Building School Readiness with Measurement

Rosemary Irons and Peter Stowasser

Importance of Language in Mathematics

- Conceptual understanding begins with the knowledge that each child possesses.
- Child's prior experiences and interaction with the world using language.
- New ideas are added through language that grows as new connections are made.
- This is a natural way to provide meaning to mathematics.

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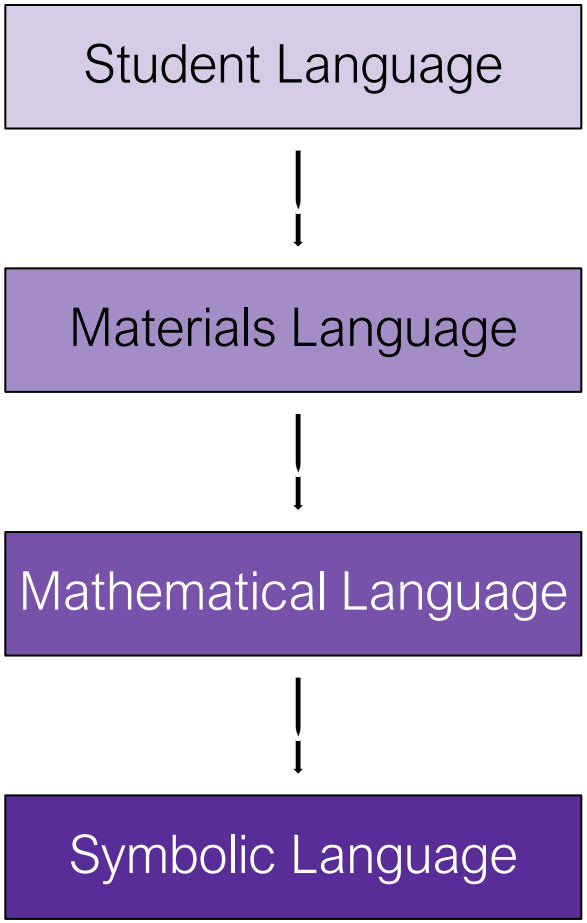
Language Stages



The everyday language that involves measurement mathematical ideas

The language that comes from using **concrete** and **pictorial** materials

The language specific to mathematics concept

The symbol for the concept or abbreviated word

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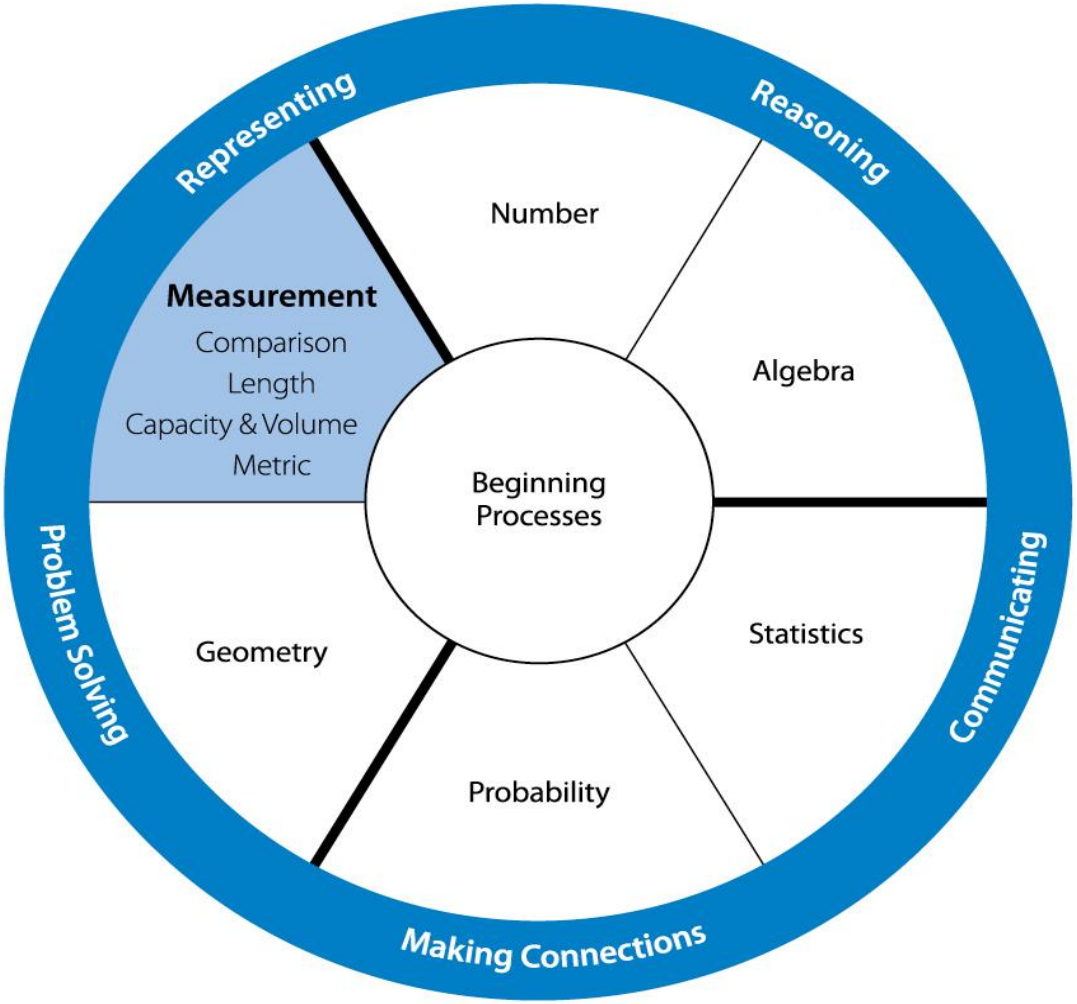

Early Childhood Mathematics Framework
(Irons 2010)

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Concept

What is measurement?

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Measurement involves finding and reporting the **amount of an attribute** that is present in an object or event.

Measurement involves finding and reporting the **amount of an attribute** that is present in an object or event.

- Length (height, width, depth, distance, etc.)
- Mass
- Capacity
- Time
- Angle
- Temperature
- Area
- Volume

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Concept

What is length?

Remember that a concept involves the **image** that you possess of the idea.

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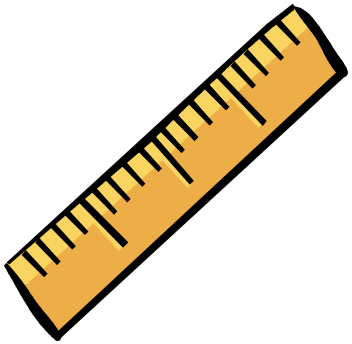
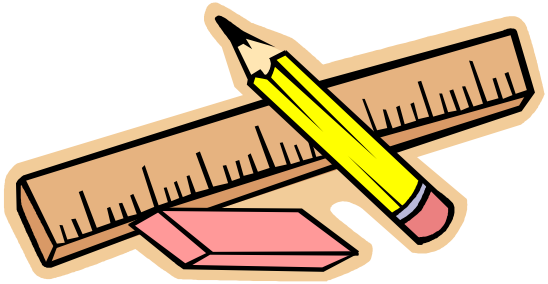
Skill

How do we measure length?

The skill involves the ability to use the **tools** and work with the various **units**.





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Important Aspect for Measurement Concepts

At the Student Language Stage, children should have learning experiences that emphasize the **comparing** process.

Work with the ideas of opposites.

In the chat, write the opposite words.

Thick	.....	Wide	.....
Tall	.....	Large	.....

Your handout includes a comprehensive list of opposite words.

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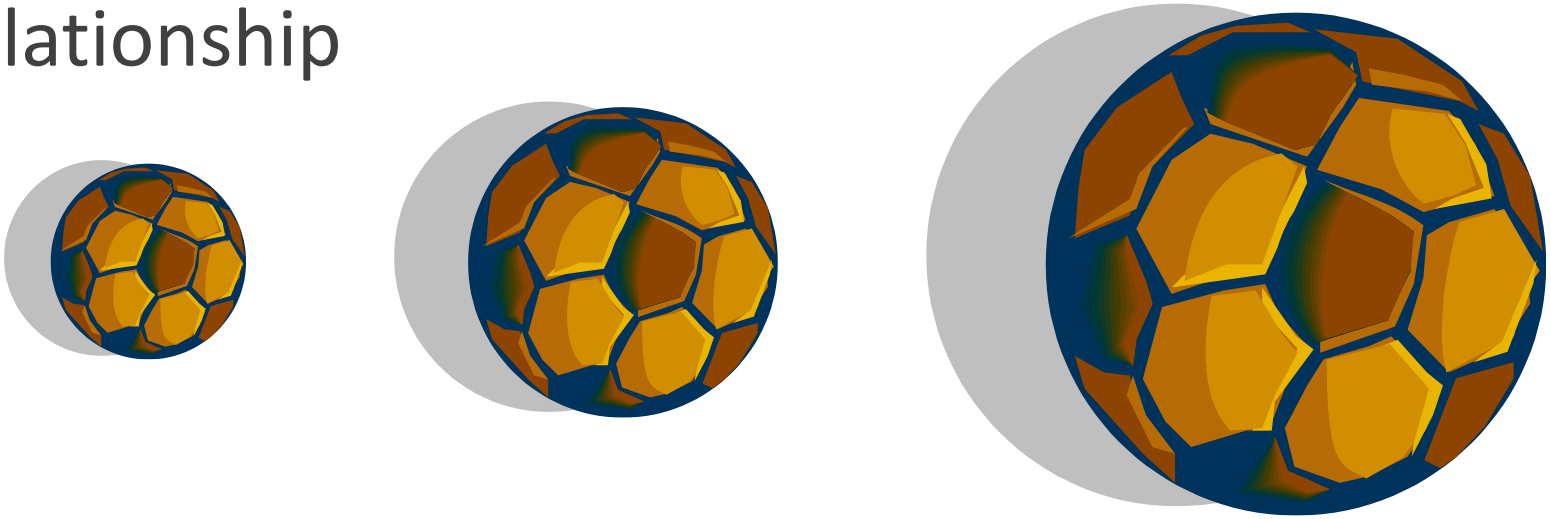
Cognitive Conflict

The Challenge of Comparison Reasoning

The idea that one object can change its description and have more than one comparison relationship



smaller than the big ball

bigger than the small ball

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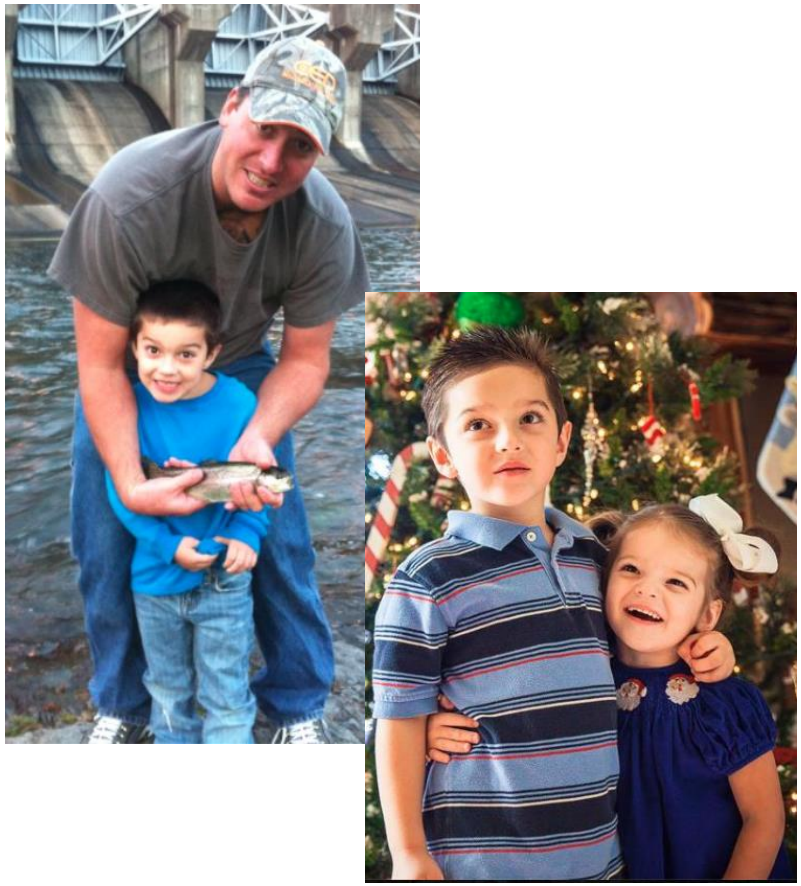
Help children think about themselves in a comparison.

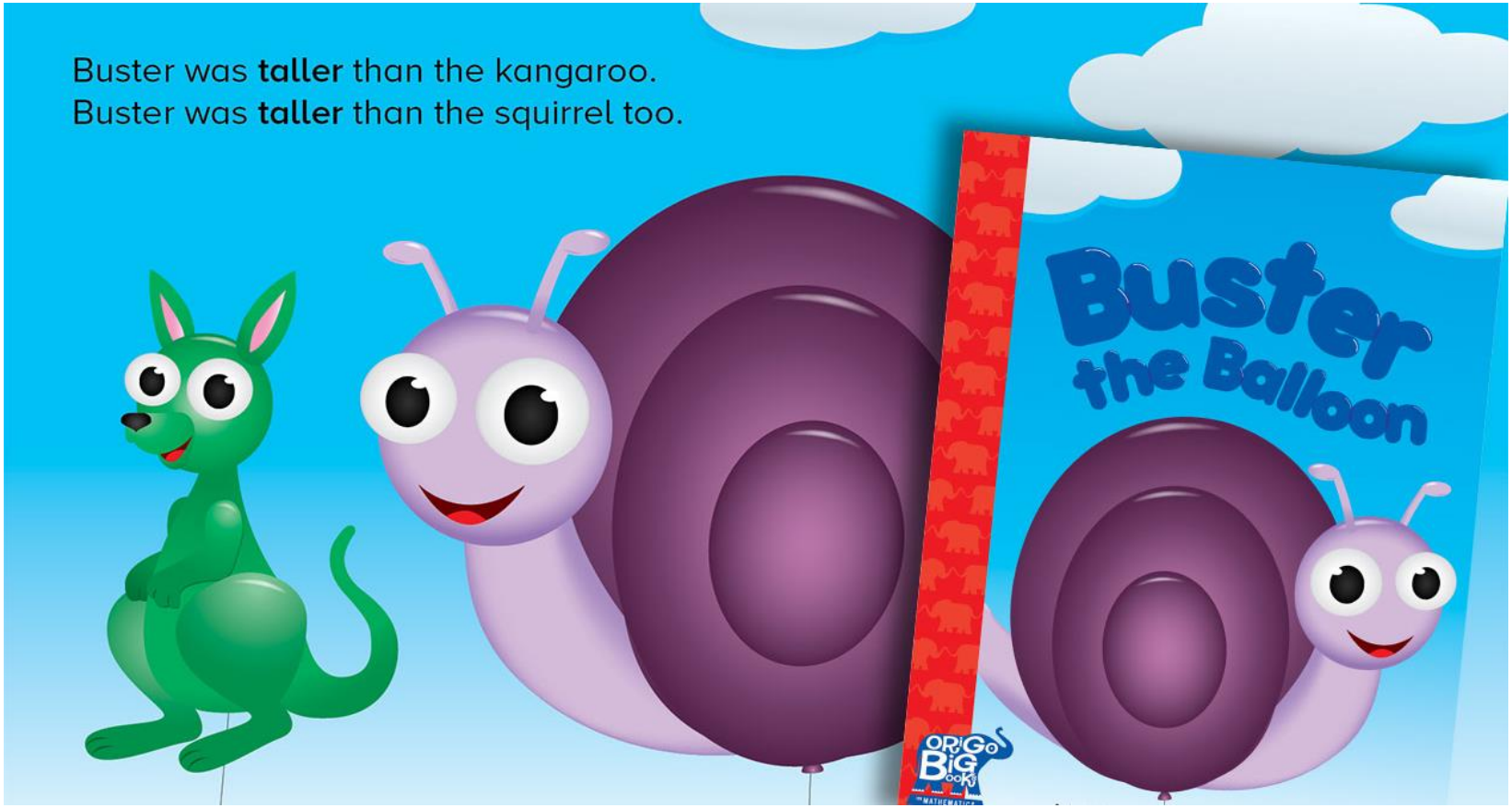
I am short*er* than my Dad.

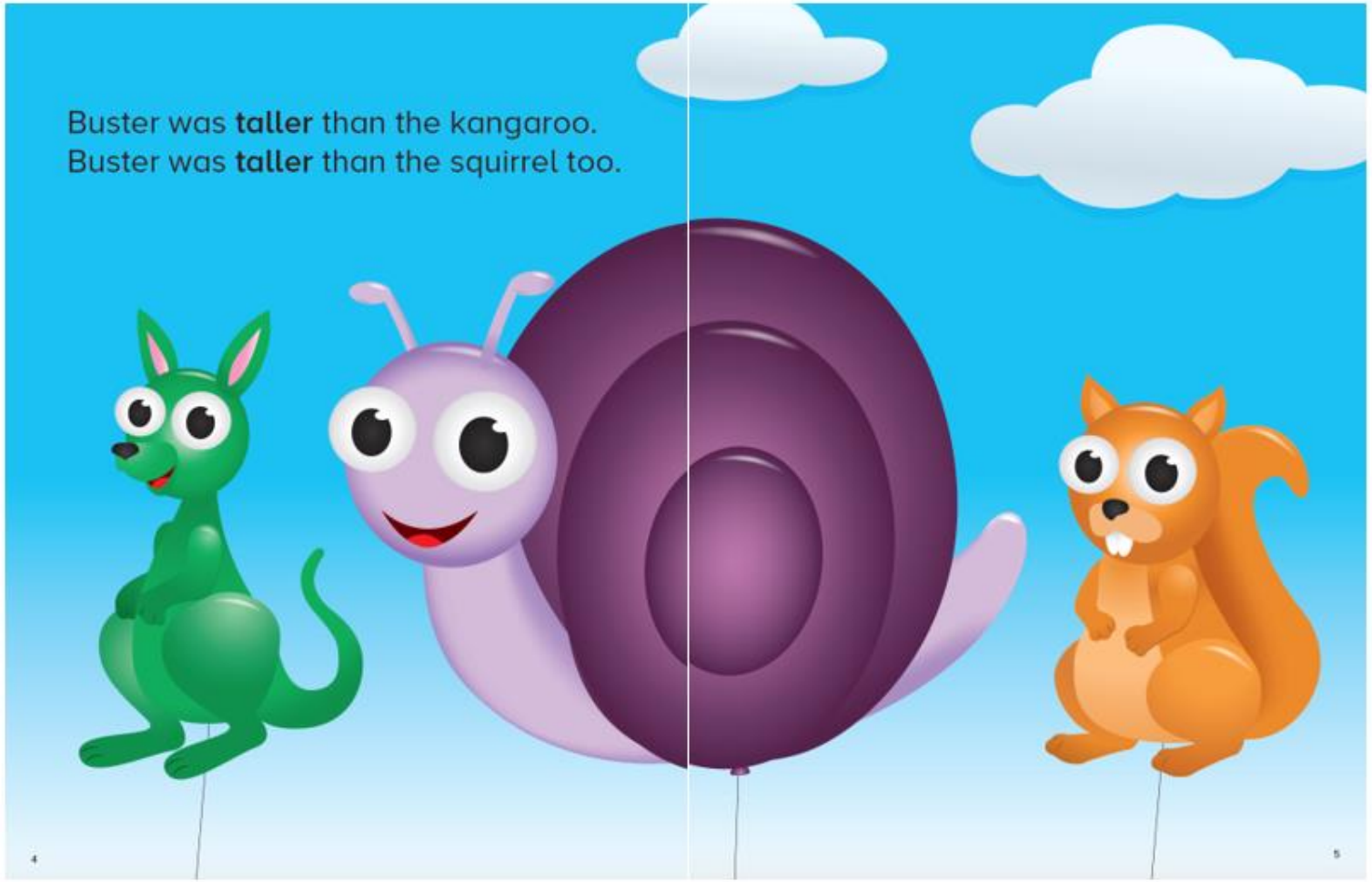


I am tall*er* than my sister.

You are both taller and shorter.

Comparison Language





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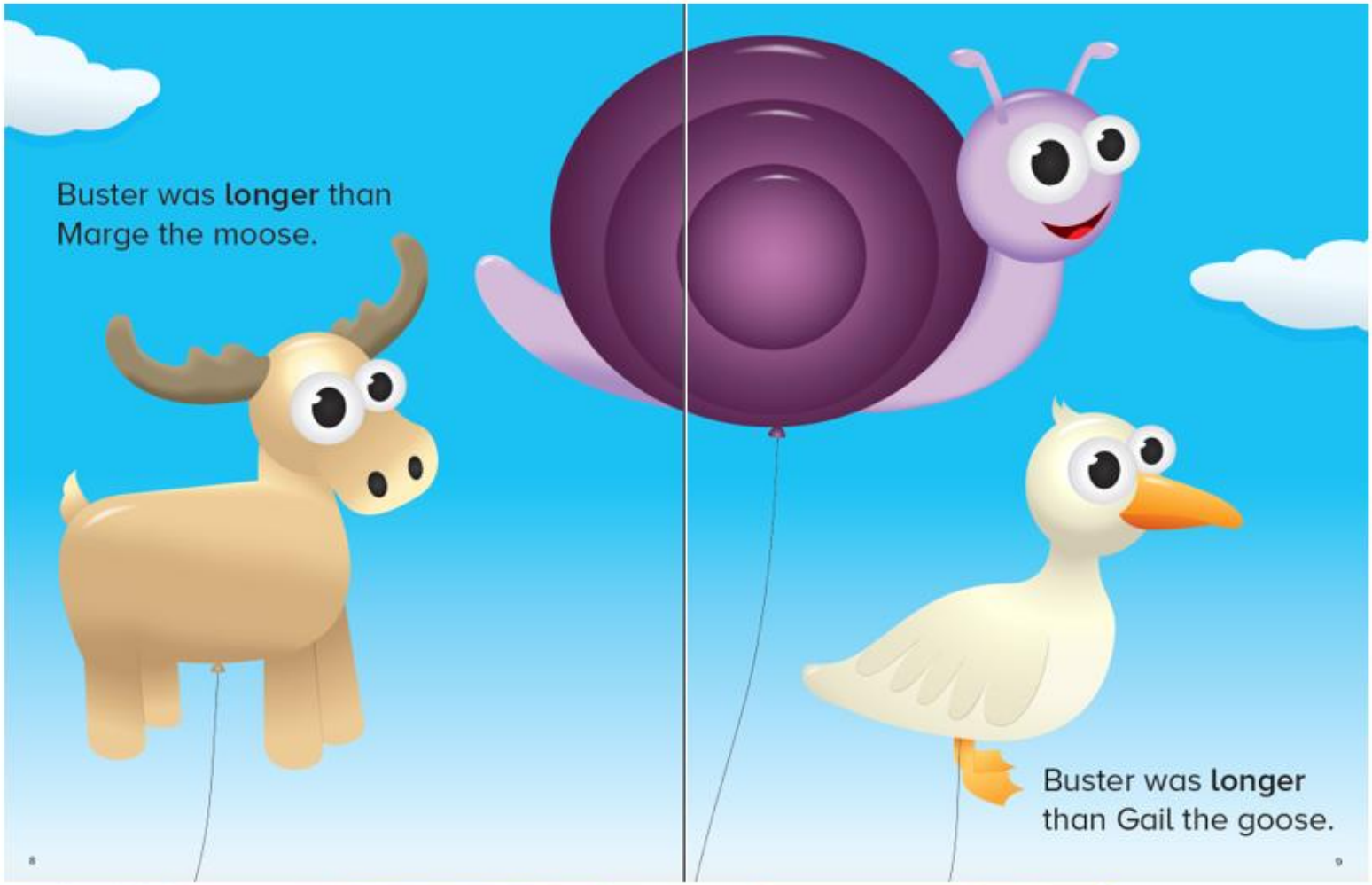
Buster was **longer** than
Marge the moose.
Buster was **longer**
than Gail the goose.

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But one day Buster began to squeak.
“Oh no!” he cried, “I’ve sprung a leak!”
16
17

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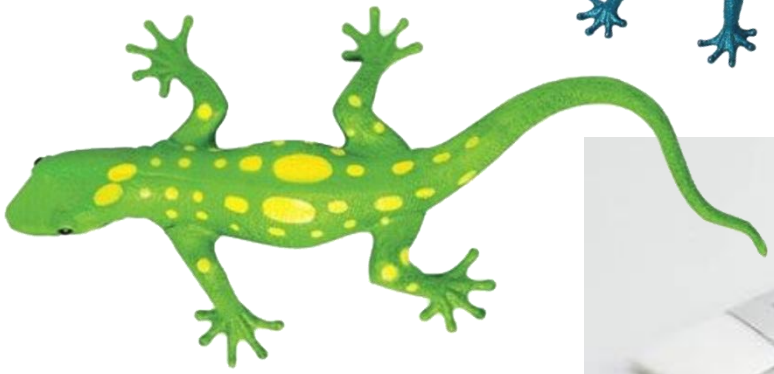
Beginning Ordering of Length



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Comparison Language

ORIGO Big Books

The everyday language that involves measurement mathematical ideas

ORIGO Big Book Tools

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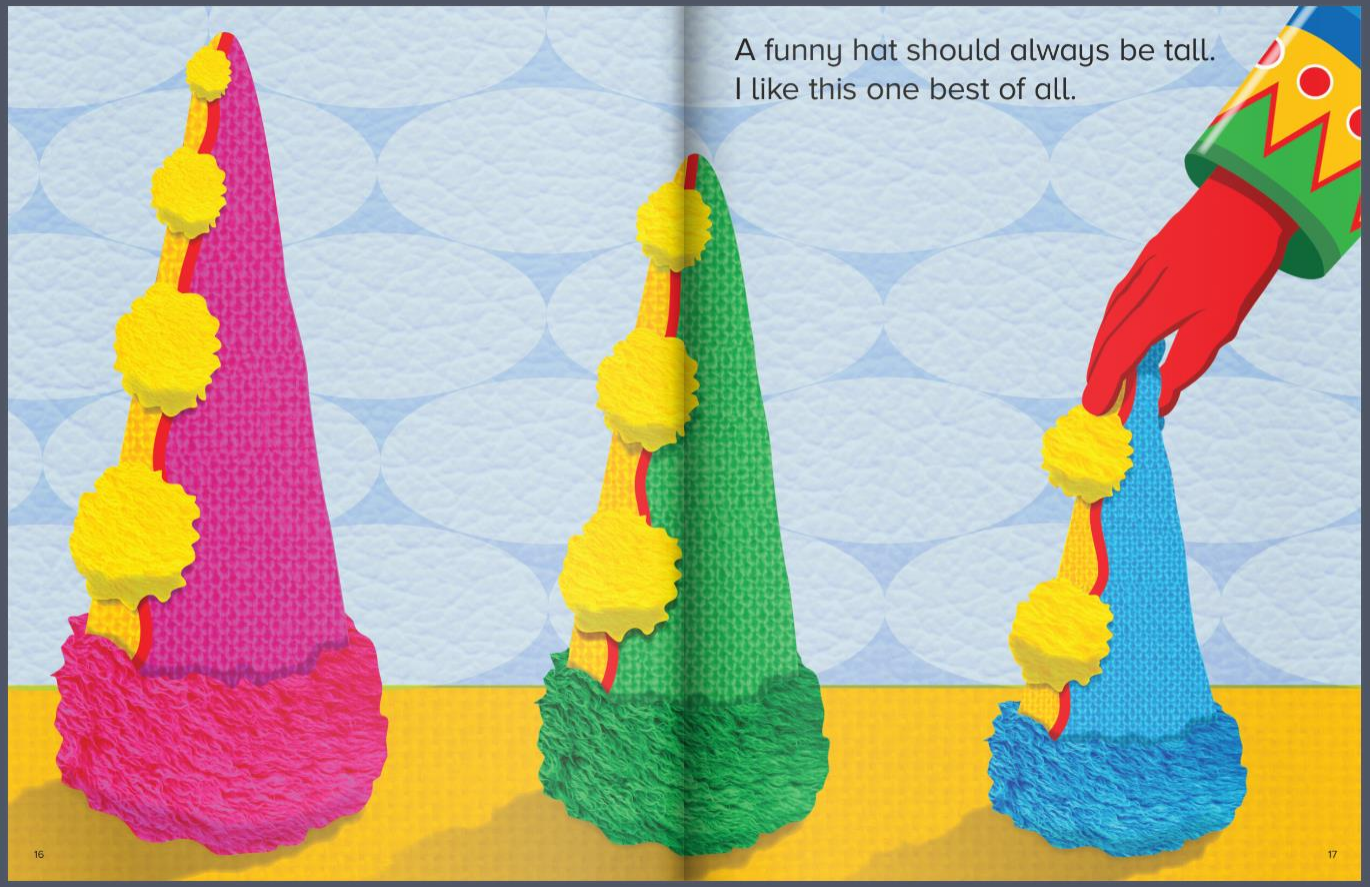
Which pair of shoes will it be?
These long ones look good on me.
6
7

I need a belt to wear with pride.

I like the red one. It is wide.

10

11


A funny hat should always be tall.
I like this one best of all.
16
17

Concept

What is length?

Student Language

tall	*short*	*deep*	*thick*
narrow	*thin*	*long*	*wide*

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Materials Language

The language that comes from using concrete and pictorial materials

lizard lengths

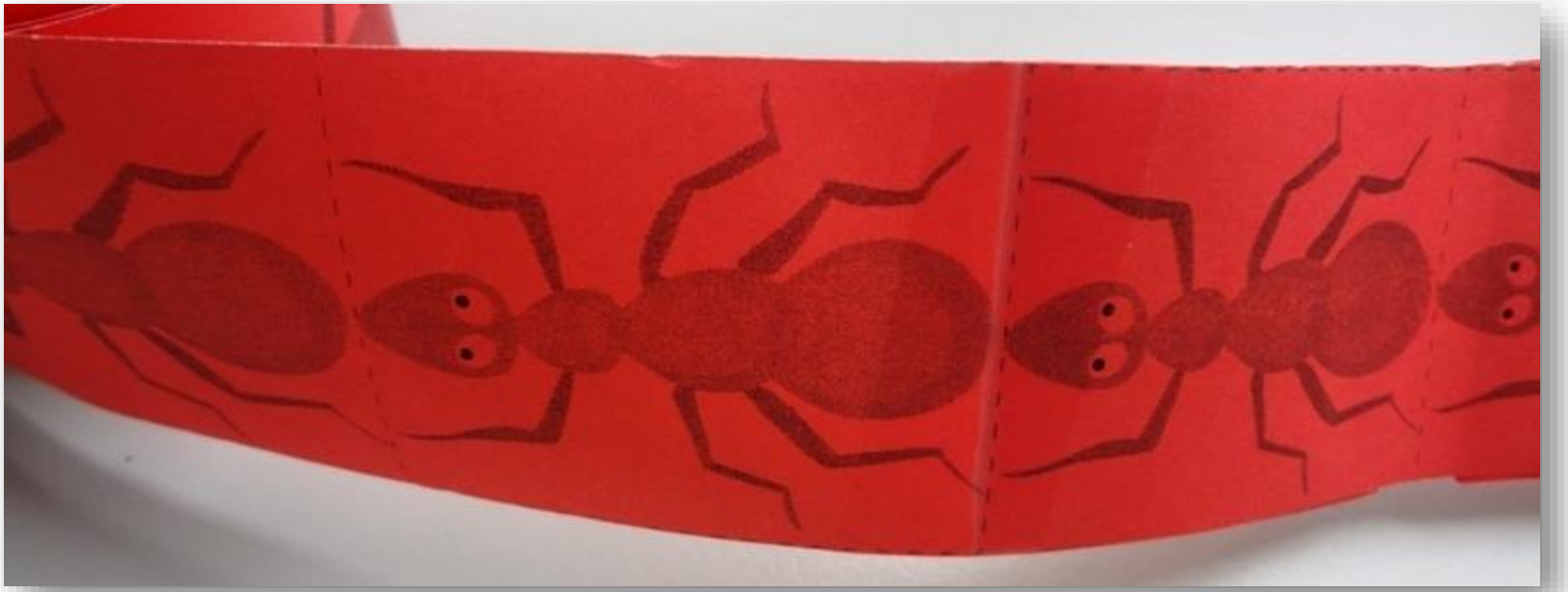
koala count

worm lengths

dinosaur count

ant lengths

BLAKE AND
Lydia



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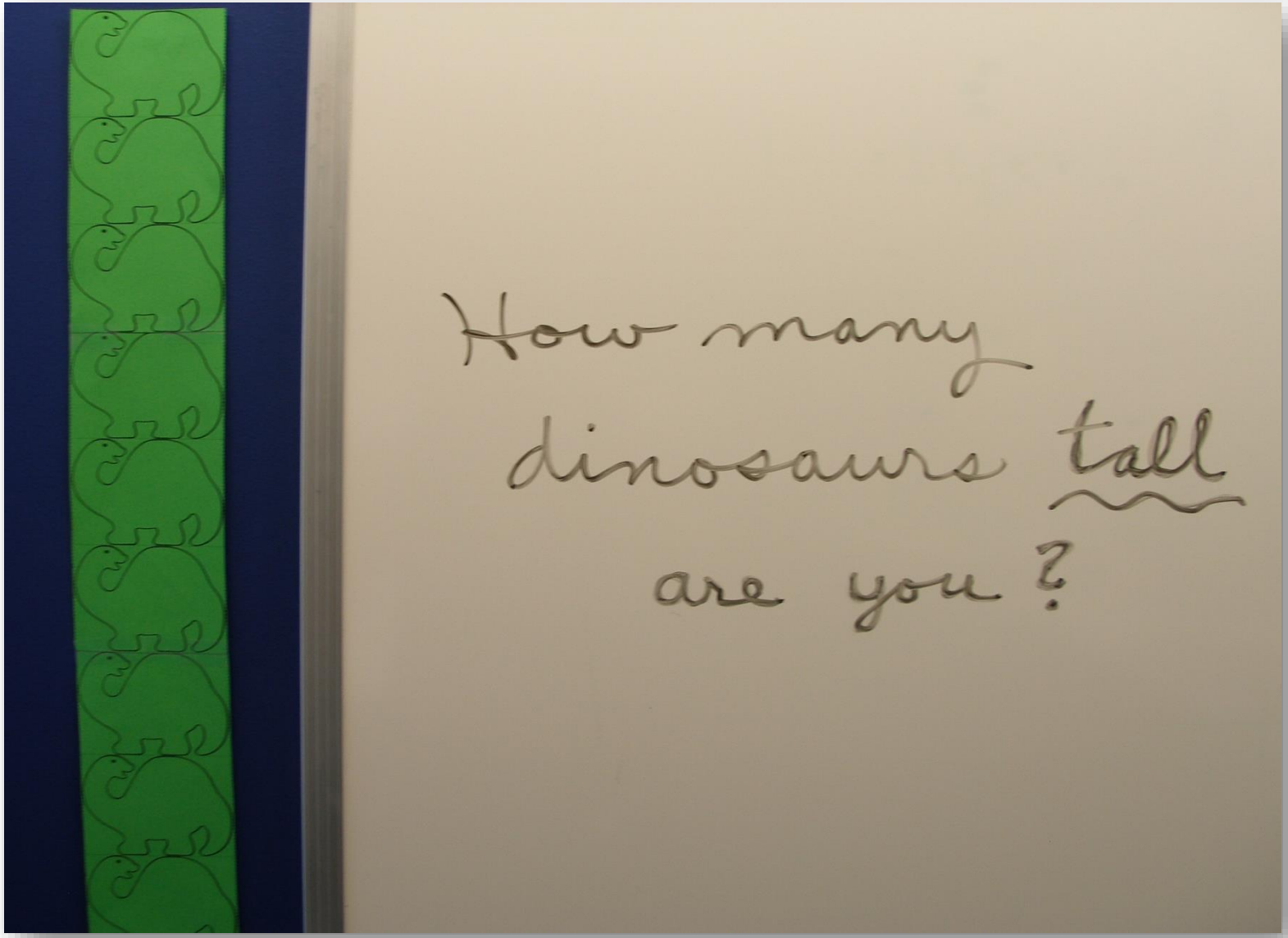

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Materials Language

sticks *links* *cubes*

steps *hands*

This step must stress counting.

These are sometimes called non-standard units.

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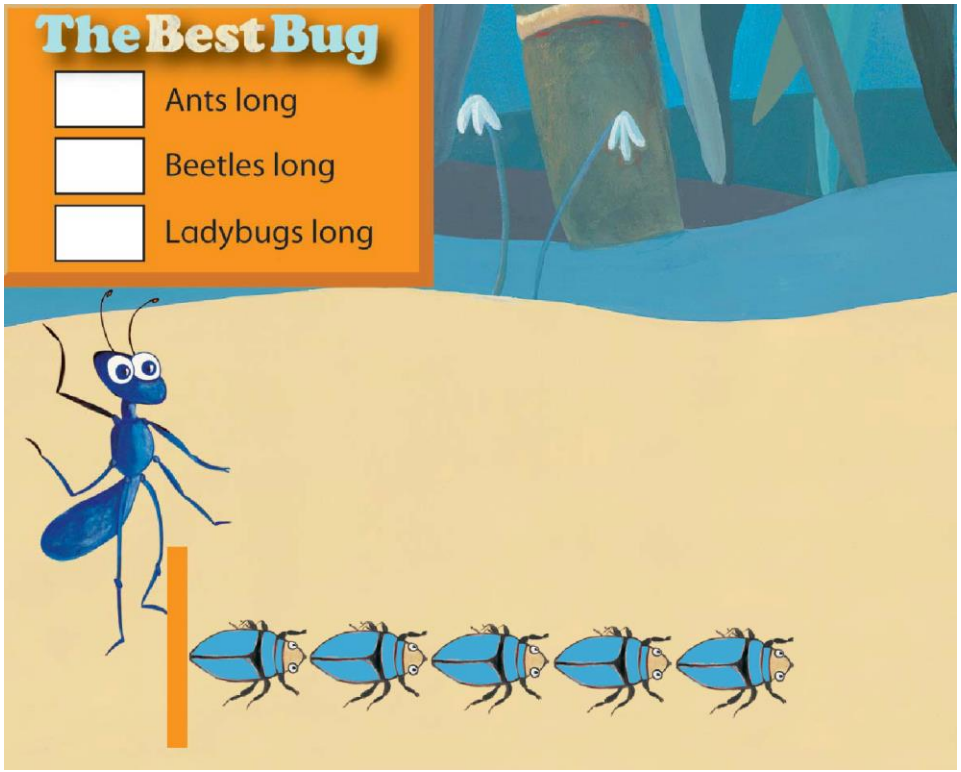
Materials Language

ORIGO Big Books

The language that comes from using concrete and pictorial materials



ORIGO Big Book Tools

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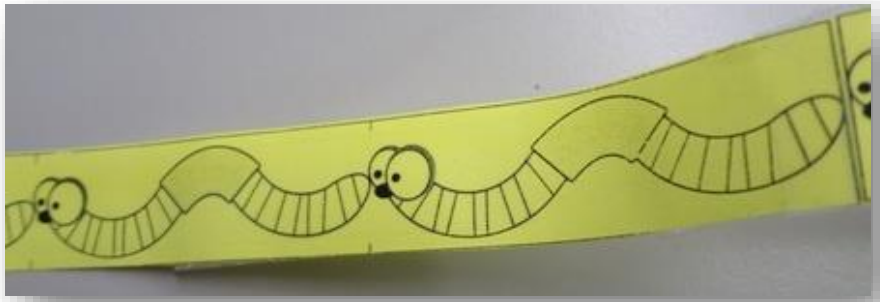

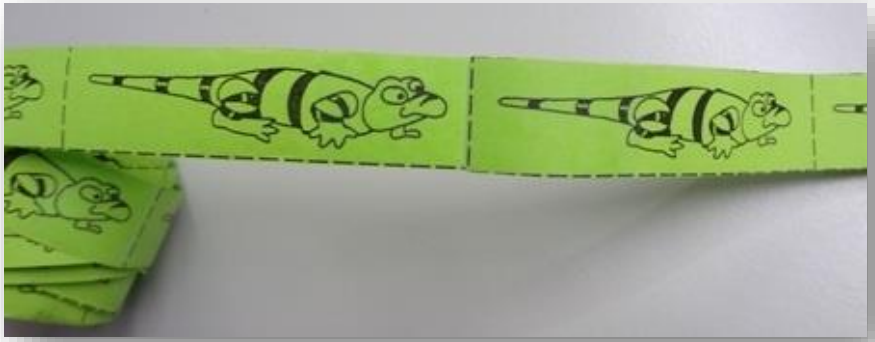

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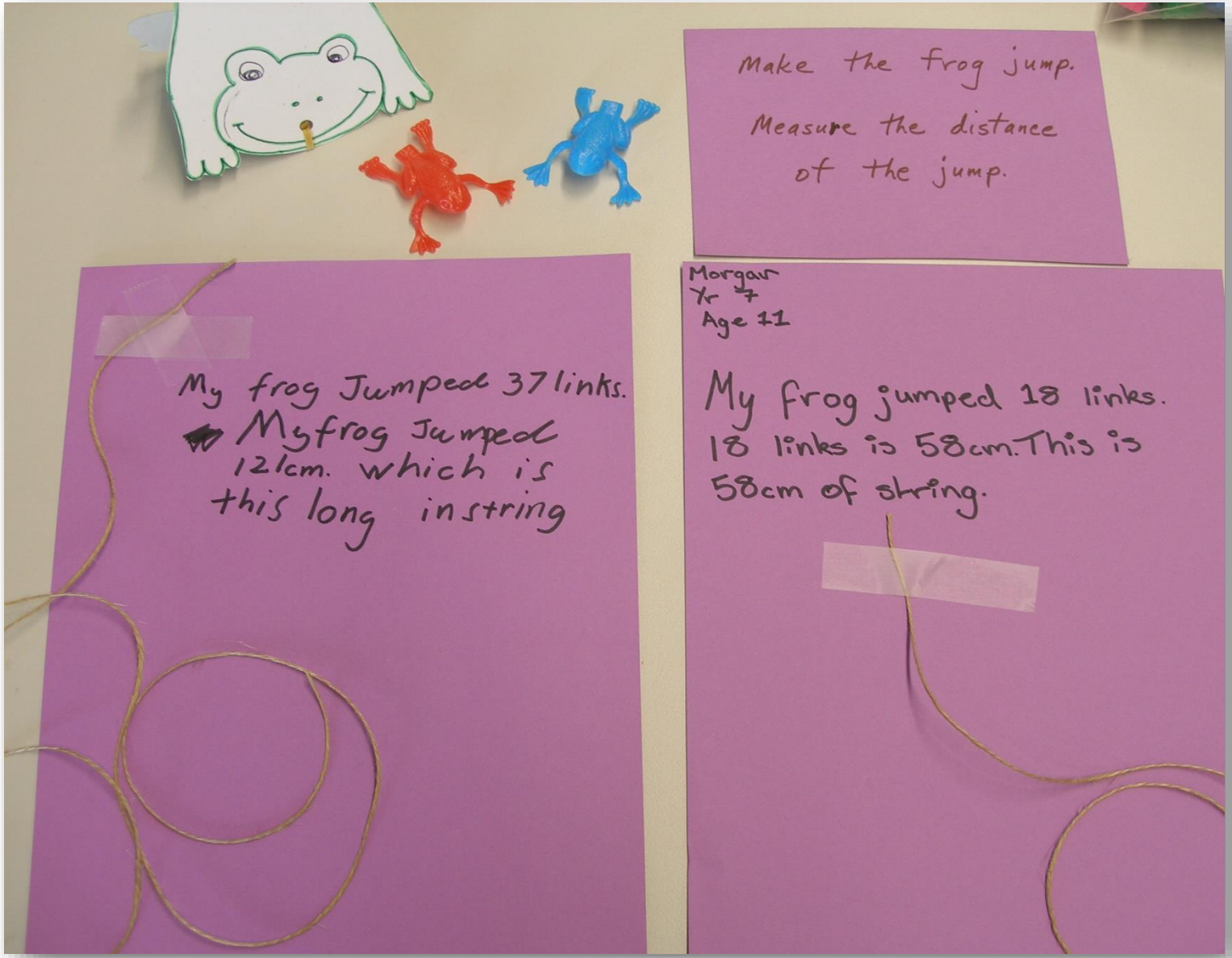

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Mathematical Language

centimetre *metre*

Tools are used to count.

These are sometimes called standard units.

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Have some meter sticks or tapes in your environment so children hear the name of the measuring instrument and see you use it to measure in the outdoor area.

Have some centicubes for your 5 and 6 year old children to measure as this is preliminary to using the centimeter measuring tape.

Mathematical Language

The new mathematical words that are used with the concept.

Children should read measurement words.

_____ *centimetres long* _____ *metres long*

After recognition, children can write measurement words.

Symbolic Language

m *cm* *mm* *km*

With length language, children also need to hear the words:

Distance: used with paces, foot lengths

Perimeter: as boundaries and edges with bricks, sticks

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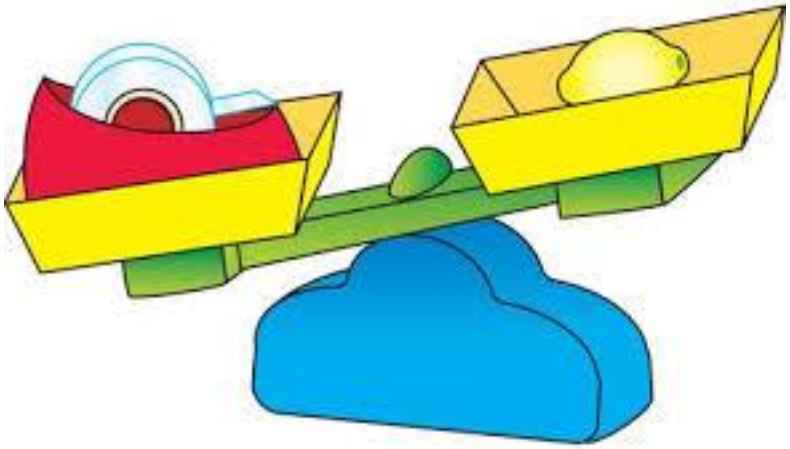
Concept

What is mass/weight?

Remember that a concept involves the **image** that you possess of the idea.



Concept

What is mass/weight?

Mass	R. Irons 2015 Weight
Mass is the amount of substance.	**Weight** is the measure of the force of gravity. It is related to mass but varies according to the gravitational effect.

What is your mass on the moon?

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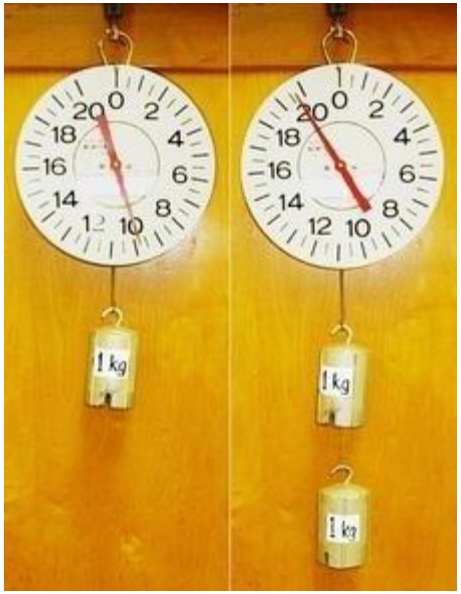
Skill

How do we measure mass/weight?

The skill involves the ability to use the **tools** and work with the various **units**.

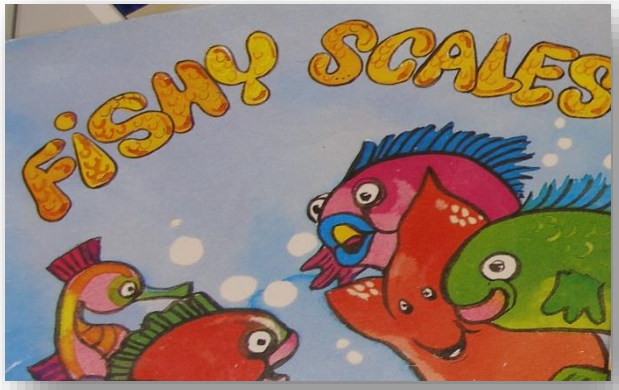


Student Language

heavy *light*

Children must heft objects to learn about the concept of mass. They need to feel the weight (pull) of the object. Mass should never be taught using pictures.

An older book, *Fishy Scales*



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Collect various objects that are:

- a large size with a small mass
- small objects with a great mass

Materials Language

sinkers *washers*

glass beads

This step must stress counting.

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Materials Language

The language that comes from using **concrete** and **pictorial** materials.

Objects balanced with blocks/washers/stones. Then complete a count.

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Mathematical Language

kilogram *gram*

Ask for donations of kilograms/pounds of flour or sugar to provide enough opportunities for the children to heft the mass of a kilogram/pound.

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Symbolic Language

kg *g*

Concept

What is capacity?

Remember that a concept involves the **image** that you possess of the idea.

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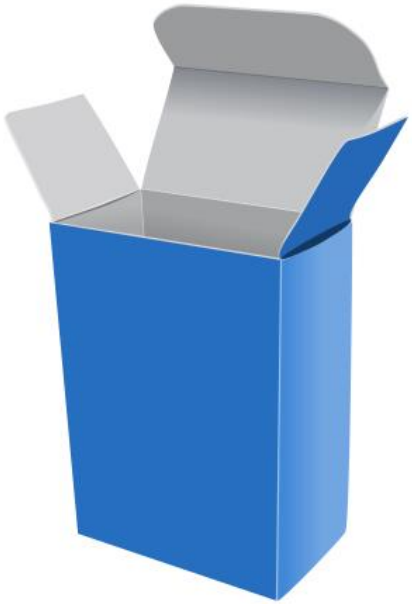
Concept

What is capacity?

The amount a container holds.



Skill

How do we measure capacity?

The skill involves the ability to use the **tools** and work with the various **units**.

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Student Language

big *little* *full* *empty*

holds a lot *holds a little*

Materials Language

cupfuls *spoons*

This step must stress counting.

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How many scoops
of rice fill the glass?

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Mathematical Language

Litre *millilitre*

Note the capital L on liter.

Symbolic Language

L *mL*

Note the capital L on liter.

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How do you know if your children are school ready?

EARLY YEARS LEARNING FRAMEWORK

OUTCOME 5: CHILDREN ARE EFFECTIVE COMMUNICATORS
Children interact verbally and non-verbally with others for a range of purposes

This is evident when children:

- demonstrate an increasing understanding of measurement and number using vocabulary to describe size, length, volume, capacity and names of numbers

Look and listen for comparison language e.g., opposite words. Are children building a picture of each concept?

Educators promote this learning, when they:

- model language and encourage children to express themselves through language in a range of contexts and for a range of purposes

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Enjoy planning application learning experiences for the children so they understand the measurement concepts and use the skills for measuring.

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Building School Readiness with Number | Tuesday, May 24 (3:15 pm – 4:00 pm AEST)
Building School Readiness with Measurement | Tuesday, May 31 (3:15 pm – 4:00 pm AEST)
Building School Readiness with Geometry | Tuesday, June 7 (3:15 pm – 4:00 pm AEST)
Building School Readiness with Algebra (Patterns) | Tuesday, June 14 (3:15 pm – 4:00 pm AEST)
Building School Readiness with Statistics | Tuesday, June 21 (3:15 pm – 4:00 pm AEST)

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