tony

Overview

Students compare the capacity of two different jars.

Skills & Concepts

- ★ compare and order containers according to capacity

Recommended Timing

Anytime after Set D3 Activities 1 and 2

You'll need

- ★ rice set-up from Set D3 Activity 1 *with all the jars removed*
- ★ 2 empty, washed clear or translucent plastic jars (see Advance Preparation)
- ★ the Measuring Jar from Set D3 Activity 2
- ★ *Apples to Applesauce* by Inez Snyder (optional)

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Advance Preparation This activity will be most interesting to children if you can use 2 jars they've never seen before. Try to find one that is tall and narrow, and one that is short and wide. Be sure that one holds just a few ounces more than the other. Ideally, the two jars will be close in capacity, but *not* identical, and it won't be obvious which holds more. Mark one with the letter "X" and the other with the letter "Z".

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Instructions for Applesauce for Uncle Tony

1. Gather students to your discussion circle. Tell the story below, making any variations you want.

There was a big apple tree next to the house where Olivia lived with her family. One day Olivia's grandma came to visit and said, "Olivia, we're going to make applesauce today."

She handed Olivia a big paper sack and said, "Go fill this sack with apples to the top. You can even take the ones off the ground that are a little bit soft or have brown spots on them. Get your little brother to help."

Olivia scurried off to get Adrian and the two of them ran out to the apple tree. They filled the sack. It was heavy! They took turns dragging it back to the kitchen, and when they got there, Grandma had a knife, a cooking pot, and a cutting board ready. She gave them each a little knife and a plate so they could help. They cut up the apples, threw the seeds into the compost bucket, and put all the apple chunks into the big pot. Grandma added a little water, put the lid on, set the pot on the stove, and turned the burner on "low".

Then she said, "There. All we need to do is wait a couple of hours for the apples to cook. Then we can mash them up and we'll have the best applesauce you ever tasted! These apples are so sweet we won't even need to add sugar."

That's exactly what they did, and when the applesauce was cool and ready, they each got their own little bowlful to eat. "Yum! This is the best!" said Adrian. "Can we take some down the street to Uncle Tony?"

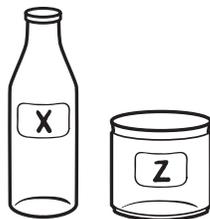
Activity 3 Applesauce for Uncle Tony (cont.)

"Sure," said Grandma. "Let's put some in a jar and you can take it over to him after dinner." She went to the cupboard and pulled out 2 jars. One was tall and skinny. The other was short and fat.

"Which one do you want to use?" she asked the children.

"The one that holds more!" they shouted.

2. Show students the 2 jars you've collected for this activity. Explain that their job over the next few days will be to find out which holds more. Ask them to pair-share their predictions right now.



Students *The tall one holds more—I just know it!
Sometimes the short one can hold more if it's really fat like that one.
That tall one gets kind of skinny at the top—it might fool you.
Taller is bigger.*

3. Then tell the children that you're going to leave the 2 jars out with the rice, funnel, scoop, and Measuring Jar so they can investigate on their own during choosing time and Work Places over the next few days. Spend a few minutes brainstorming some of the ways they might determine which of the two jars holds more.

Students *We could fill one with rice and then pour the rice into the other.
We could fill one up and then pour it into the Measuring Jar. Then we could do it with the other.
Can I try it now?*

4. Let students work individually or in pairs to find out which of the two jars holds more. Reconvene the class after a few days to discuss the results. At that time, you might want to try some of their ideas as a group to confirm which jar actually does hold more.

Extensions

- Keep a checklist with each child's name on it near the rice set-up. Ask students to record the letter of the jar they believe to hold more beside their name after they've had a turn to experiment.
- Read *Apples to Applesauce* by Inez Snyder either before or after you introduce this activity. You might find other related books in your school library as well.
- Make applesauce with your students.