



GRADE 1 SUPPLEMENT

Set D5 Measurement: Capacity

Includes

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Skills & Concepts

- ★ compare and order objects according to capacity

Bridges in Mathematics Grade 1 Supplement

Set D5 Measurement: Capacity

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Prepared for publication on Macintosh Desktop Publishing system.

Printed in the United States of America.

P201304

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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 D5 ★ Activity 1



ACTIVITY

Scoops of Rice

Overview

Students fill jars with level scoops of rice to compare and order them by capacity.

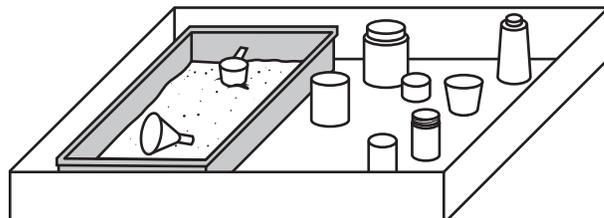
Skills & Concepts

- ★ compare and order objects according to capacity

You'll need

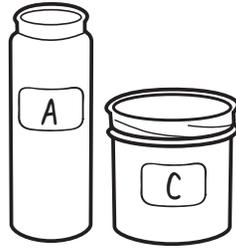
- ★ Scoops of Rice Record Sheet (page D5.4, class set plus a few extra)
- ★ Scoops of Rice Challenge Sheet (page D5.5, run as needed)
- ★ 6–8 empty, washed clear plastic or glass jars of various sizes and shapes, each labeled with a letter of the alphabet
- ★ 3–4 pounds of rice in a plastic storage container with a lid
- ★ the top of a cardboard carton (see Advance Preparation)
- ★ a plastic scoop that holds about a quarter cup
- ★ a funnel

Advance Preparation Place the rice in a plastic container that comes with a lid (to prevent mice and other classroom pests from discovering the rice when it's not in use). Set the container of rice into the top of a cardboard carton (the top of a box that holds 8 reams of copy paper works well). Add a plastic scoop, a funnel, and 6–8 clear plastic jars to complete the set-up. (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 jars that vary widely in size and shape, such as the ones that hold honey, 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.)



Activity 1 Scoops of Rice (cont.)**Instructions for Scoops of Rice**

1. Place the entire rice set-up in the middle of your discussion area, and post a copy of the record sheet on an easel or whiteboard within easy reach. Ask the children to join you, forming a circle around the materials. Choose 2 of the jars, perhaps one that's short and wide and one that's tall and narrow. Ask students which 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.



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

Yep, the tall one for sure.

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

2. Show students the plastic scoop, and explain that you're going to use it to fill each of the jars. Choose the jar most students think will hold more and ask them to estimate how many level scoops of rice it will take to fill the jar clear to the top. After some discussion, record a guess on your Scoops of Rice Record Sheet.

3. Use the scoop and the funnel to fill the jar, working directly over the rice container to minimize spills. Ask students to count the scoops with you, and invite them to change their estimates after the jar is half full. When you're finished, record the actual number of scoops it took to fill the jar (round the number to the nearest full scoop if necessary).

Set D5 Measurement: Capacity Blackline Run a class set plus a few extra			
Name <u>Alexandra</u>		Date _____	
Scoops of Rice			
Jar	A	10	8
		 s	 s
		Guess	Check

4. Repeat steps 3 and 4 with the second jar. Then 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 short jar got 11 scoops.*

It holds more because the tall jar only got 8 scoops.

But the tall one is bigger!

Maybe it's 'cause the little jar is fatter around.

Let's do it again! Maybe you didn't fill up the scooper right.

Activity 1 Scoops of Rice (cont.)

5. Work with input from the class to fill in the bottom of the record sheet, which asks them to order the two jars by capacity.

Set D5 Measurement: Capacity Blackline Run a class set plus a few extra
Name Alexandra Date _____

Scoops of Rice

Jar	A	10	 s	8	 s
		Guess		Check	
Jar	C	7	 s	11	 s
		Guess		Check	
Jar	C	holds more. 			
Jar	A	holds less. 			

6. Place the rice set-up, along with copies of the Scoops of Rice Record Sheet, on a table or extra desk. Ask students to work individually or in pairs during Work Places over the next couple of weeks to try this measuring experiment for themselves. Encourage them to try different pairs of jars. (Keep a dustpan and whiskbroom handy so children can clean up any spills.)

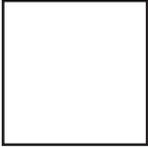
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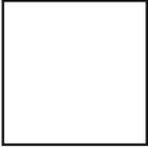
- You can keep interest in this activity high by changing some of the jars in the collection every so often. Encourage families to contribute clean jars with interesting shapes to your collection.
- Some students might be interested in comparing and ordering 3 jars, instead of 2, by capacity. Give these students copies of the Scoops of Rice Challenge Sheet to record their discoveries.

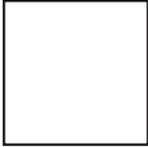
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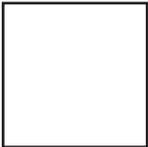
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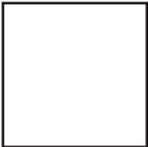
Scoops of Rice

Jar 

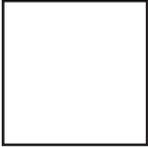
Guess   's

Check   's

Jar 

Guess   's

Check   's

Jar  holds more. 

Jar  holds less. 

NAME _____

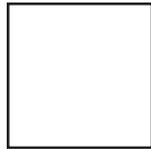
DATE _____

Scoops of Rice Challenge Sheet

Jar



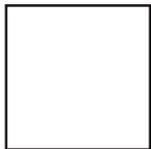
Guess



Check



Jar



Guess



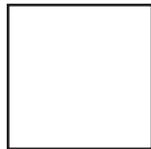
Check



Jar



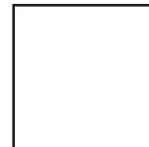
Guess



Check



List the jars in order, from the one that holds the most to the one that holds the least.



Set D5 ★ Activity 2



ACTIVITY

The Measuring Jar

Overview

Students determine the amount of rice it takes to fill 2 different jars by using a calibrated “Measuring Jar”. Then they use the information to compare and order the jars by capacity.

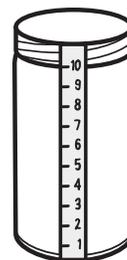
Skills & Concepts

- ★ compare and order objects according to capacity

You'll need

- ★ The Measuring Jar Record Sheet (page D5.10, run 1 1/2 class sets, see Advance Preparation)
- ★ the rice set-up described in Set D5 Activity 1
- ★ an empty, washed, 12–18 oz. plastic or glass 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 jar with straight sides, such as a 16-oz. olive jar. Mark the tape at even intervals from 1–10. Follow the instructions at the top of page D5.10 to make a class set of recording mini-booklets, plus one for yourself and another half-class set for use during Work Places.

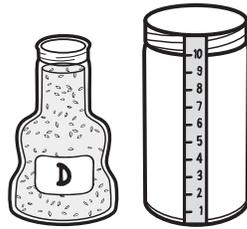


Instructions for The Measuring Jar

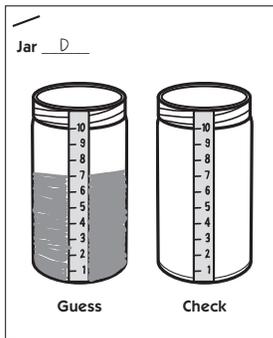
1. Place the rice set-up in the middle of your discussion area, and ask the children to join you, forming a circle around the materials. Show children the new Measuring Jar, and explain that you're going to use it to measure how much rice some of the other jars in the collection hold. Give each child 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. Have them record the letter of the jar on their record sheet and then predict how full the Measuring Jar will be by coloring in the “guess” side of the sheet. Model the procedure on the first page of your own recording booklet.

Activity 2 The Measuring Jar (cont.)

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



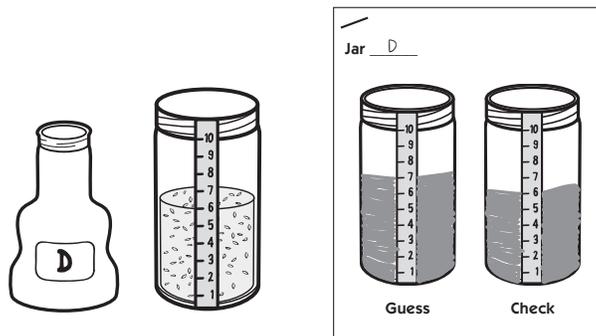
Alyssa I think it'll come up to line number 7. That's how I'm going to color my guess.



Sherwin I think it'll come clear 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 page to show what actually happened. Then ask them to compare which of the two jars—the one you originally filled or the Measuring Jar—holds more rice. How do they know?

Teacher Jar D 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.

Activity 2 The Measuring Jar (cont.)

- Repeat steps 2 and 3 two more 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.
- Set the Measuring Jar aside, and set the 3 jars you “measured” in a row. Which of the 3 held the most rice? Which held the least? Ask children to use their record booklets to help answer the questions, and encourage them to explain their reasoning as they share their answers.

Students *I think Jar B held the most because it's biggest.*

I think it was Jar B because the rice from that one filled the Measuring Jar up to the top.

I think Jar F is the smallest because the rice from that jar only came up to the 3 on the Measuring Jar.

- As students share their answers, line the 3 jars up in order, starting with the jar that held the most and ending with the jar that held the least rice.

Extension

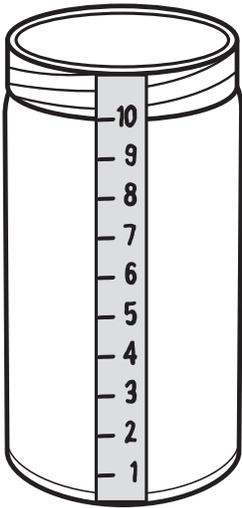
- Add the Measuring Jar and some copies of the recording booklet to your rice set-up, and ask student pairs to repeat the experiment with other jars during Work Places over the next couple of weeks.

NAME _____

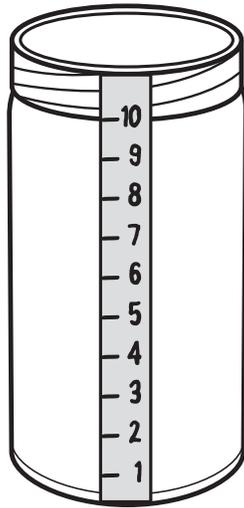
DATE _____

Measuring Jar Record Sheet

Jar _____

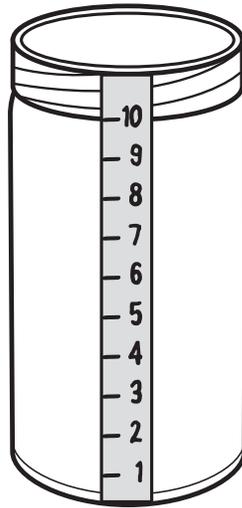


Guess

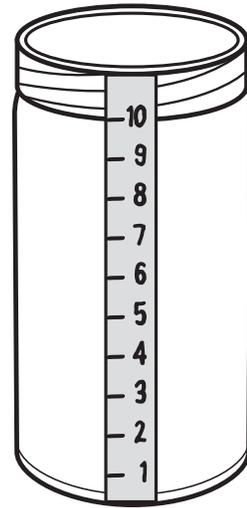


Check

Jar _____

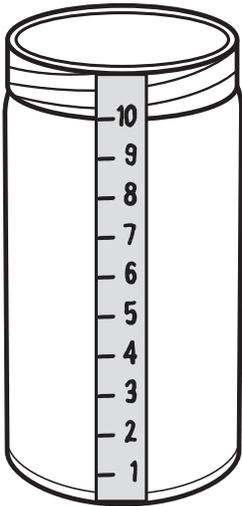


Guess

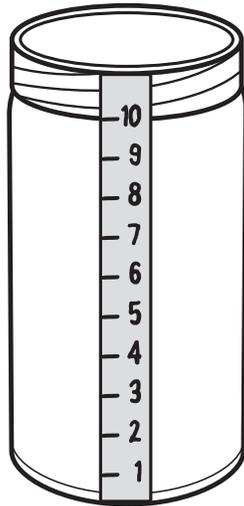


Check

Jar _____

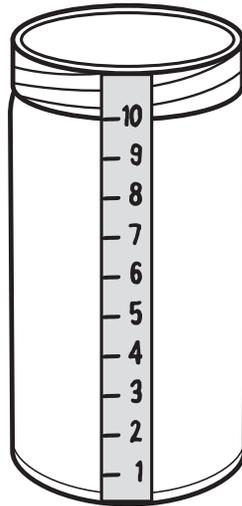


Guess

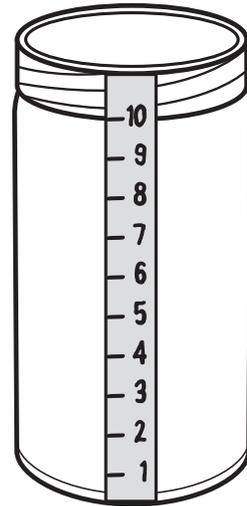


Check

Jar _____



Guess



Check

Set D5 ★ Activity 3



ACTIVITY

Goldilocks & the Three Jars

Overview

Students compare the capacity of three different jars.

Skills & Concepts

- ★ compare and order objects according to capacity

You'll need

- ★ Goldilocks & the Three Jars Record Sheet (page D5.14, run a $\frac{1}{3}$ class set and cut the sheets apart along the line)
- ★ 3–4 pounds of rice in a plastic storage container with a lid
- ★ the top of a cardboard carton
- ★ a plastic scoop that holds about a quarter cup
- ★ a funnel
- ★ 3 empty, washed clear plastic or glass jars (see Advance Preparation)
- ★ the Measuring Jar from Set D5 Activity 2
- ★ *Goldilocks and the Three Bears* (see Advance Preparation)

.....

Advance Preparation This activity will be most interesting to children if you can use 3 jars they've never seen before. Try to find one that is tall and narrow, one that is short and wide, and one that has curved sides such as a salad dressing bottle. Be sure that the capacity of each is different, but ideally not too different. Mark one with a square, one with a triangle, and one with a circle. If your students aren't familiar with the story of Goldilocks and the Three Bears, you'll want to read it to them before this session. (You'll probably find several different versions of the story in your school library; if not, you can find numerous versions online.)

.....

Instructions for Goldilocks & the Three Jars

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

A few days after her big adventure at the Three Bears' house, Goldilocks was helping her mother wash dishes in their sunny kitchen. She was very quiet for a few minutes and then she said, "I feel really bad about all the trouble I made for the three bears, Mom. I ate up all Baby Bear's breakfast, broke his chair, and messed up his bed. What do you think I should do?"

Her mother replied, "Why don't you write them a little note to say you're sorry and take it to their house with some honey from our beehives?"

Activity 3 Goldilocks & the Three Jars (cont.)

“Oh, Mommy, I’m scared to go back. What if they’re still mad at me?”

“What’s done is done, and we all make mistakes. If you say you’re sorry and you really mean it, I’m sure they’ll understand. After you write your note, we’ll put it in this basket with some honey and I’ll walk you down the path to their house.”

Goldilocks thought for a moment and said, “I know! We can put the honey into three jars. Papa Bear should get the jar that holds the most, then Momma Bear, and then Baby Bear should get the jar that holds least.”

Her mother said, “That’s a wonderful idea. Let’s see. We have exactly 3 empty jars here in the cupboard. I’ll get them down for you.”

When Goldilocks saw the 3 jars her mother set on the counter, she was puzzled. She said, “But Mommy, which one holds the most and which one holds the least? I can’t tell!”

Her mother smiled and said, “You figure it out while I find the lids for the jars. Let’s see. I think they’re somewhere in the bottom drawer.”

2. Show students the 3 jars you’ve collected for this activity, and draw their attention to the fact that each is labeled with a different shape. Explain that their job over the next few days will be to help Goldilocks by finding out which jar holds the most, which holds the least, and which is somewhere in between. Ask them to pair-share their predictions right now.

Students *The tallest one holds more—I just know it!*

But the sides on that one are curvy, and it gets really skinny at the top. I think maybe the one with the circle on it holds the most.

Taller is always bigger.

No it isn’t. Sometimes the short jar is more if it’s really fat like that one.

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

Students *We could fill one with rice and then pour the rice into the other, and keep pouring back and forth.*

We could use the Measuring Jar, like see which one fills it up the most.

I’m going to use that scooper. The one that holds the most scoops is the biggest.

And the one that only holds maybe 3 or 4 scoops is the littlest.

Can I try it now?

4. Show students a copy of the Goldilocks & the Three Jars Record Sheet.

Activity 3 Goldilocks & the Three Jars (cont.)

Set D5 Measurement: Capacity Blackline Run a 1/4 class set and cut the sheets apart along the line

Name _____ Date _____

Goldilocks & the Three Jars Record Sheet

name _____

Papa Bear	Mama Bear	Baby Bear
<input type="checkbox"/> 	<input type="checkbox"/> 	<input type="checkbox"/> 
Most		Least

Explain that when it's their turn to work with the jars over the next few days, they'll record their discoveries by drawing the shape on each jar (circle, square, or triangle) where it belongs on the sheet.

5. Let pairs of students work on the problem as time allows over the next few days. You may want to post a list of names near the rice set-up to keep track of the process and let students know where to put their completed record sheets. Reconvene the class to discuss the results after each pair has had their turn. At that time, you might want to try some of their ideas as a group to confirm which jar actually holds the most, and which holds the least.

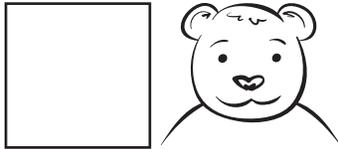
NAME _____

DATE _____

Goldilocks & the Three Jars Record Sheet

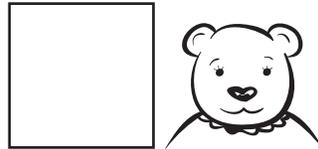
NAME _____

Papa Bear

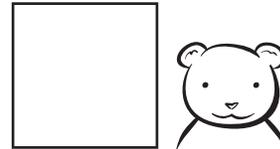


Most

Mama Bear



Baby Bear



Least

NAME _____

Papa Bear

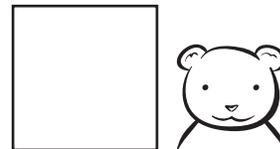


Most

Mama Bear



Baby Bear



Least

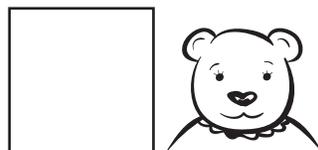
NAME _____

Papa Bear

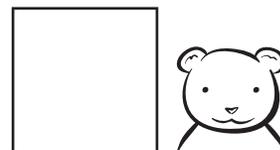


Most

Mama Bear



Baby Bear



Least