Mama Khanyi and the Pots

Mama Khanyi and the Pots

A mathematical story and activity book

Words: Pamela Vale with Mellony Graven and Jana Višňovská

Artwork: Carmen Ford

Story adapted from: Cortina, J.L. & Višňovská, J. & Zúñiga, C. (2014). Unit fractions in the context of proportionality: supporting students' reasoning about the inverse order relationship. *Mathematics Education Research Journal, 26*(1), 79-99.

This work, and associated resources, are downloadable from:
https://www.ru.ac.za/sanc/teacherdevelopment/miclegr4-7/

Mama Khanyi was a famous potter who lived long, long ago in the village of Matewu. She lived with her daughter, Thembi.

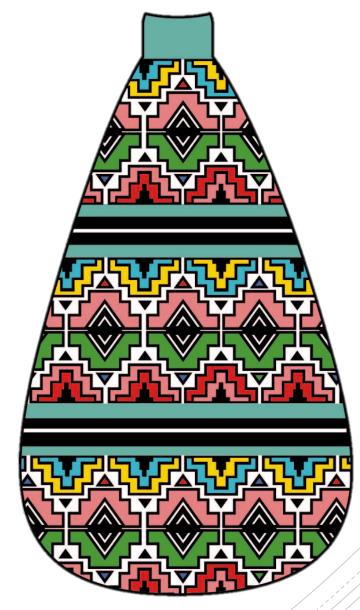People travelled from near and far to buy her pots.

She made beautiful clay pots in all shapes and sizes.

There were BIG pots…

and there were small pots,

and roUnd pots...

and taLL pots...

all painted in bright patterns.

Mama Khanyi lived in a time before measuring tools like rulers and tape measures.

She used her hands to measure the pots.

What else do you think she could use to measure?

One day Mama Khanyi went to collect some firewood.

Two elders visited from a village far away. They wanted to ask Mama Khanyi to make a very special pot. The pot was a gift for a wedding.

It needed to be exactly the same height as the one they were carrying.

Thembi measured it very carefully with her hands for her mother.

When Mama Khanyi returned from the field, Thembi told her of the elders' visit.

Mama Khanyi was sad that she missed them, but Thembi told her that she had carefully measured the pot.

"Mama," she said, "they want you to make a pot that is THREE hands high. They said they will come to fetch it tomorrow."
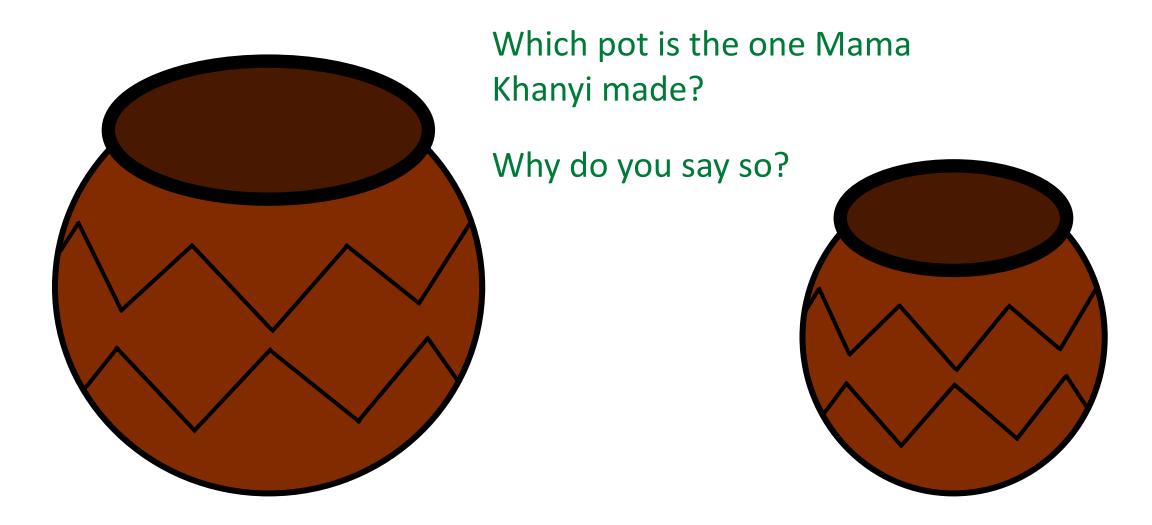
Thembi ran off to play and left Mama Khanyi to make the pot.

"Three hands high, that is easy to do," Mama Khanyi said to herself as she started to make the pot.

She worked very carefully to make sure the pot was EXACTLY three hands high.

The elders returned the next day. They brought the old pot and put it down next to the new one. The new pot was the wrong size!

Which pot is the one Mama Khanyi made?

Why do you say so?

Mama Khanyi asked the elders to let her make them a new pot. They agreed.

This time Mama Khanyi measured the pot herself.

Do you think Mama Khanyi got the same measurement as Thembi?

Why do you say so?

That evening Mama Khanyi sat outside under the full moon. She could not sleep.

She knew that she had taught Thembi how to measure properly. She knew that her and Thembi's hands were different sizes, and was worried the same mistake would happen again.

Was there another way for Thembi to help her mother take measures of pots?

She heard someone sigh…
"I will help," said a voice from above.

Mama Khanyi got a fright! "Who said that?"

It was Moon.

"Look below the tree at dawn," said Moon. "I will leave something there to help you and Thembi."

Mama Khanyi ran to the tree the next morning to see what Moon had left her.

The only thing lying under the tree was a perfectly straight, white stick!

Could this really be something that would help her and Thembi to measure pots?

Mama Khanyi called Thembi to come and look at the stick.

"Moon said that this will help us to measure pots. How can a stick help us?"

"I know!", said Thembi, "we can use the stick to measure instead of our hands. If we always use the same stick, we will always get the same measurement."

Mama Khanyi and Thembi practised using the stick by measuring the door of their hut. They were very careful when measuring.

Thembi placed the stick upright on the ground and drew a line where it ended. Then she carefully placed the stick on the line and made another line to see where to place the stick next.
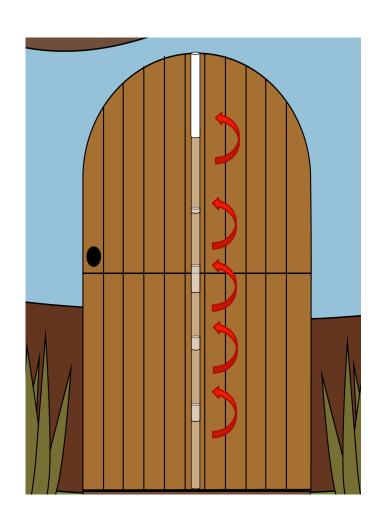
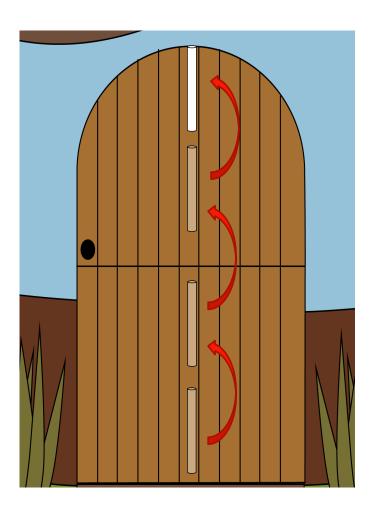Mama Khanyi and Thembi both measured the door as five sticks high.

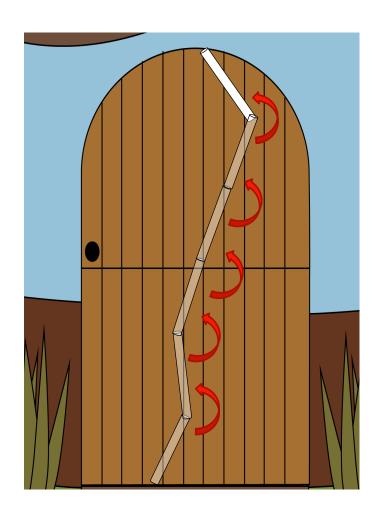And then they measured a path, a tree, a chair, a bed and each time they both got the same measurement.

Why do you think they drew a line at the end of the stick each time so carefully?

Why did they measure straight up, vertically, along the line?

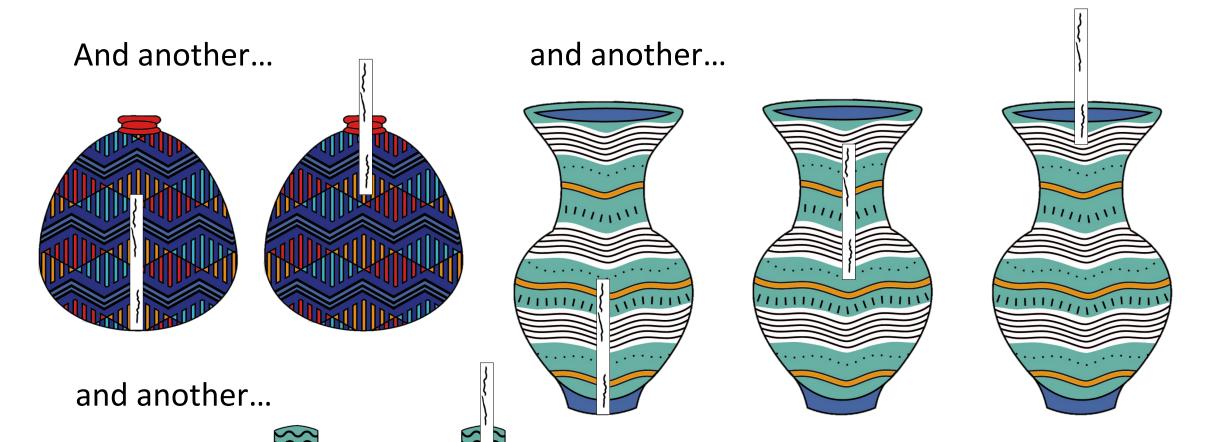What would happen if they placed the stick skew sometimes?

Explain why these are not good ways to measure.

Next they decided to try to measure one of their pots.

And another...

and another...

and another...

"Oh no!" said Thembi. "What do we do when the stick does not fit exactly?"

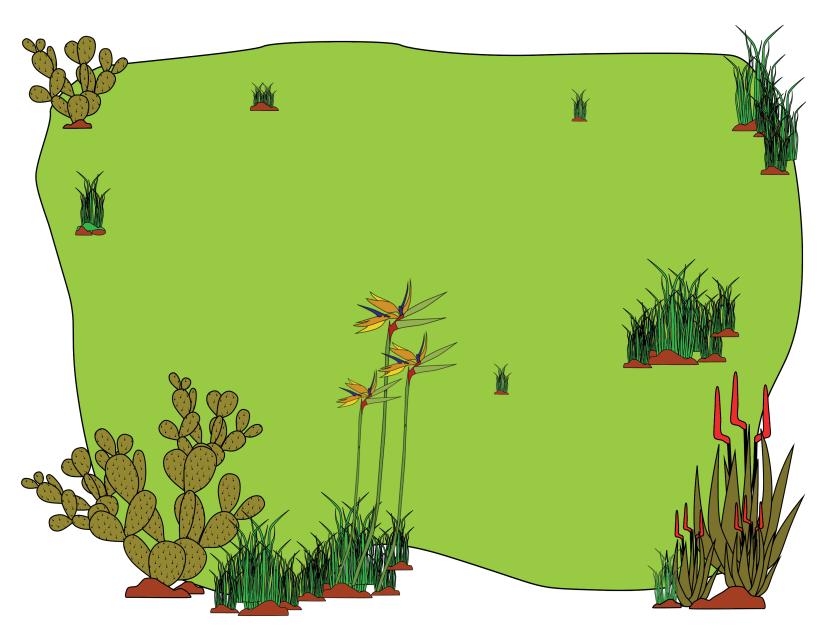"We can't use our fingers because our hands are different sizes."

Can you think of something they could do to measure the pieces that are less than one stick?

Mama Khanyi looked out at the field and spotted her favourite plant.

It had a long, straight stem and beautiful flowers.

Can you find it?

Mama Khanyi suddenly thought of a plan!

"We can use this plant to make smaller pieces to use to measure when the white stick is too long.

But, we must make them very carefully.

We can call these smaller pieces 'smalls'."

"We should start with a piece so long that when we measure the stick with it, it will fit along the stick exactly TWO times," said Mama Khanyi.

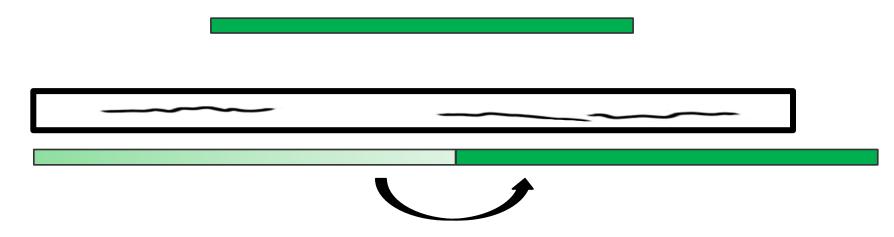She added, "we will call this new piece an otibele, because 'bele' means small, and 'oti' means TWO."

One otibele will fit along the stick exactly TWO times.

How many otibele will the stick measure?

Mama Khanyi started to make an otibele. She cut the stem to make a piece that would fit along the stick exactly TWO times.

First she cut this piece and placed it along the stick to test if it fit exactly TWO times...
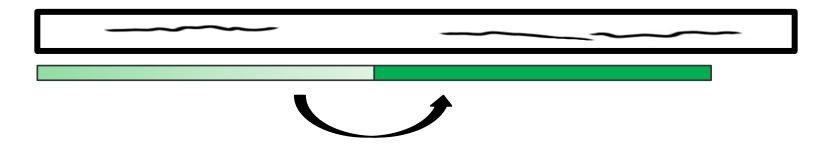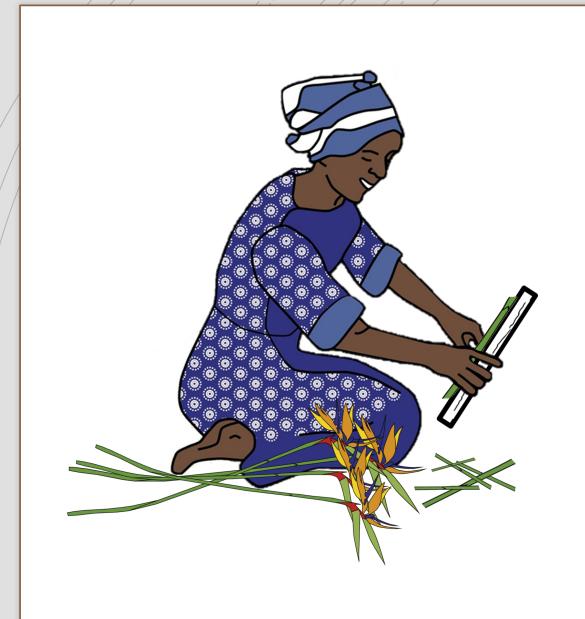

Is this a real otibele?

Would a real otibele be shorter or longer than this?

Mama Khanyi tried again. She took the piece and cut it a little shorter. This is the new length she tried…

She tested it to see if it fit along the stick exactly TWO times.
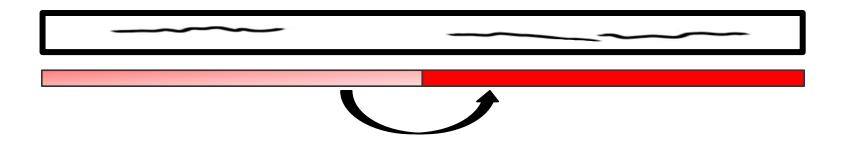
Is this a real otibele? What should Mama Khanyi do now?

Mama Khanyi picked up a new stem to try again. After many tries, she finally got the correct length for the otibele.

This is the length she tried…

When she tested it, it fit exactly TWO times along the stick!
She painted it red so that she knew this was the small she would use to measure pots.
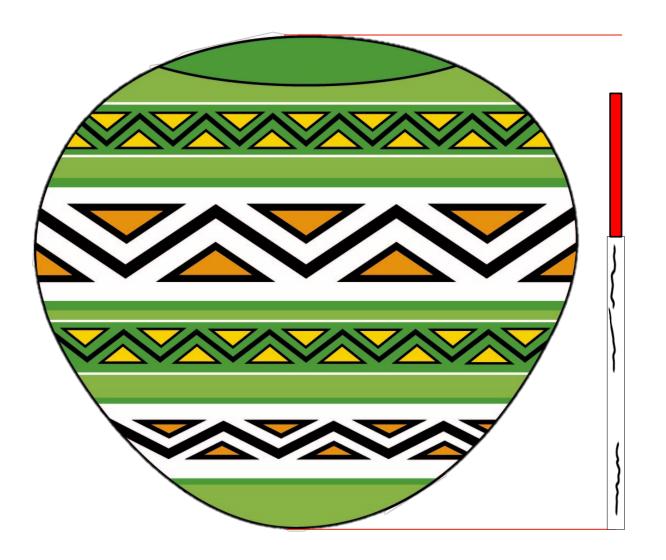
How did Mama Khanyi know it was a real otibele?

"But will that be enough?" asked Thembi. "Will we be able to measure every pot?"

Will Mama Khanyi be able to measure this pot exactly with her stick and the otibele?

Why do you say so?

"We can create more," said Mama Khanyi.

"Let us make a piece so long that when we measure the stick with it, it will fit along the stick exactly THREE times."
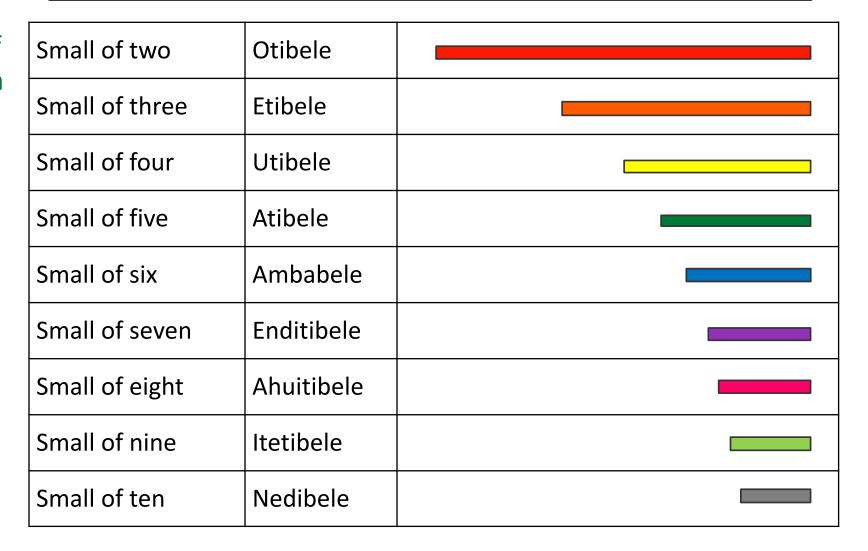
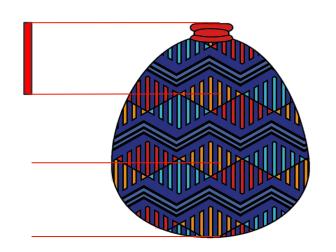"We can call that an etibele," shouted Thembi happily, "because 'eti' means THREE!"

Do you think that an etibele will be shorter or longer than an otibele? Why do you say so?

And so Mama Khanyi and Thembi created a whole set of smalls so that they could measure ALL pots. They painted each small a different colour. Try to make these smalls:
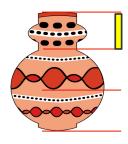
One otibele fits along the stick exactly TWO times.

One etibele fits along the stick exactly THREE times.

One utibele fits along the stick exactly FOUR times.

Now make the rest of the smalls that Mama Khanyi and Thembi made.

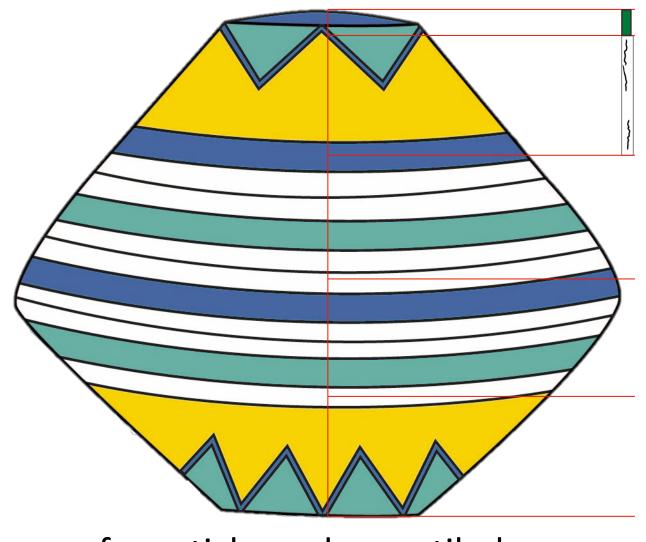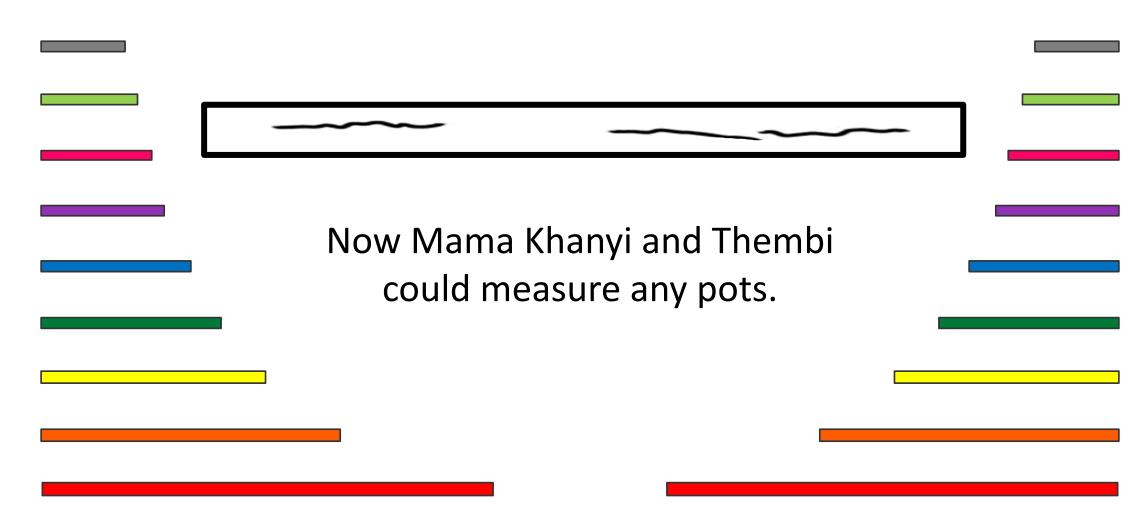|		
Small of two	Otibele	
Small of three	Etibele	
Small of four	Utibele	
Small of five	Atibele	
Small of six	Ambabele	
Small of seven	Enditibele	
Small of eight	Ahuitibele	
Small of nine	Itetibele	
Small of ten	Nedibele	

three otibele

three utibele

four sticks and one atibele

Mama Khanyi and Thembi practised measuring some of their pots. They discovered that the measuring tools worked for their needs!

Now Mama Khanyi and Thembi could measure any pots.

Other pot-makers soon heard and came to Mama Khanyi to make their own stick and smalls. This way they would all be able to make the same size pots when needed.

From that time on, whenever anyone asked for a pot, it did not matter who took the measurements, as long as they measured carefully and accurately.