# Building School Readiness with Number

Rosemary Irons and Peter Stowasser

# Relevance of Language in Mathematics

- Model of specific mathematical terms
- Use of language by children to describe ideas
- Support for mathematical concepts and involvement in investigations, thinking and reasoning
- Books present a pictorial representation

Adapted from EYF, Canberra, 2009

Modeling and describing are powerful teaching tools.

After watching cooking shows on television, child's play centered around using utensils and resources to cook.

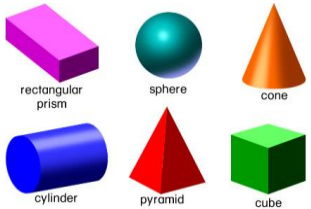
# Mathematics in Action

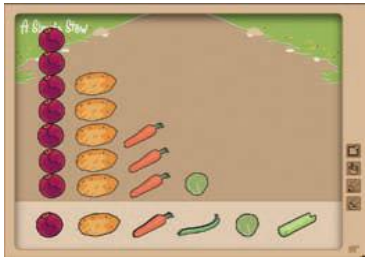
Child negotiated with teacher to allow the constructed building to stay up overnight rather than dismantle it. Child wrote a sign to place on the building.

0 tochs plez

# Strands of Early Childhood Mathematics

- Number
- Measurement
- Geometry
- Data(Statistics)
- Patterns(Algebra)

# *Concepts of this session will focus on*


Number

# Challenge of learning number

Four aspects or ideas for meaningful understanding of number:

*Quantity*

*Relative Position*

*Ordinal*

*Label*

# Counting Principles

**The One-to-One Principle**

- Each object is counted once and only once.

**The Stable-Order Principle**

- There is a list of number names that is said in a conventional order.

**The Cardinal Principle**

- The last number said determines the quantity in the collection.

**The Abstraction Principle**

- Countable ‘things’ can be tangible or nontangible.

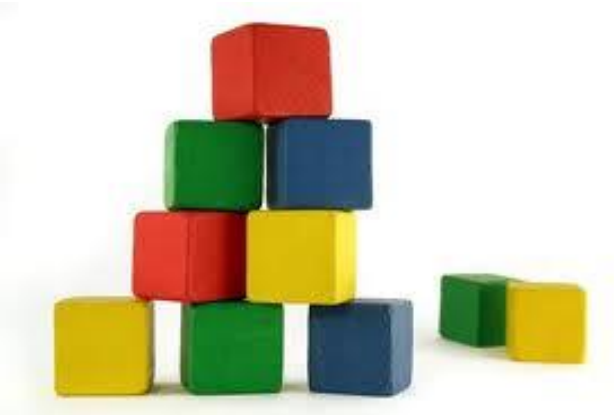
**The Order-Irrelevance Principle**

- The objects can be counted in any order.

Gelman, R. & Gallistel, C. (1978)

# The One-to-One Principle

Each object is counted once and only once.



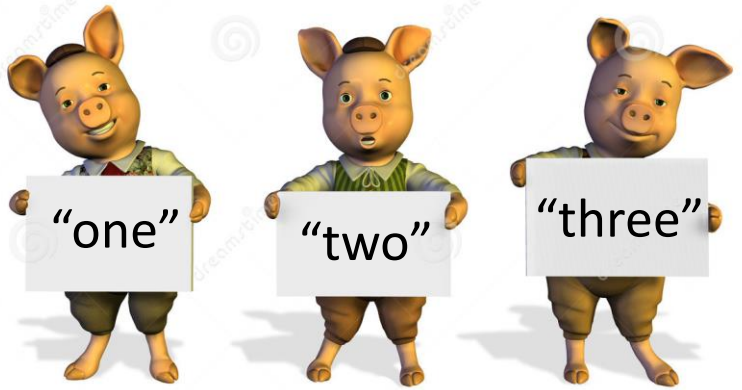
# The Stable-Order Principle

There is a list of number names that is said in a conventional order.

“One …. Two …. Three …. Four …. Five ….”

# The Cardinal Principle

The last number said determines the quantity in the collection.

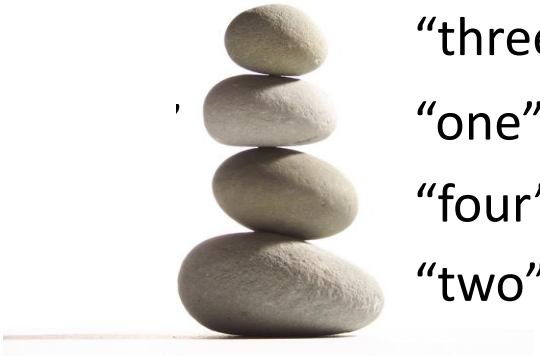


# The Abstraction Principle

Countable ‘things’ can be tangible or nontangible. Some objects cannot be counted.

# The Order-Irrelevance Principle

The objects can be counted in any order.



“three”

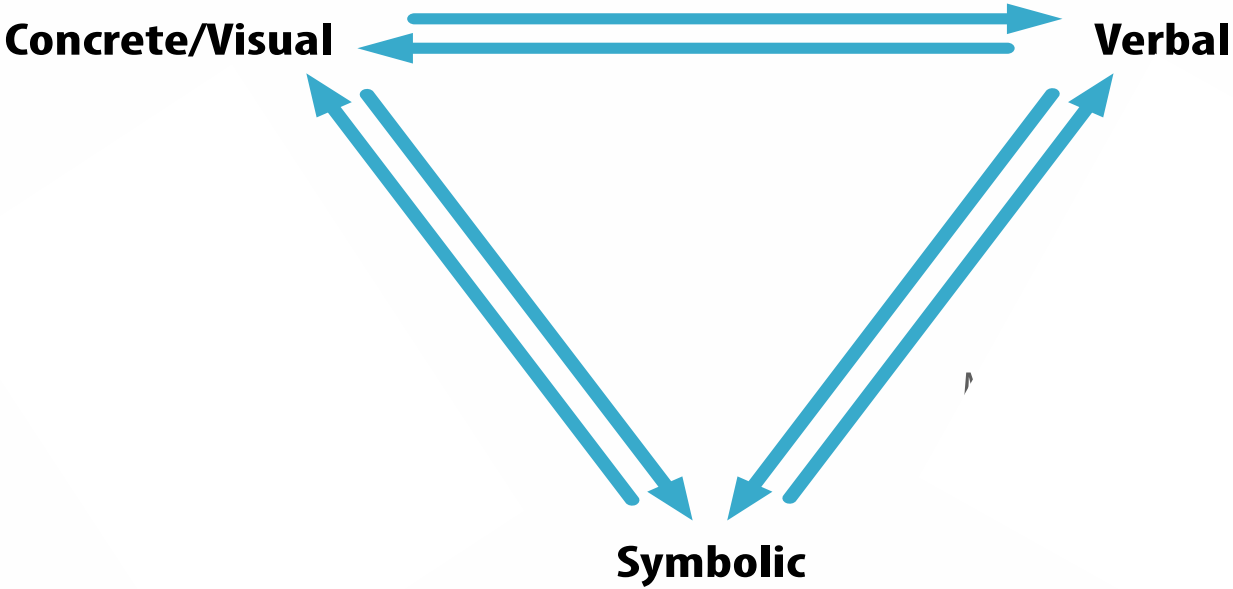
“one”

“four”

“two”

# Origo's Teaching Model

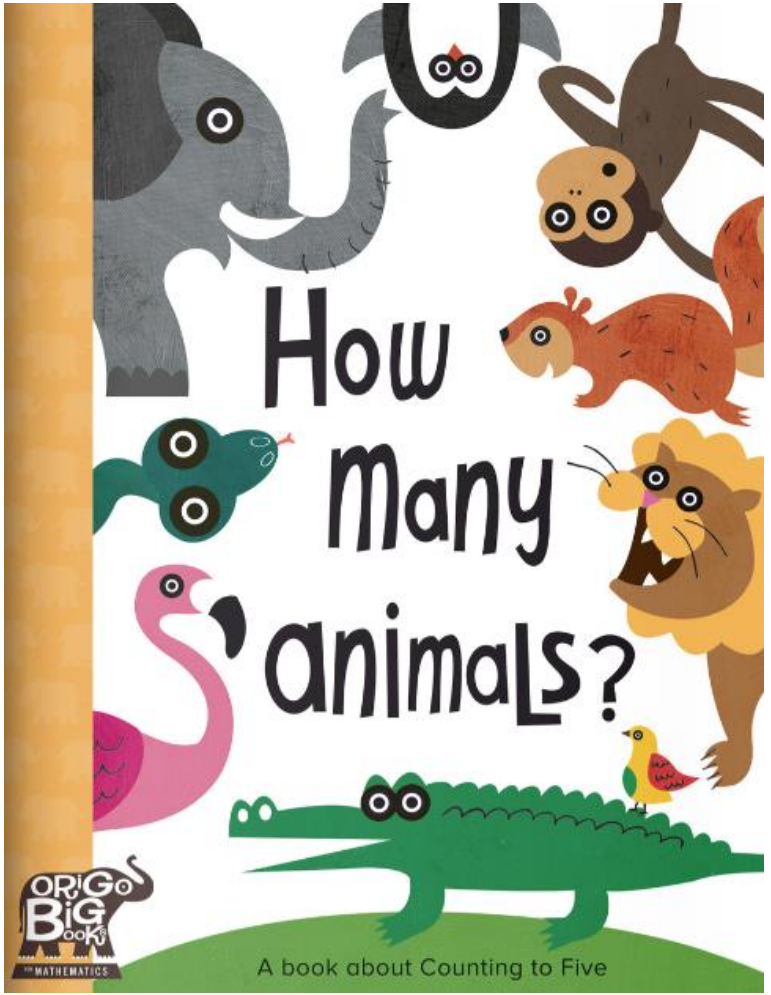
***Plan for representation of quantity, verbal name and selecting the number symbol.***



# Number- Quantity

- Count to determine quantity
- Make groups of a certain quantity
- Recognise quantity by sight
- Match quantity to number symbol

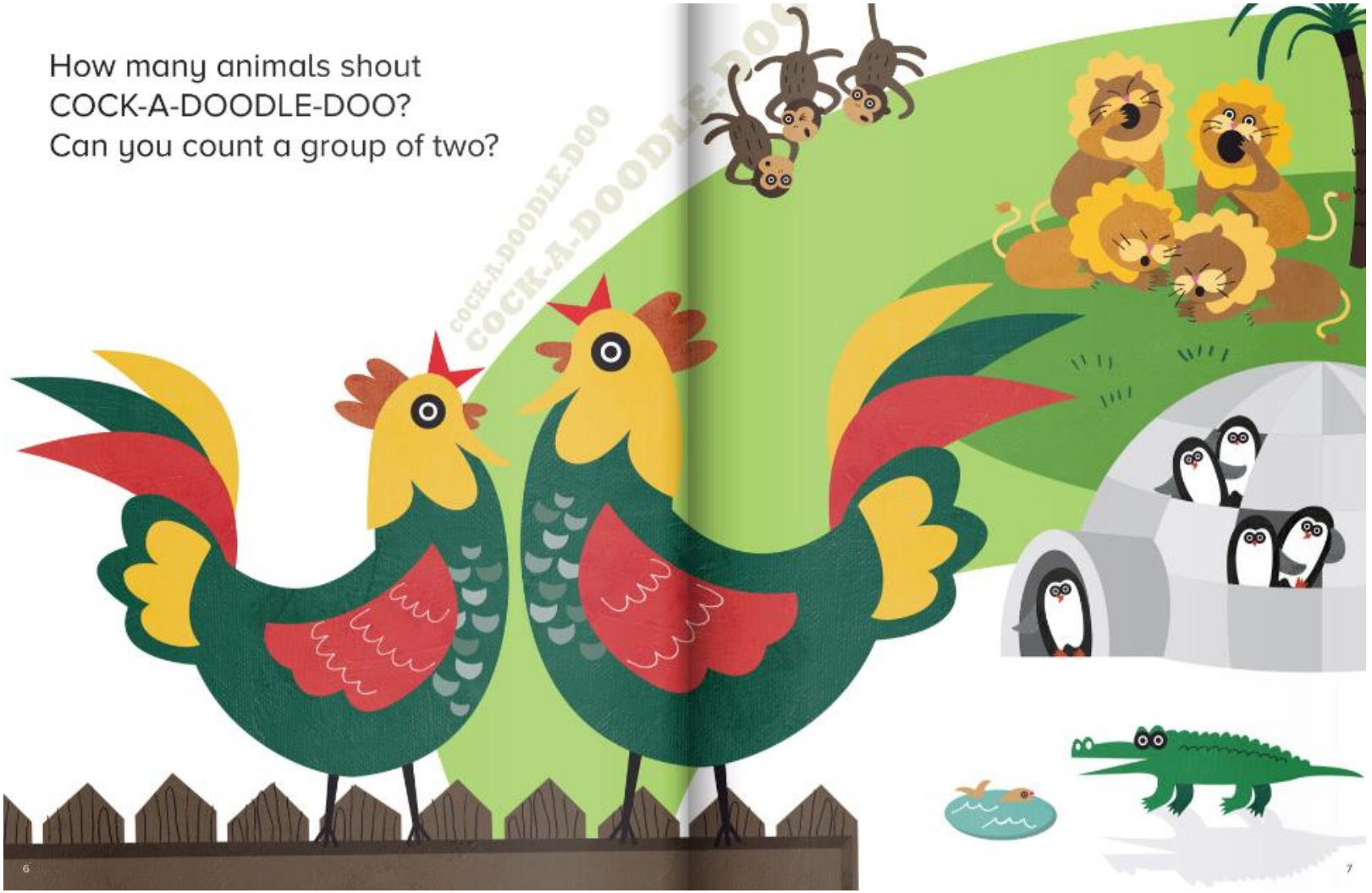
# Number Quantity



Counting can be fun to do.
Let's count animals at the zoo.

How many animals like to ROAR?
Can you count a group of four?

How many animals shout
COCK-A-DOODLE-DOO?
Can you count a group of two?



How many animals say EEE-EEE-EEE?
Can you count a group of three?

# “Make a group to show four animals.”

# Counting Experiences

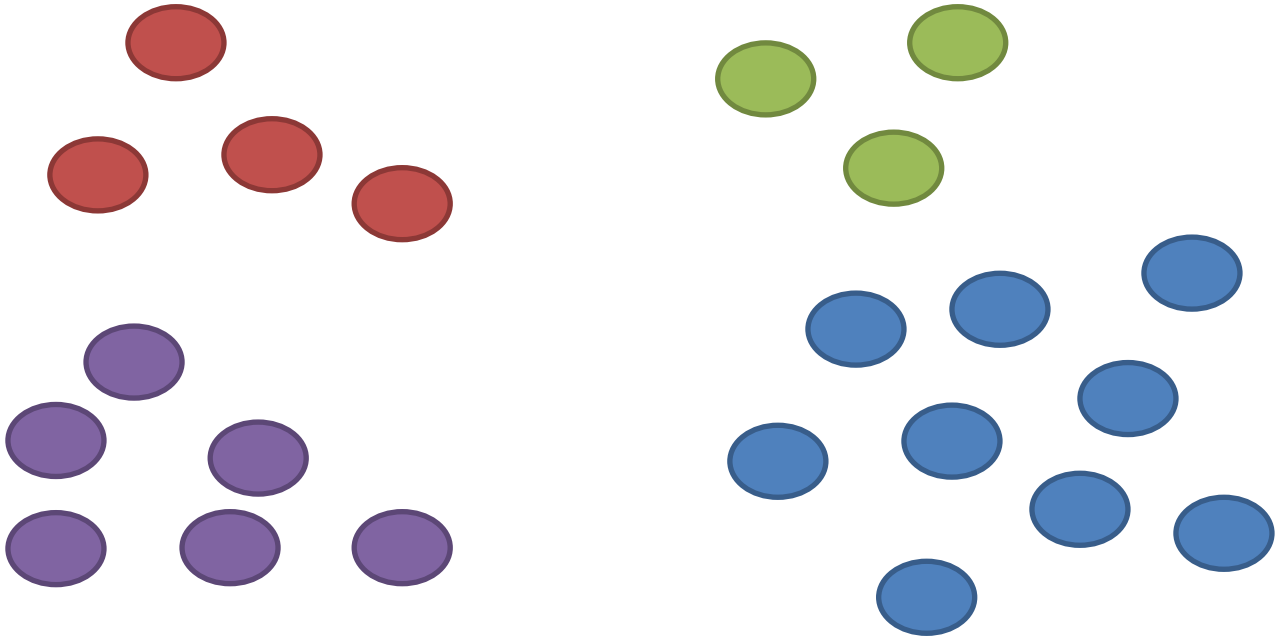
- Count children and objects
- Activities for subitising- one to six
- Make groups to represent quantity
- Match quantity to number symbol

# Subitising

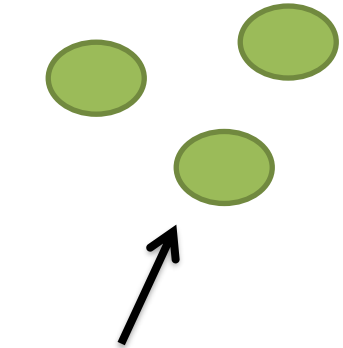
(*subitus* meaning ‘sudden’)

... the ability to instantly recognize the total quantity of objects in a group without counting.

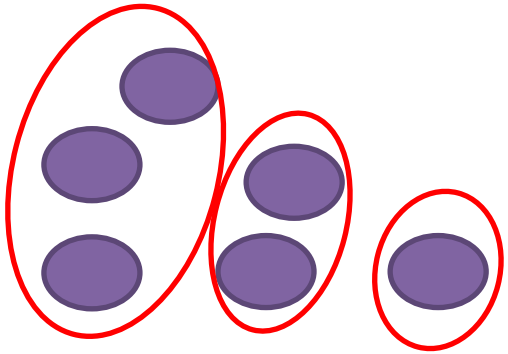
# Subitising



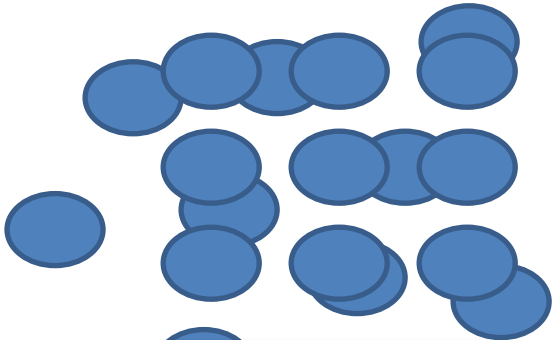
# Perceptual vs. Conceptual Subitising



Perceptual



3 + 2 + 1



3 rows of 3
3 x 3

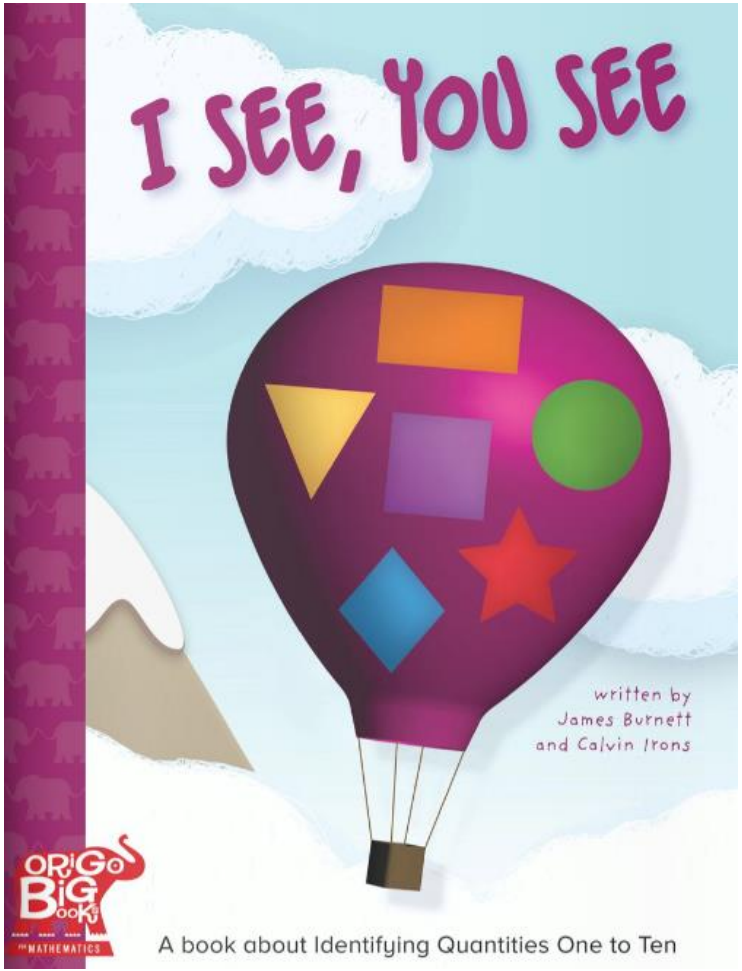
Conceptual

Clements, 1999

# Subitising

Students need to be able to subitise a variety of arrangements.

A Book about Representing Groups to Subitise



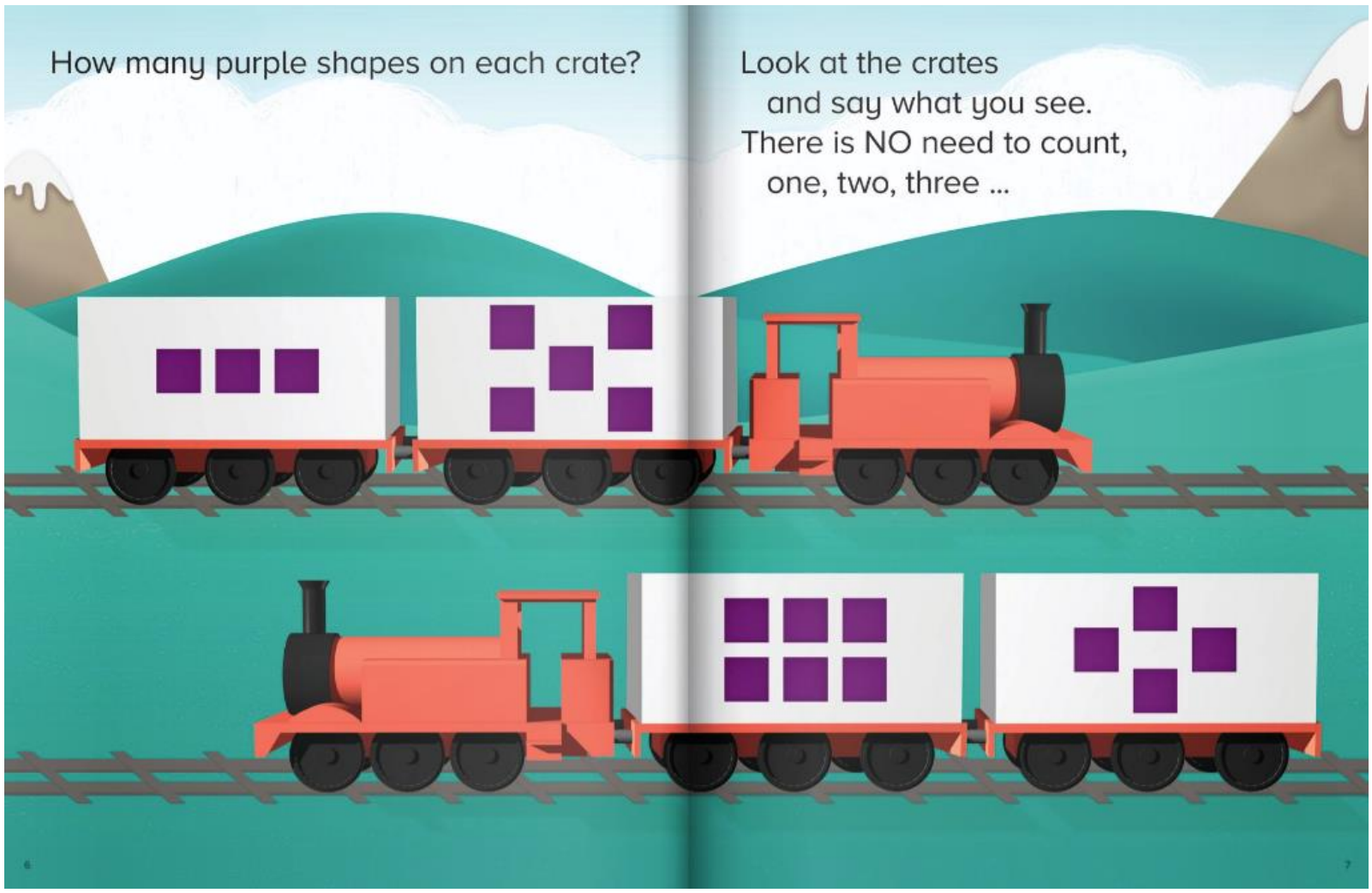

Red shapes, yellow shapes,
green shapes, blue ...
I see shapes, how about you?
2
3

How many red shapes on each flag?

Look at the flags
and say what you see.
There is NO need to count,
one, two, three ...

How many purple shapes on each crate?

Look at the crates
and say what you see.
There is NO need to count,
one, two, three ...



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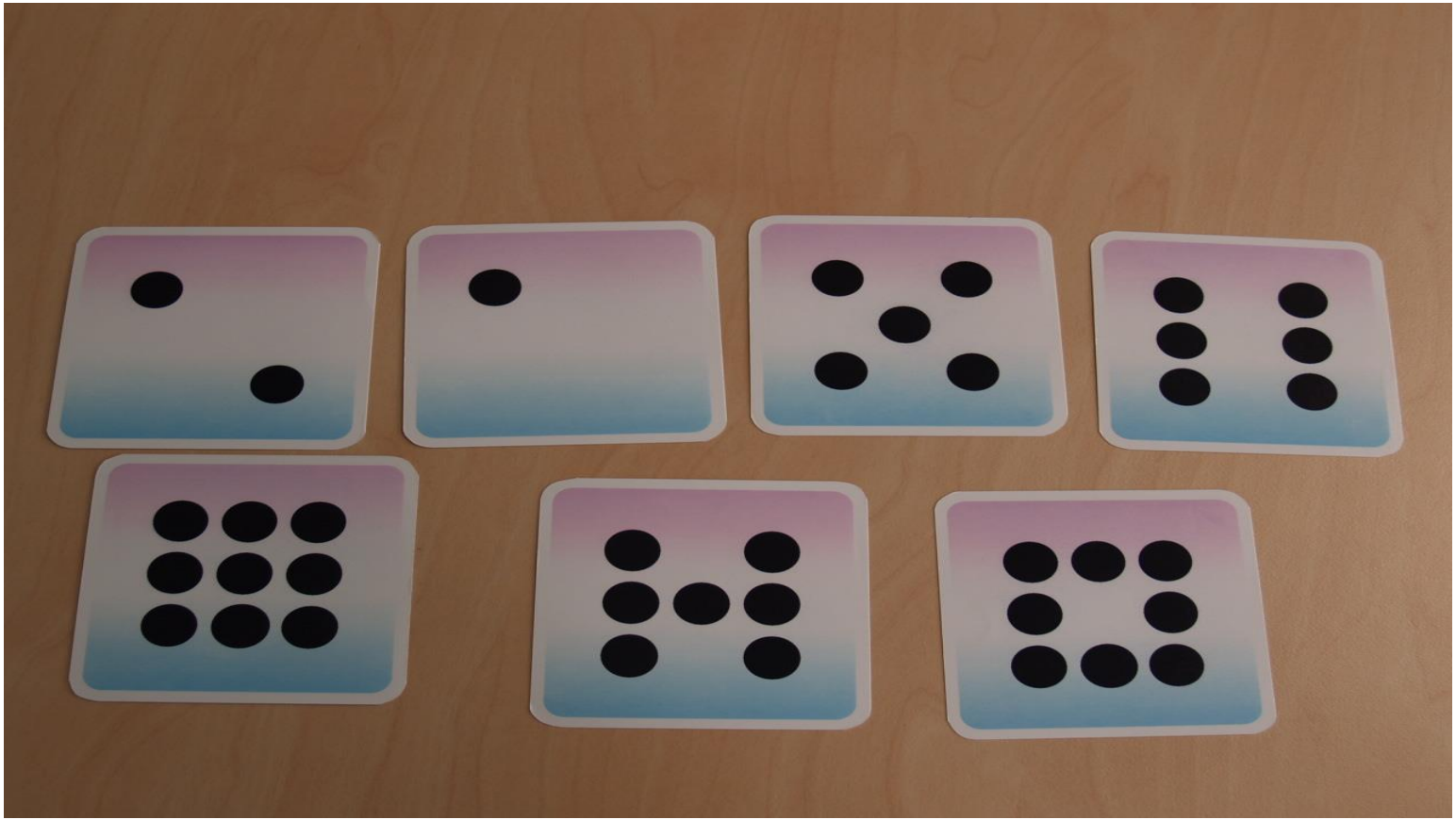
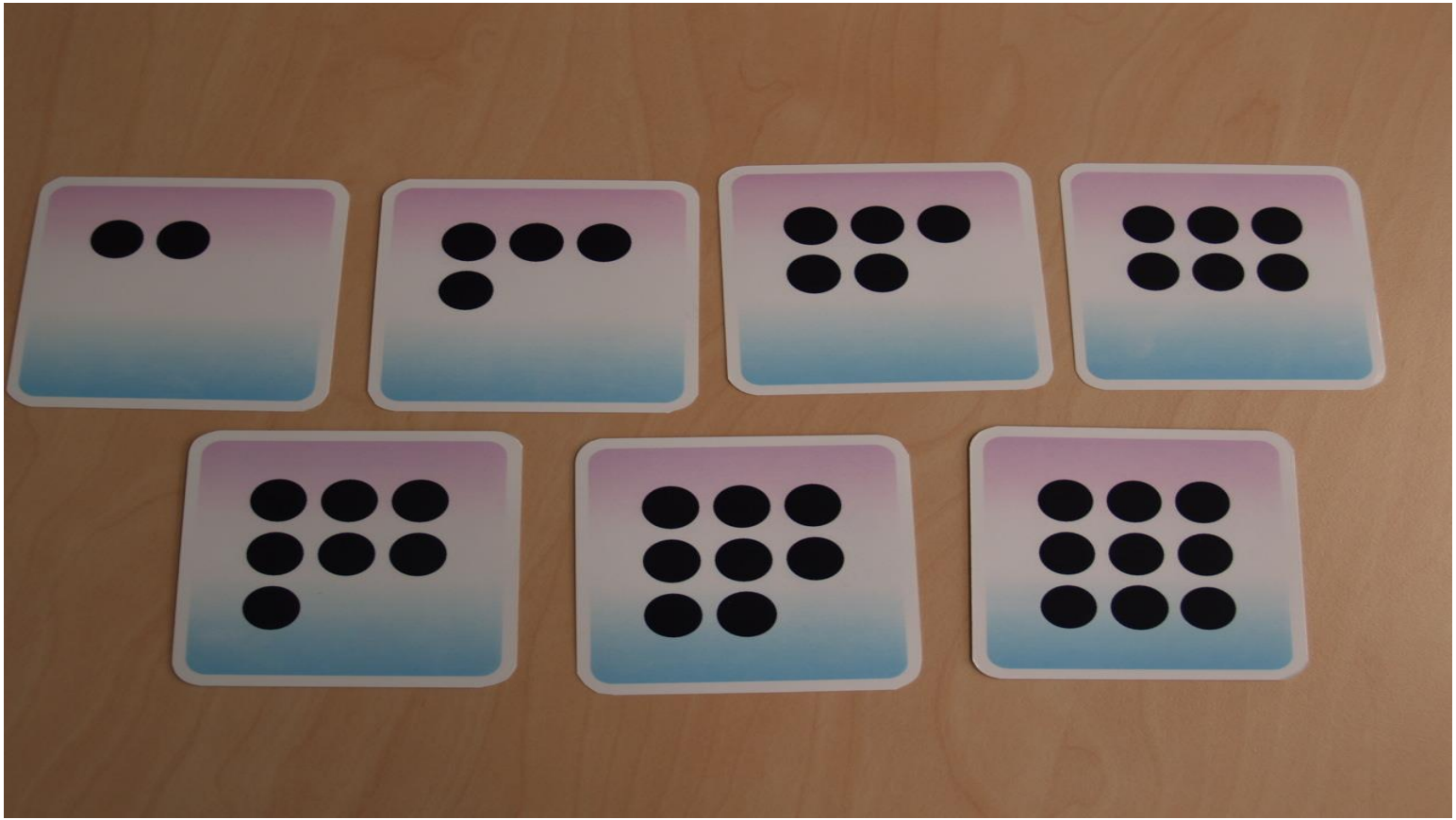
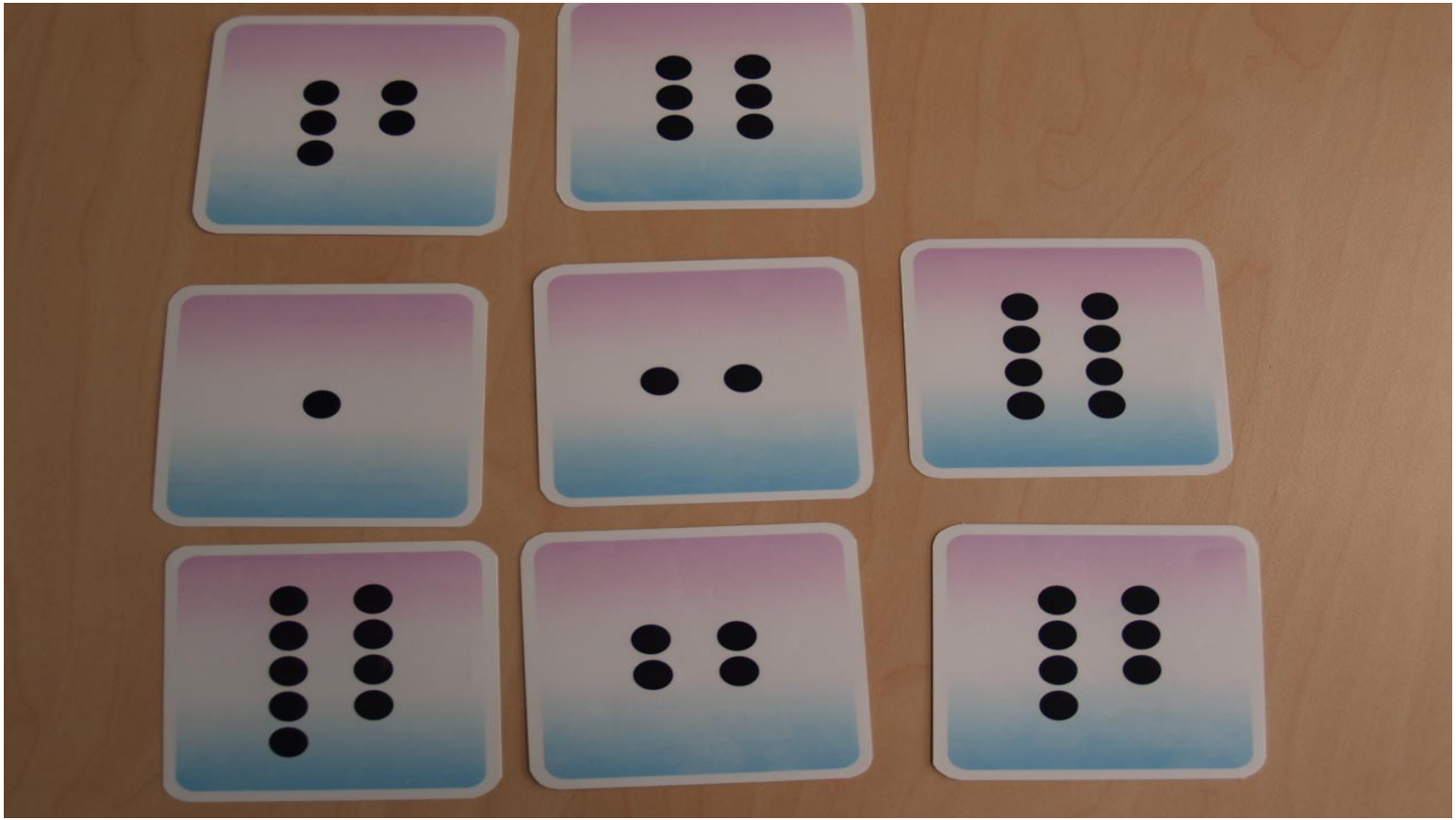
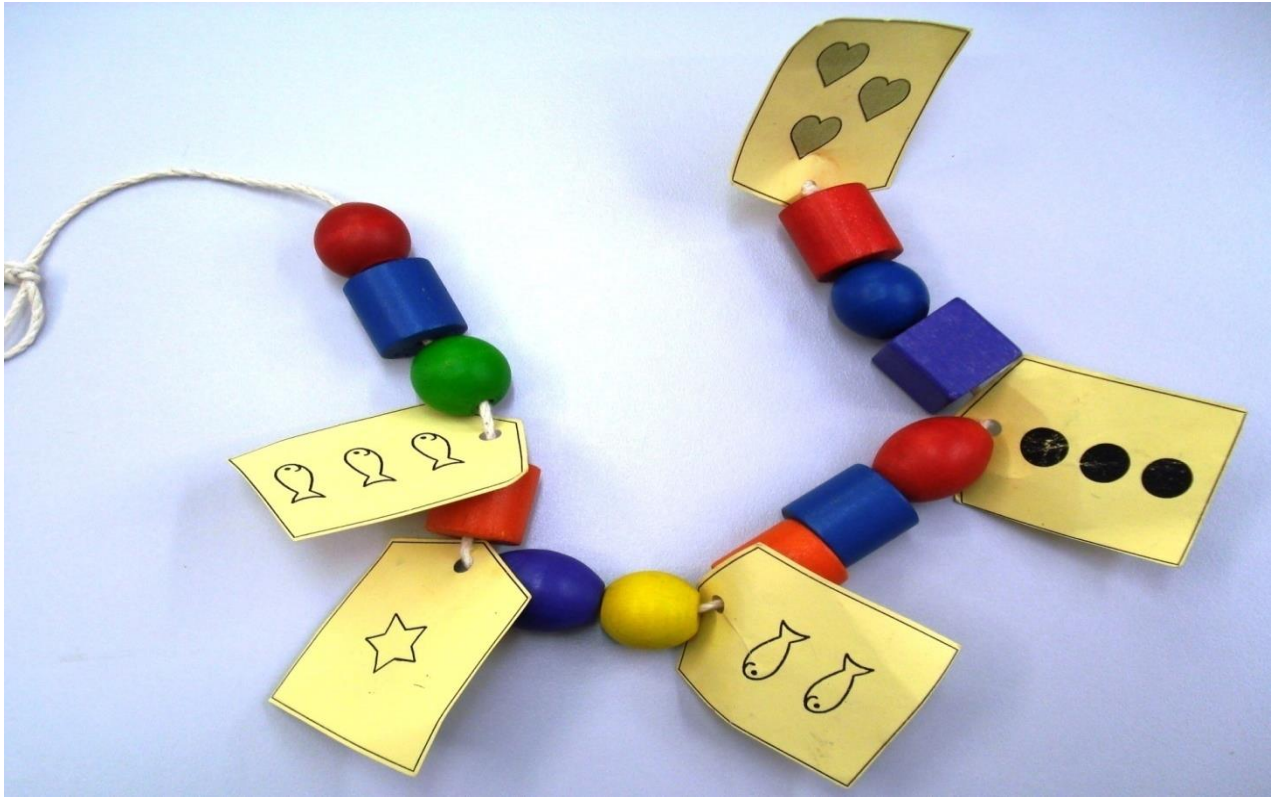






# TEACHER: “Toss the cube. Say the number.”


row up we want to be
uide Dogs!



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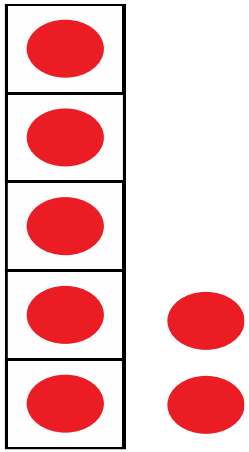
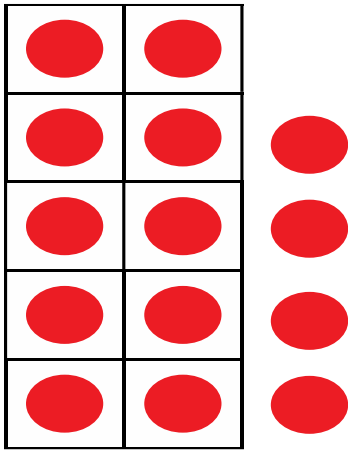
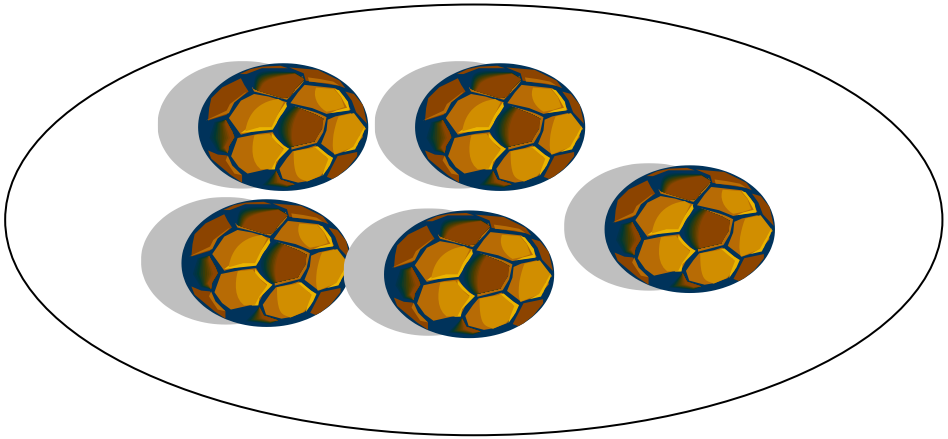
# Subitising – Use Benchmarks

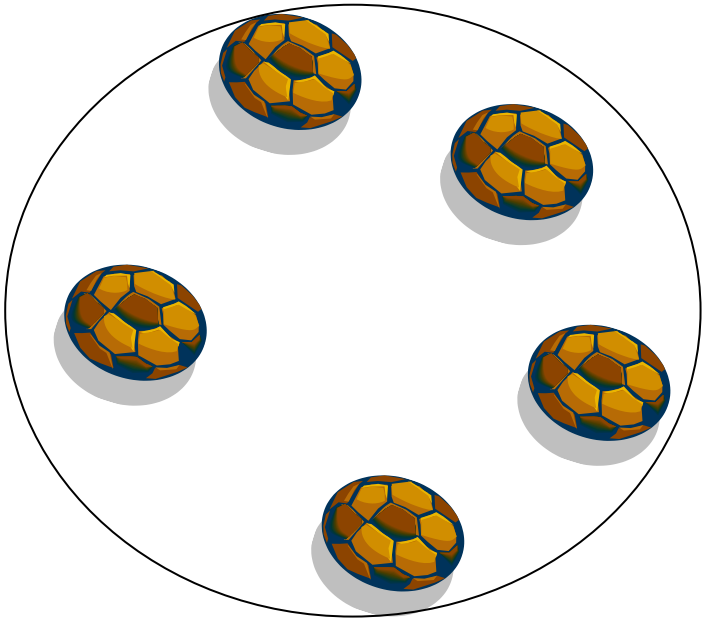
Make use of benchmark numbers that the students know.

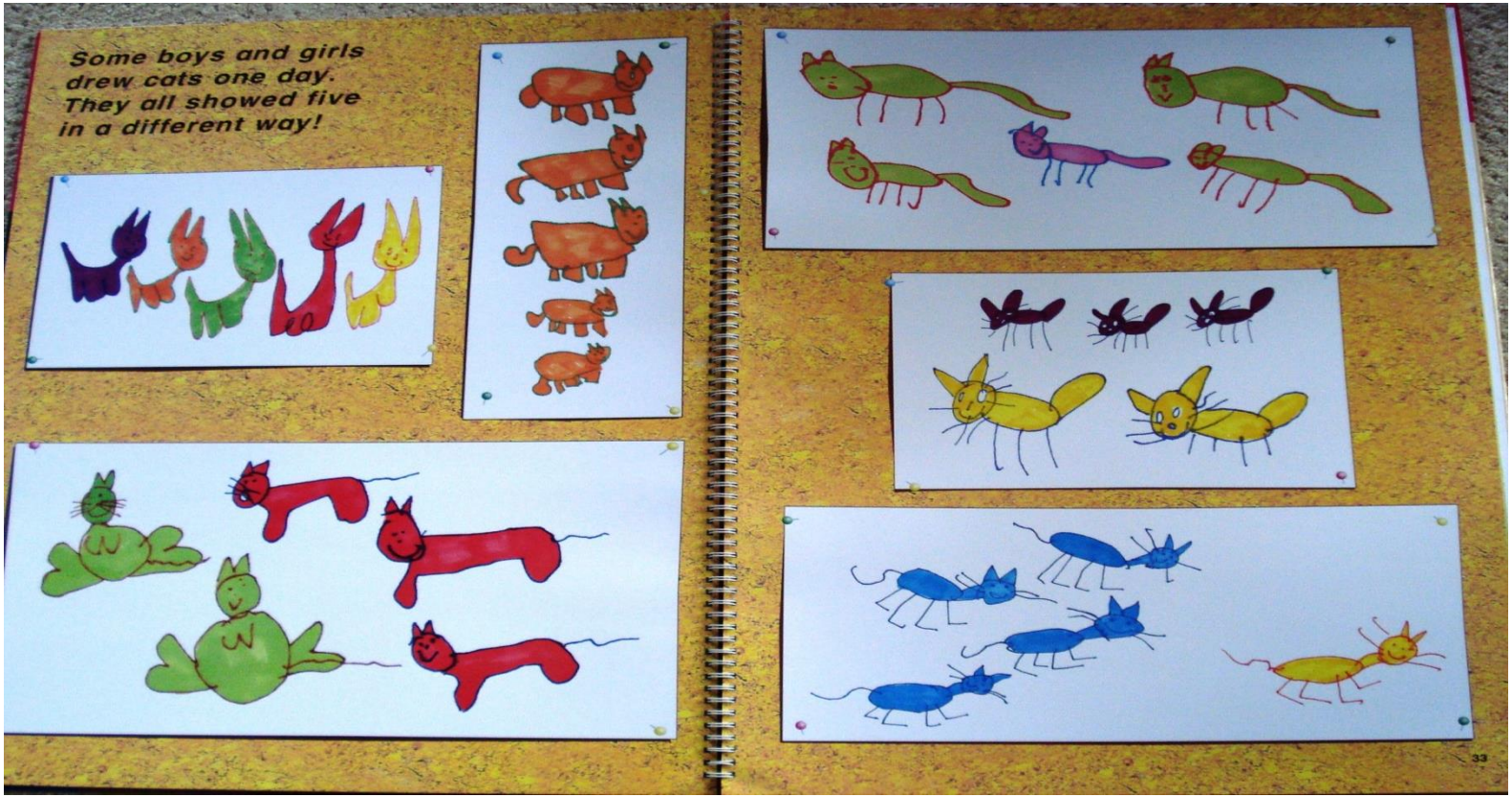




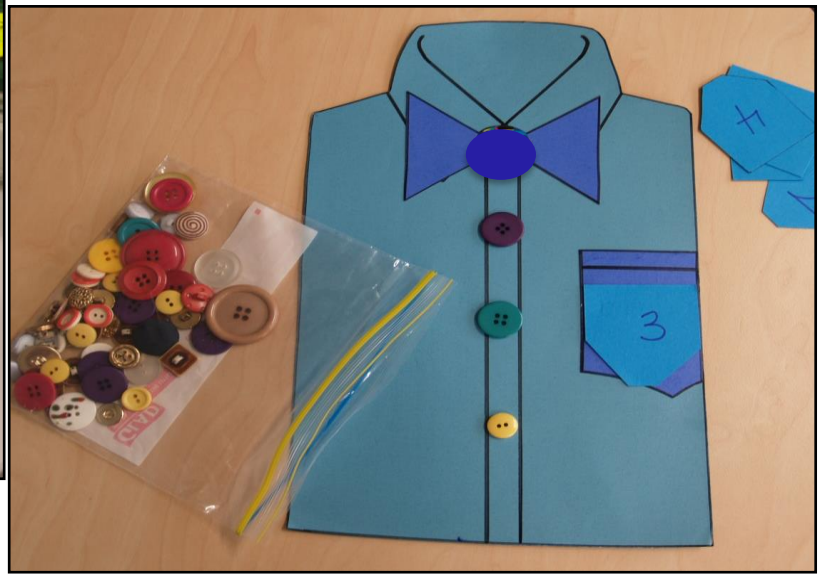
# Conservation principle – the arrangement of a collection of objects does not change the count



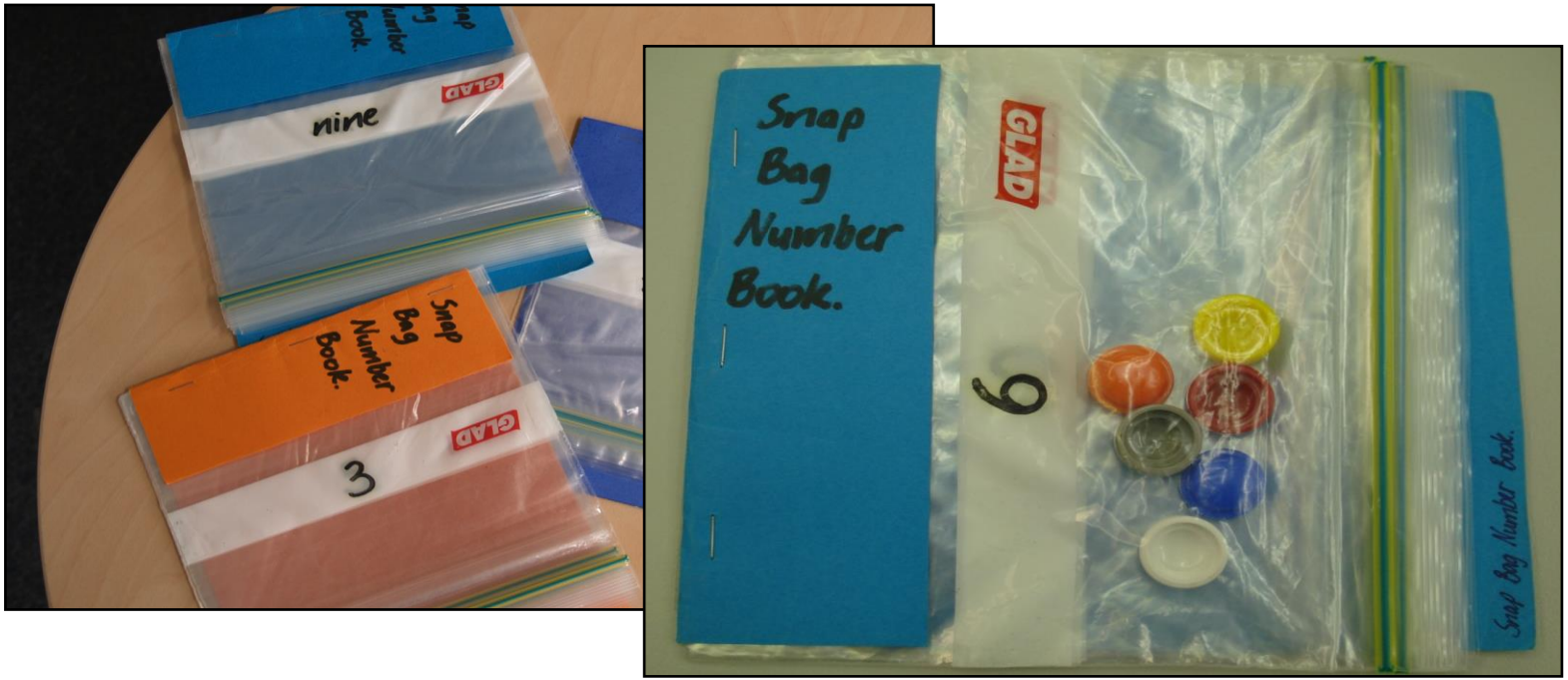



Some boys and girls
drew cats one day.
They all showed five
in a different way!
33

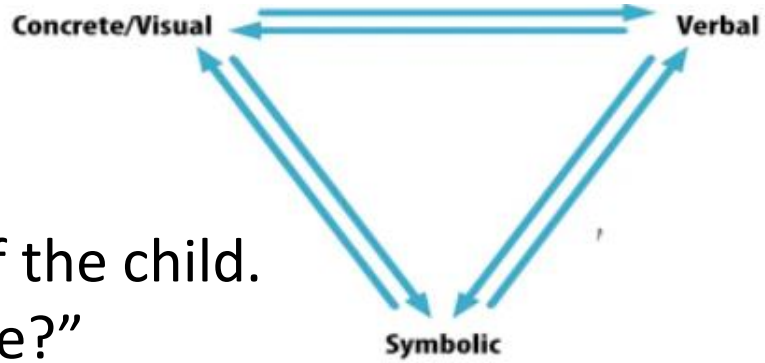
# “Make a group to match the number.”

# “Make a group to match the number and show your friend.”



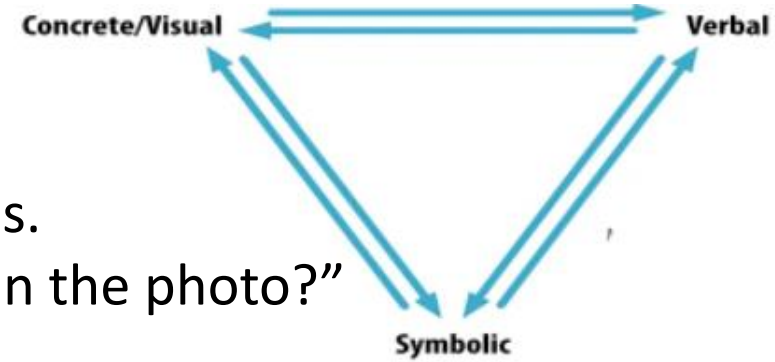
# Teaching Five




Place five toys on a plate in front of the child.
Ask, “How many animals do you see?”

What sides of the triangle are explored?

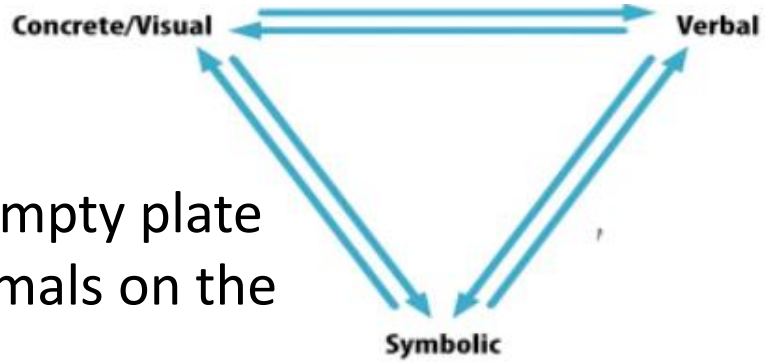
# Teaching Five




Show the child a photo of five animals.
Ask, “How many animals do you see in the photo?”

What sides of the triangle are explored?

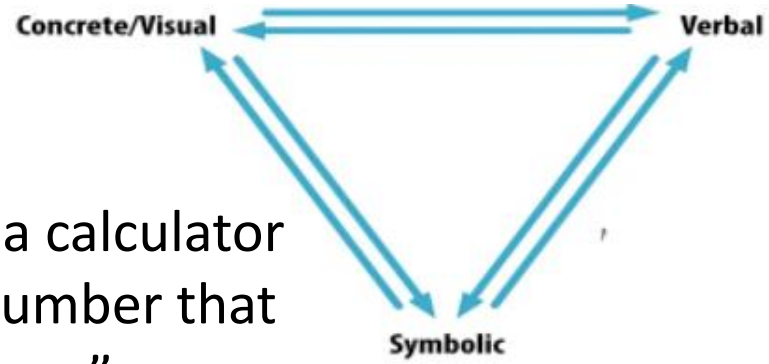
# Teaching Five




Place a collection of animals and an empty plate in front of the child. Say, “Put five animals on the plate.”

What sides of the triangle are explored?

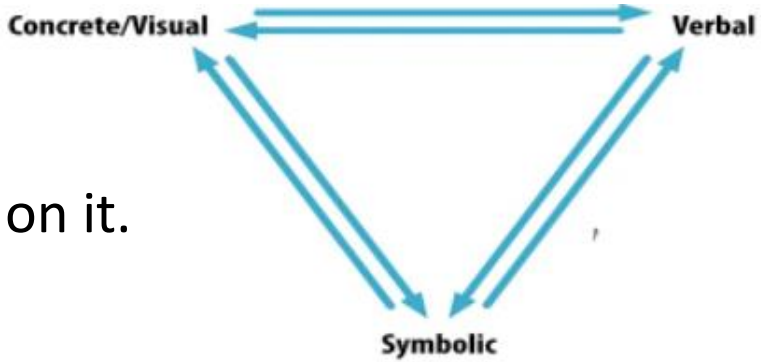
# Teaching Five




Place five toy animals on a plate and a calculator in front of the child. Say, “Press the number that matches the number of animals you see.”

What sides of the triangle are explored?

# Teaching Five




Show the child a card with ‘5’ written on it.
Ask, “What number is this?”

What sides of the triangle are explored?

# The Concept of Zero

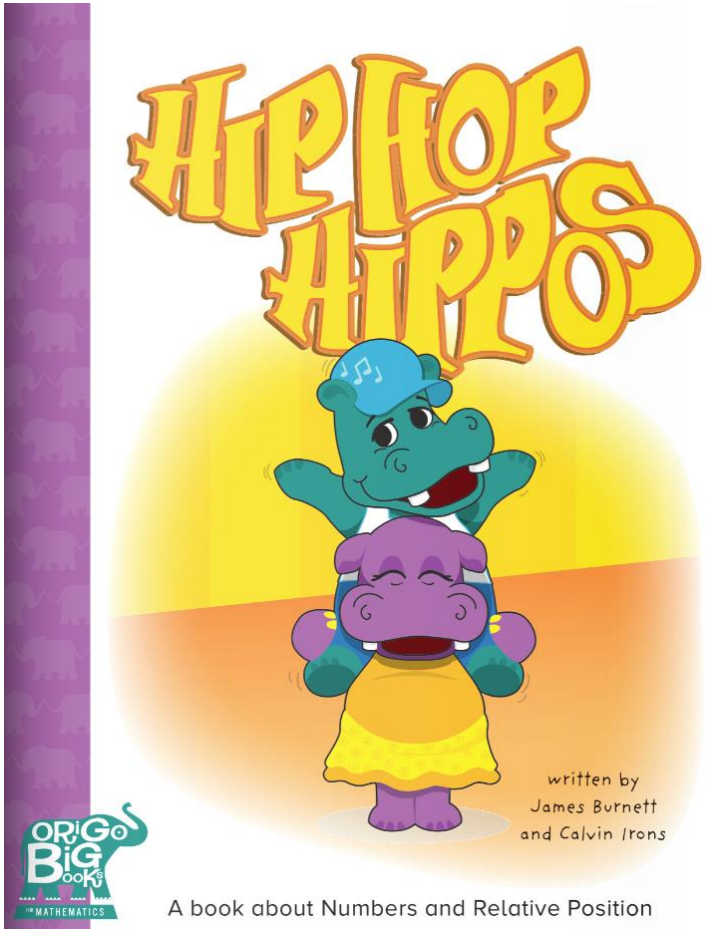
This is a challenging idea for young children.

Work with the idea of zero quantity. Use pictures:
an empty nest- zero eggs
no dogs in the classroom
zero clouds today
nothing in the basket

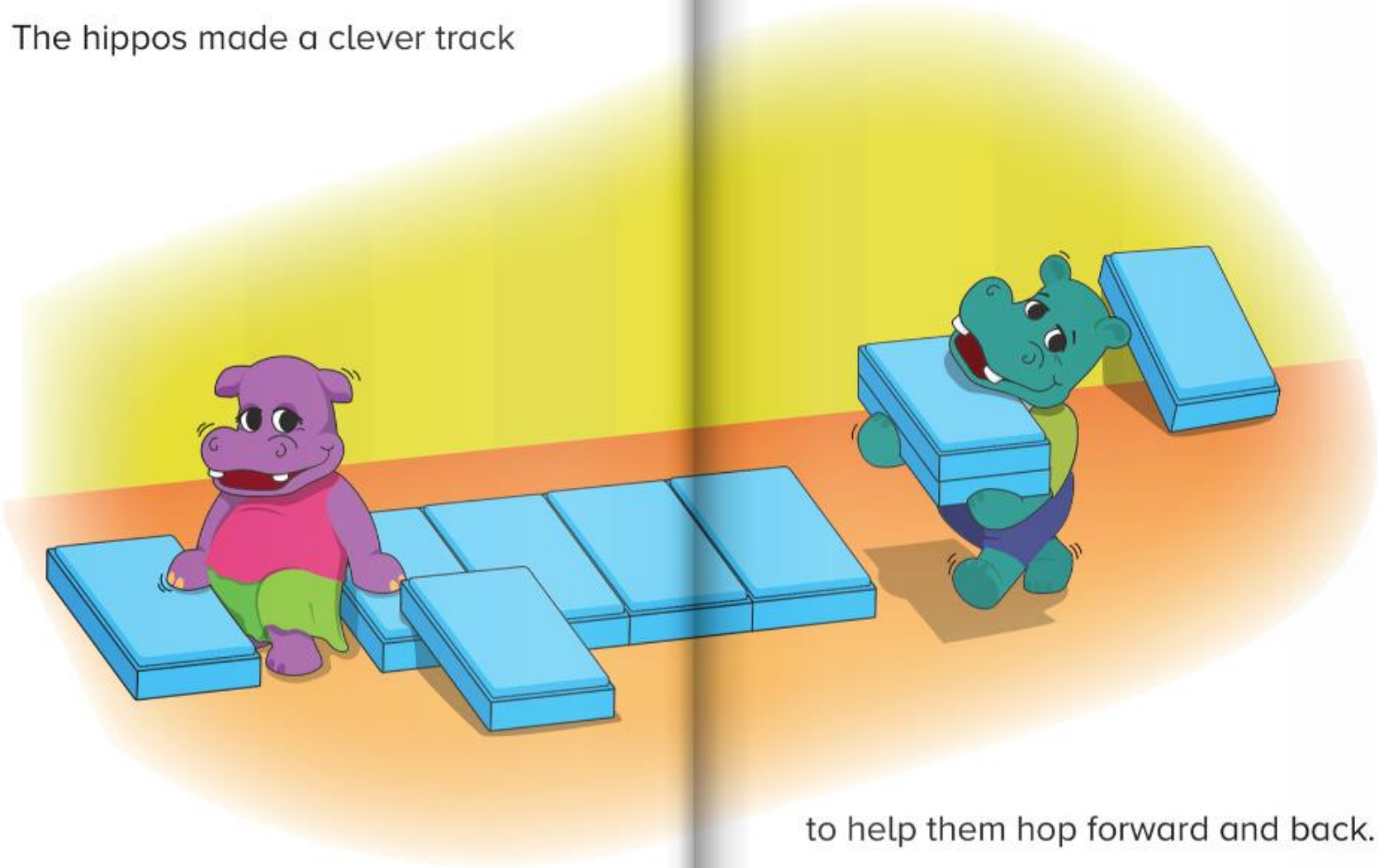
# Number- Relative Position

- Know a number in relationship to neighbour numbers (five comes just after six)
- Place the number symbols in order
- Abstract notion of number since only dealing with symbols

Number
Relative Position

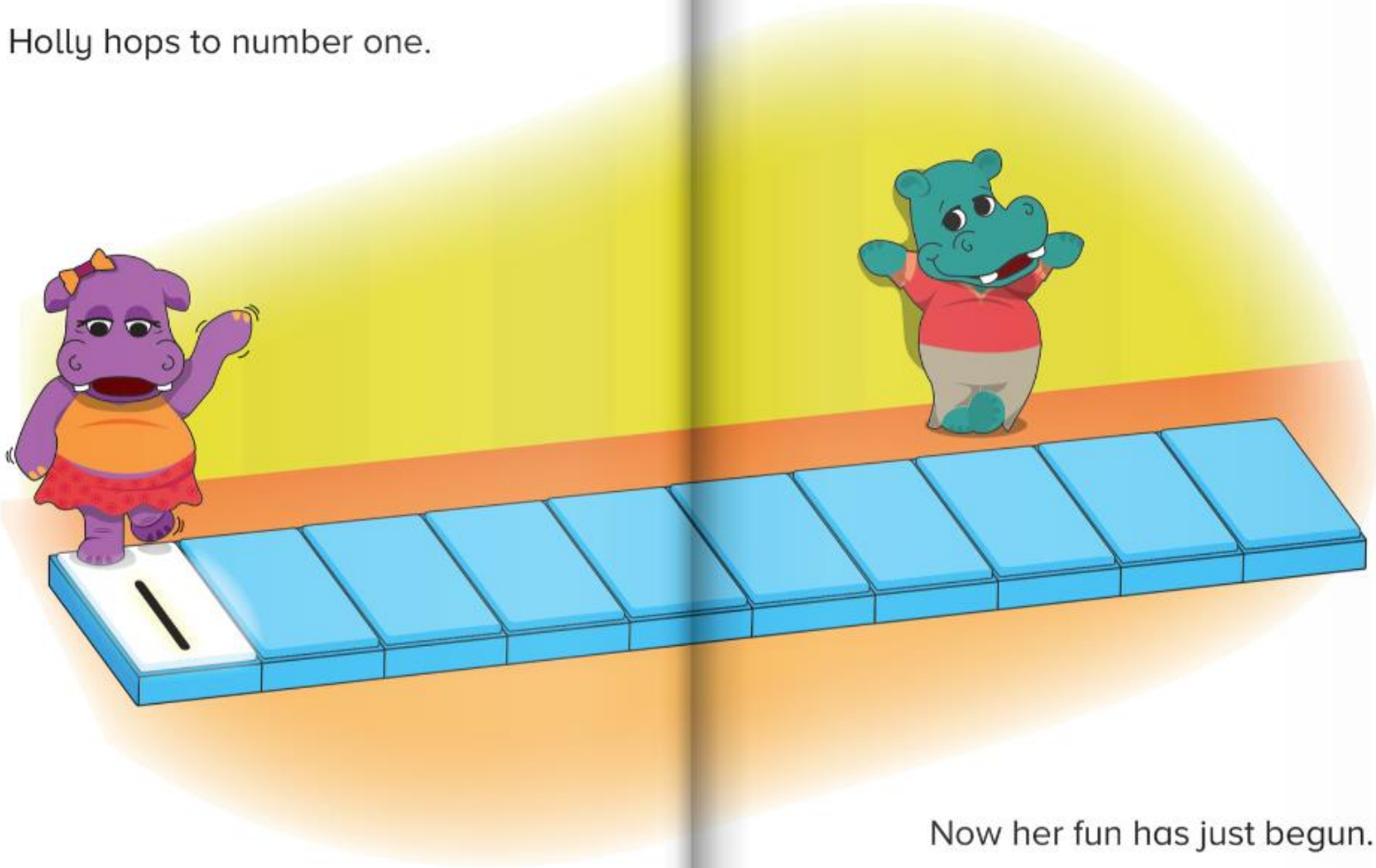


The hippos made a clever track



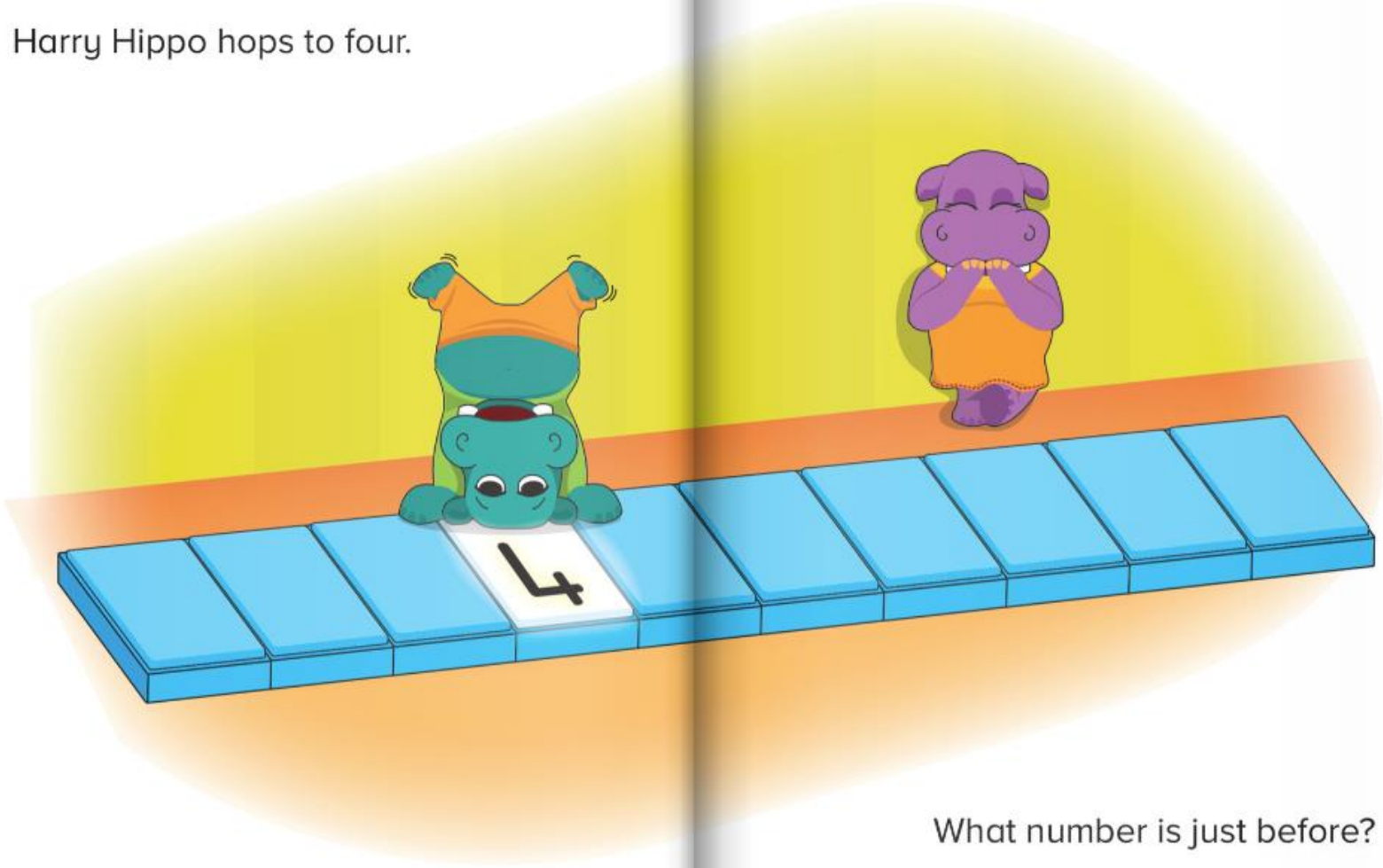
to help them hop forward and back.

Holly hops to number one.



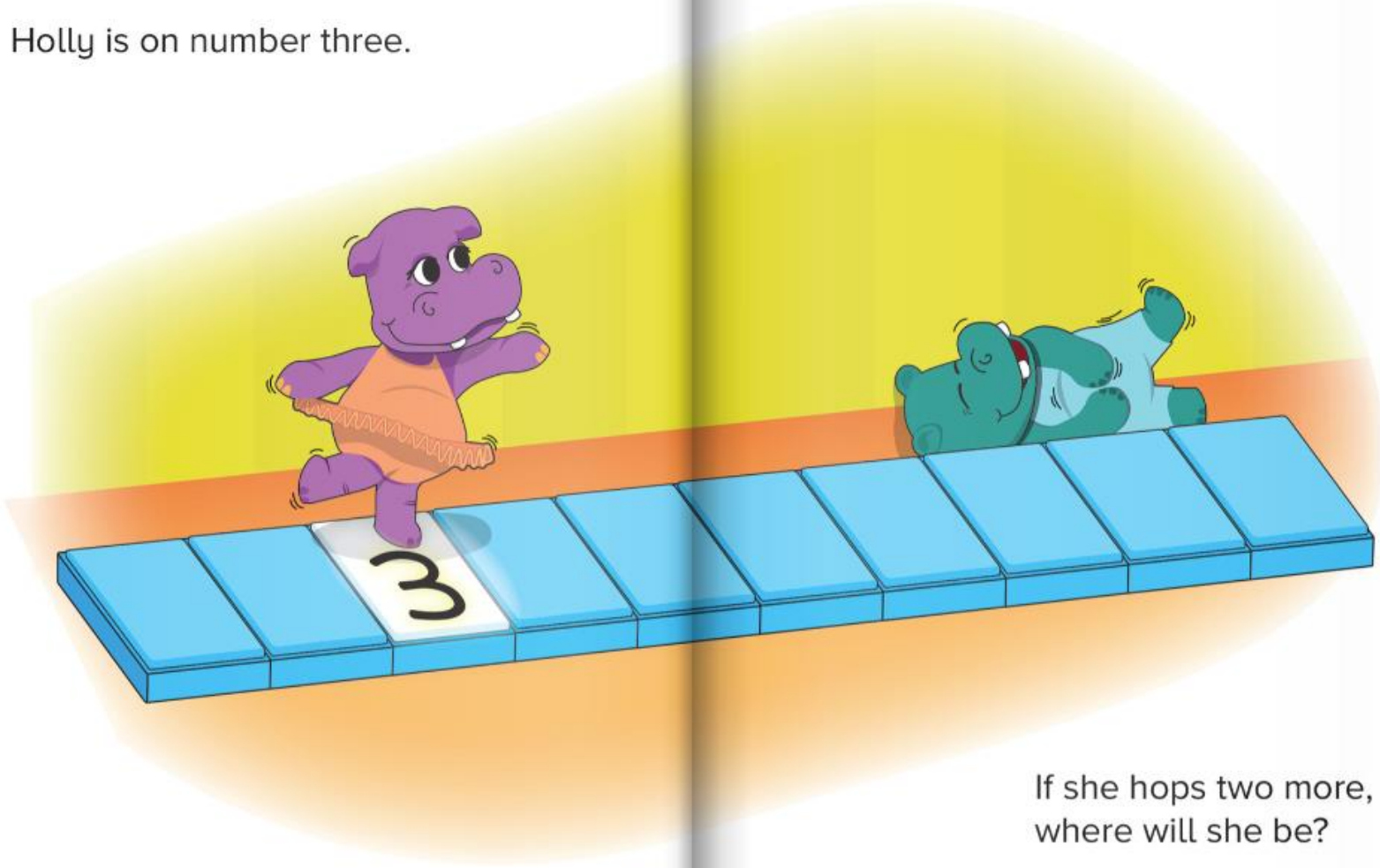
Now her fun has just begun.

Harry Hippo hops to four.



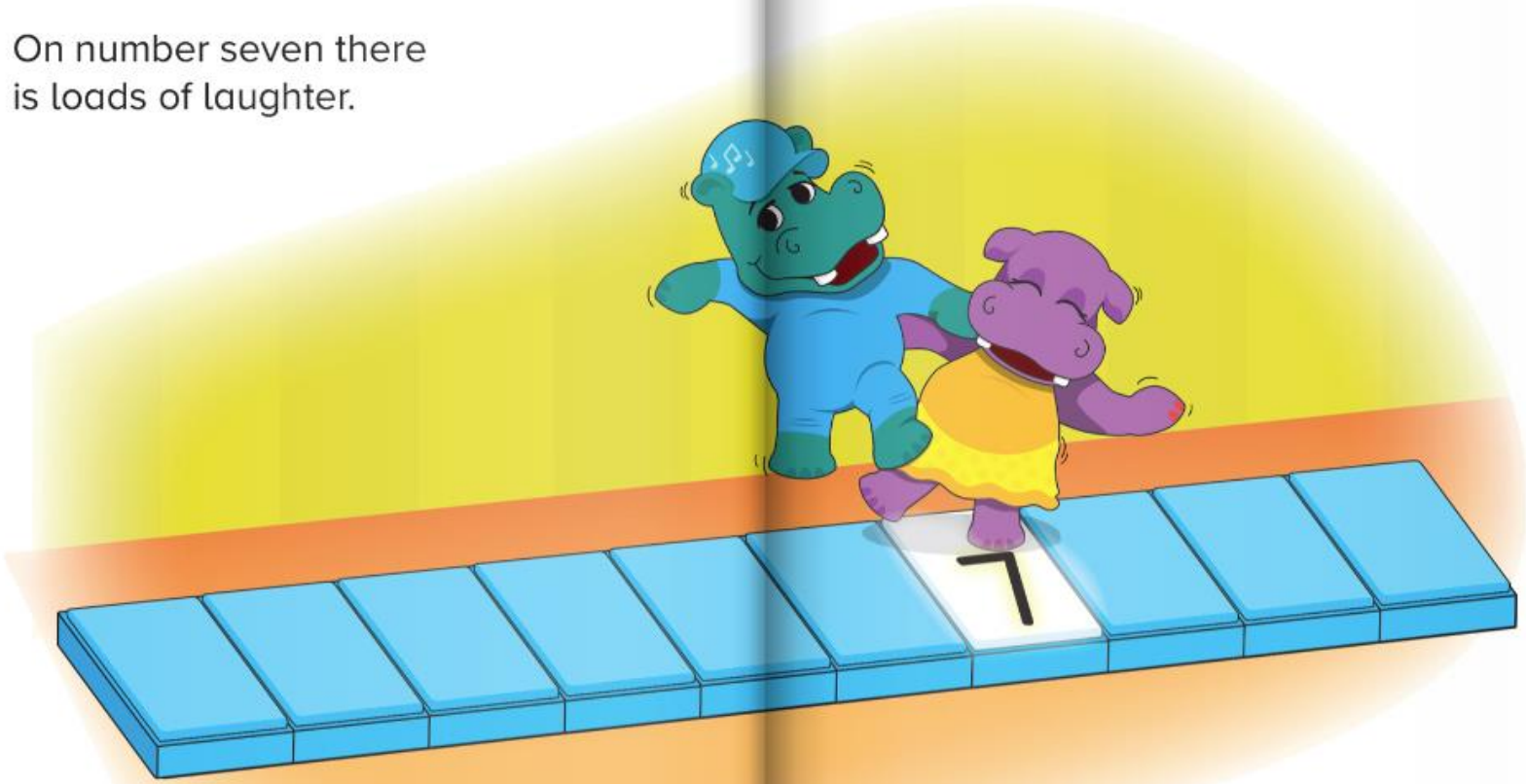

What number is just before?

Holly is on number three.




If she hops two more,
where will she be?

On number seven there
is loads of laughter.




What numbers come
just before and after?

# Placing the number symbols in order

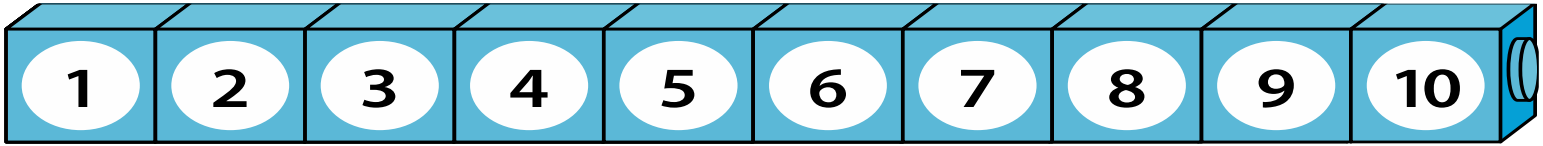
# Length Model

Students need experiences with number tracks to fully understand the abstract idea of a number line.


Number tracks serve to bridge discrete set models and the continuous number line model.

# Length Model

Build a number track




Note that zero (0) would not have a space on a number track.

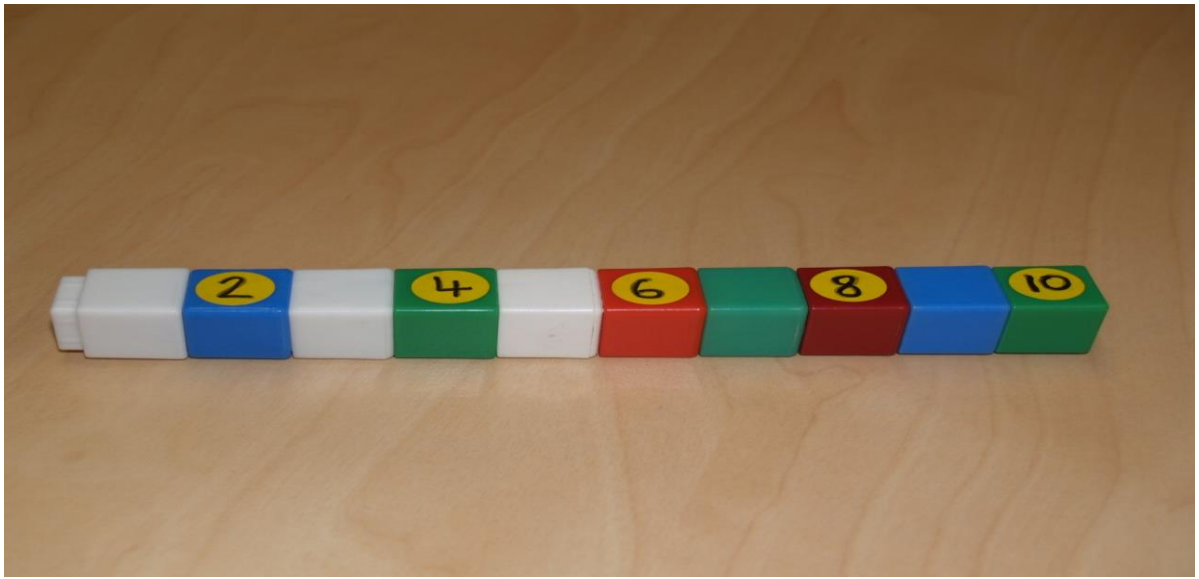
# Relative Position Activities


- P… …7.
  V… …7?
- E…
  r… …der.
- What number comes just after five?

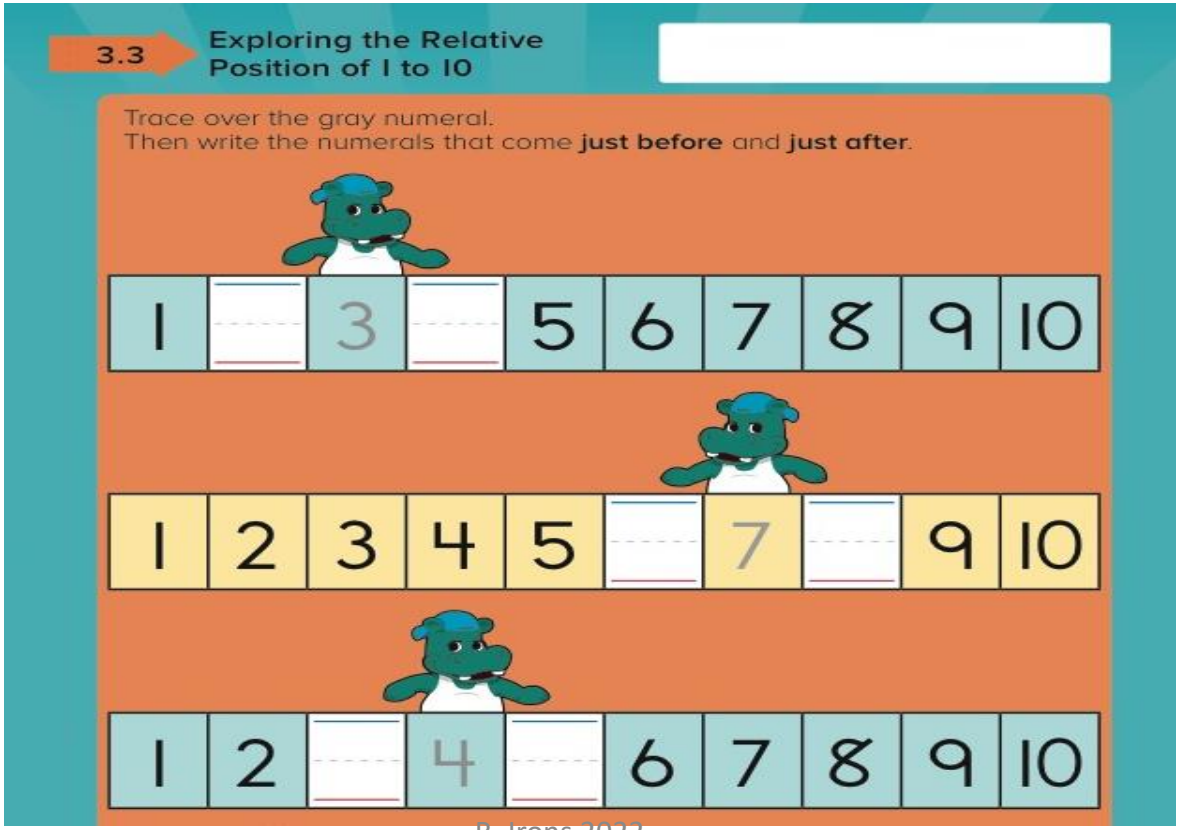
# Relative Position Activities

- Take a cube away and ask a friend to name the missing number.
- What number do you land on if you start at 5 and jump on 2 more?

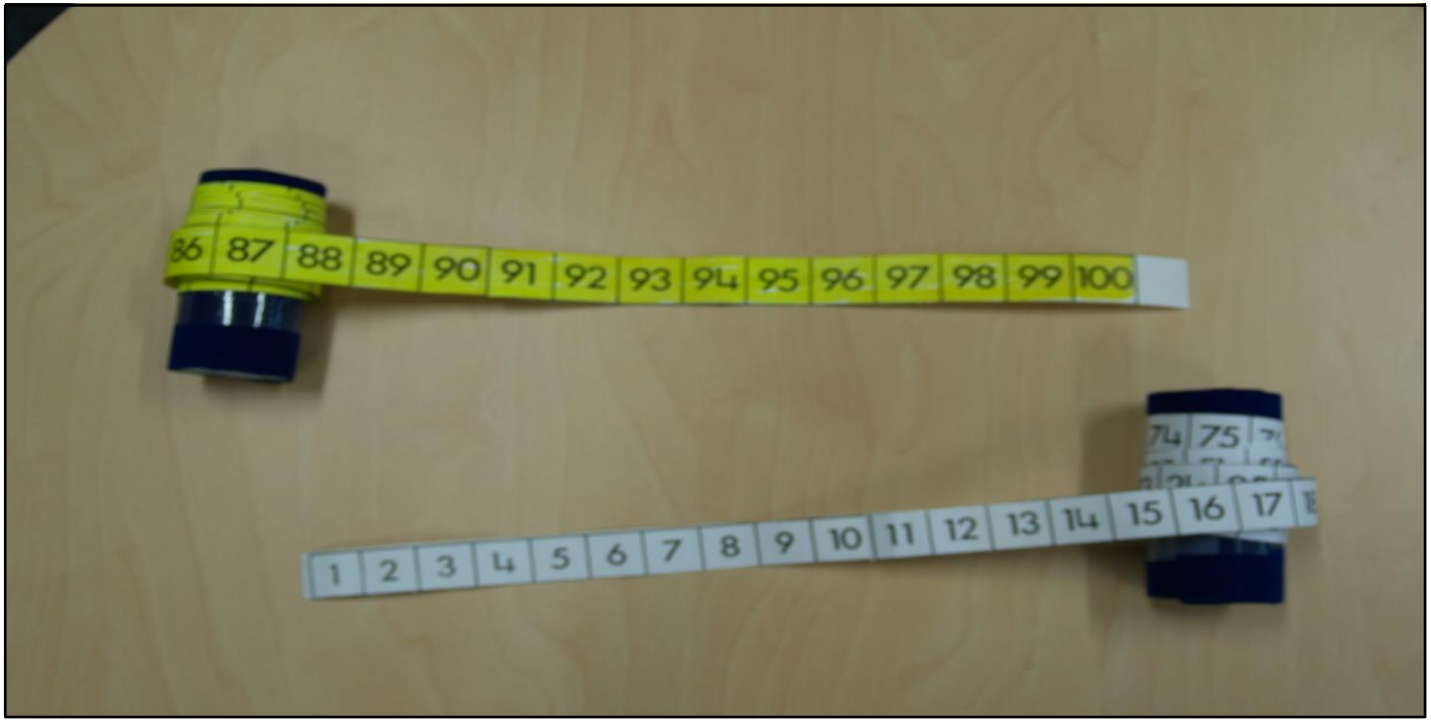
# Turn over every second cube. Read the numbers you see.



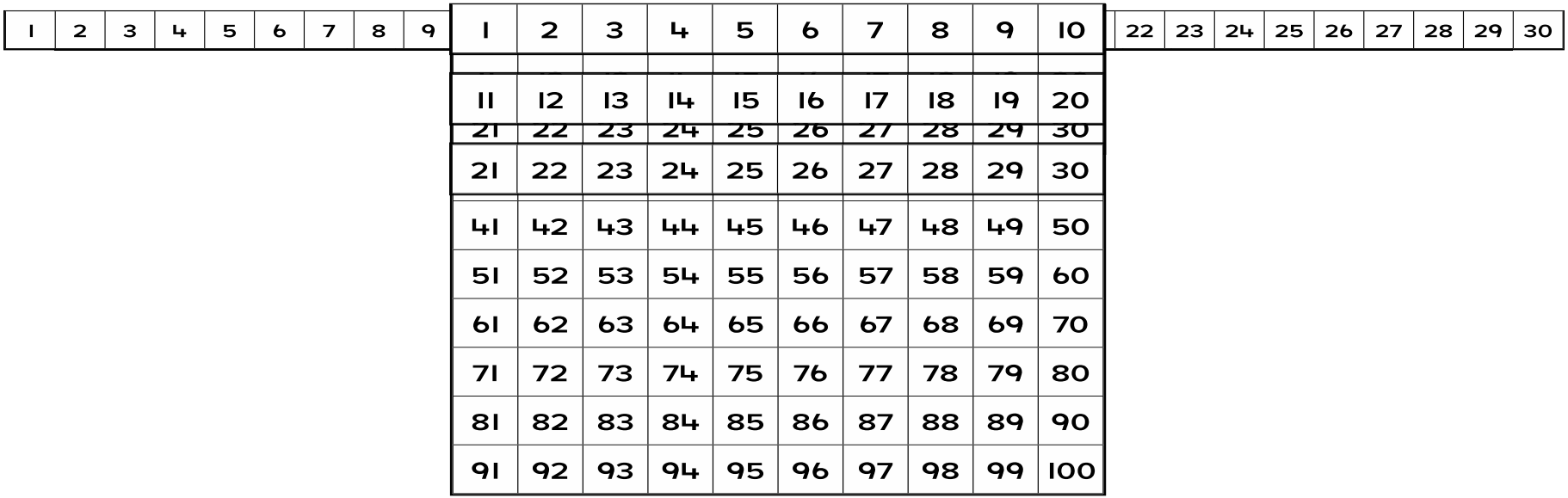
# Length Model



# Length Model

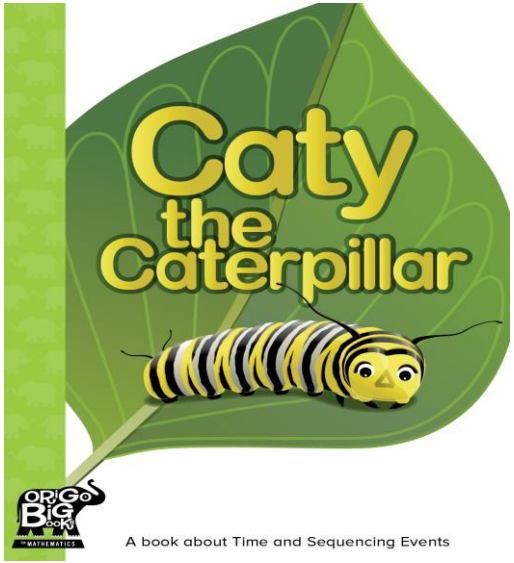


# Length Model

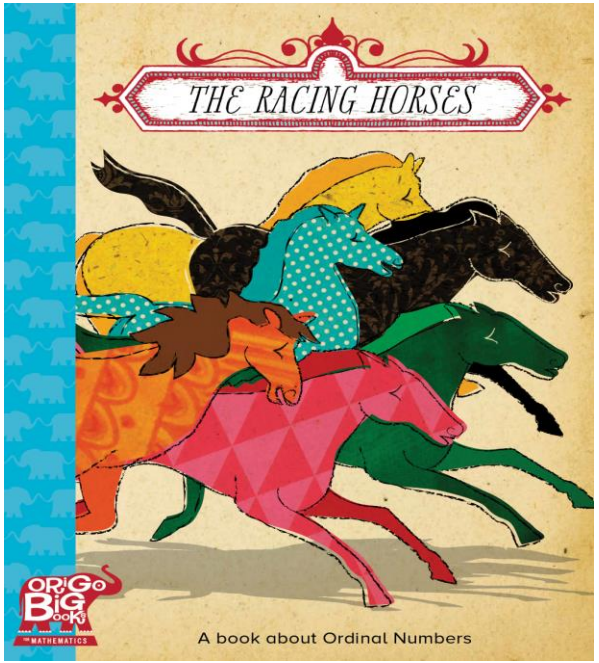


# Number- Ordinal

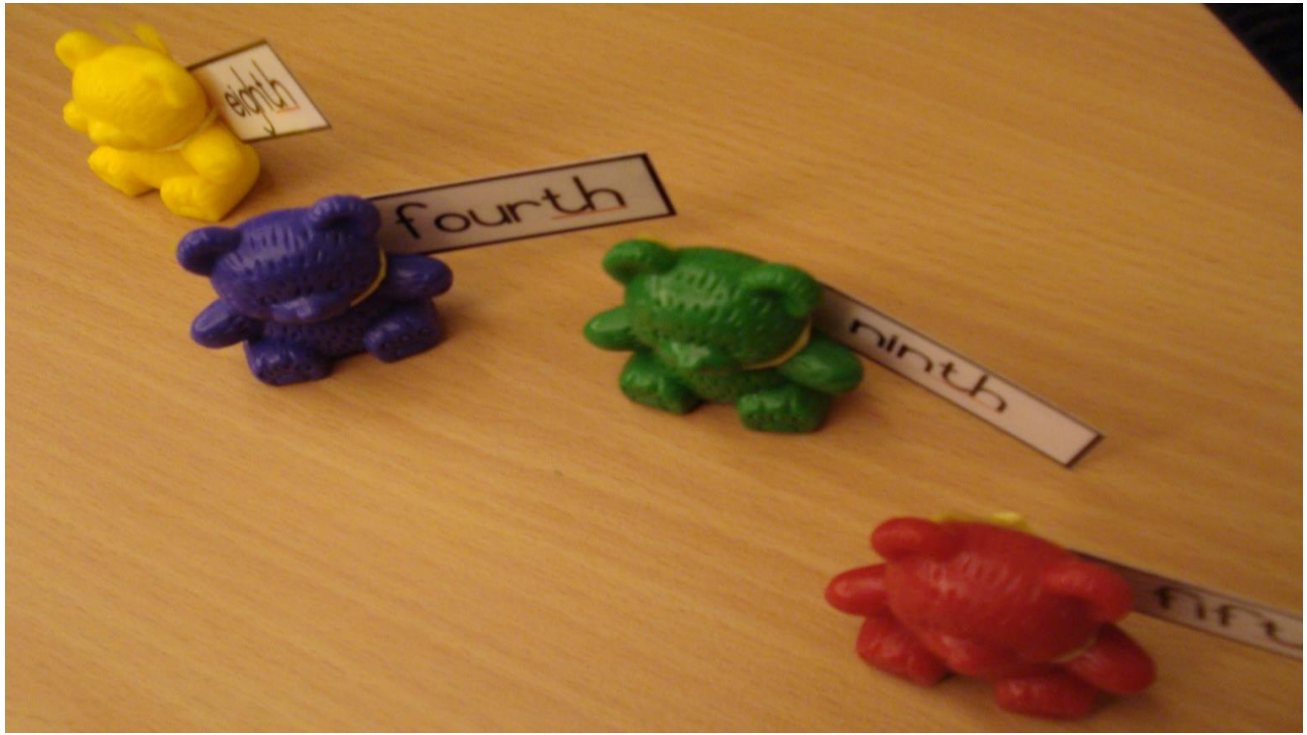
Caty the Caterpillar

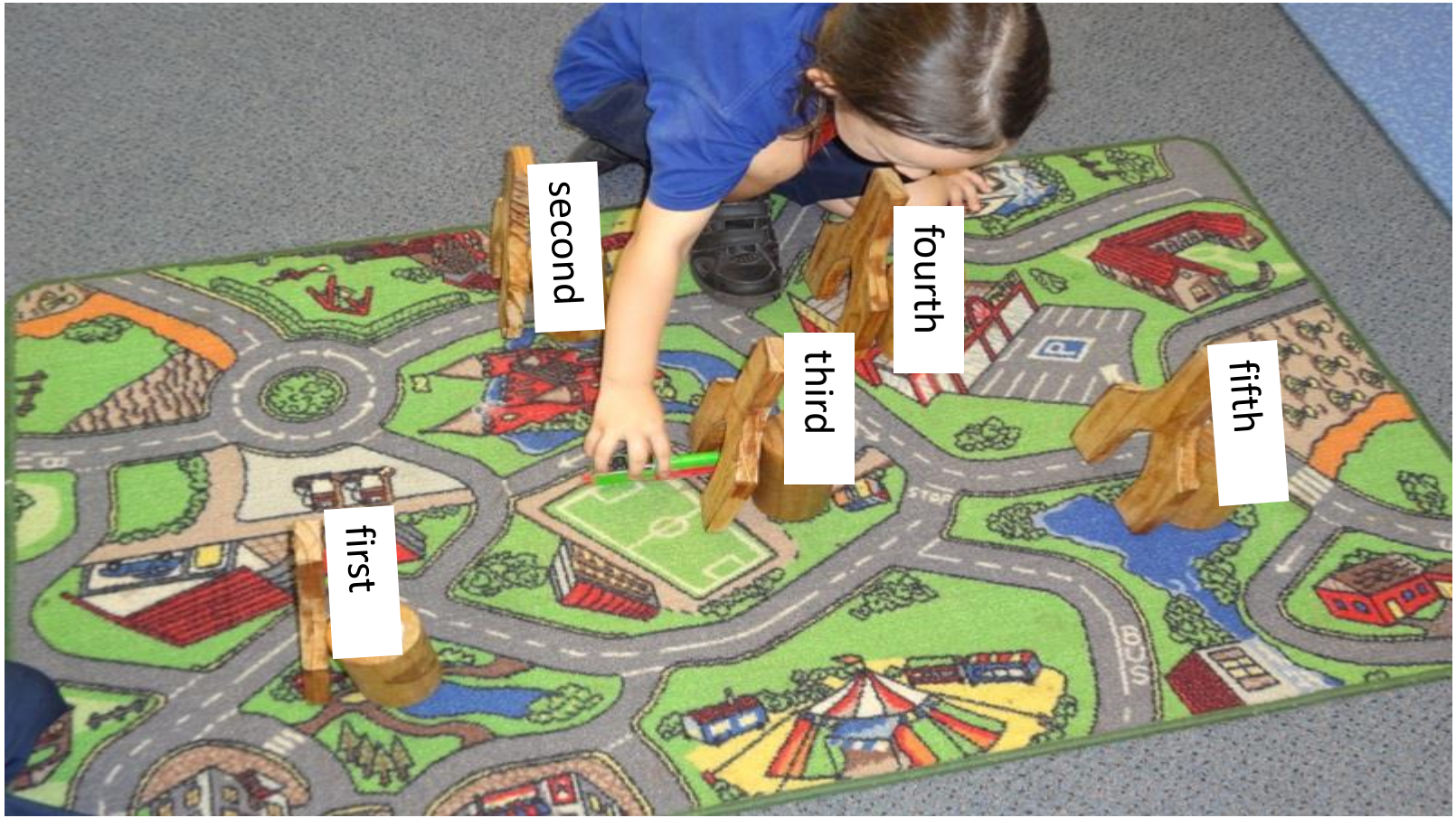


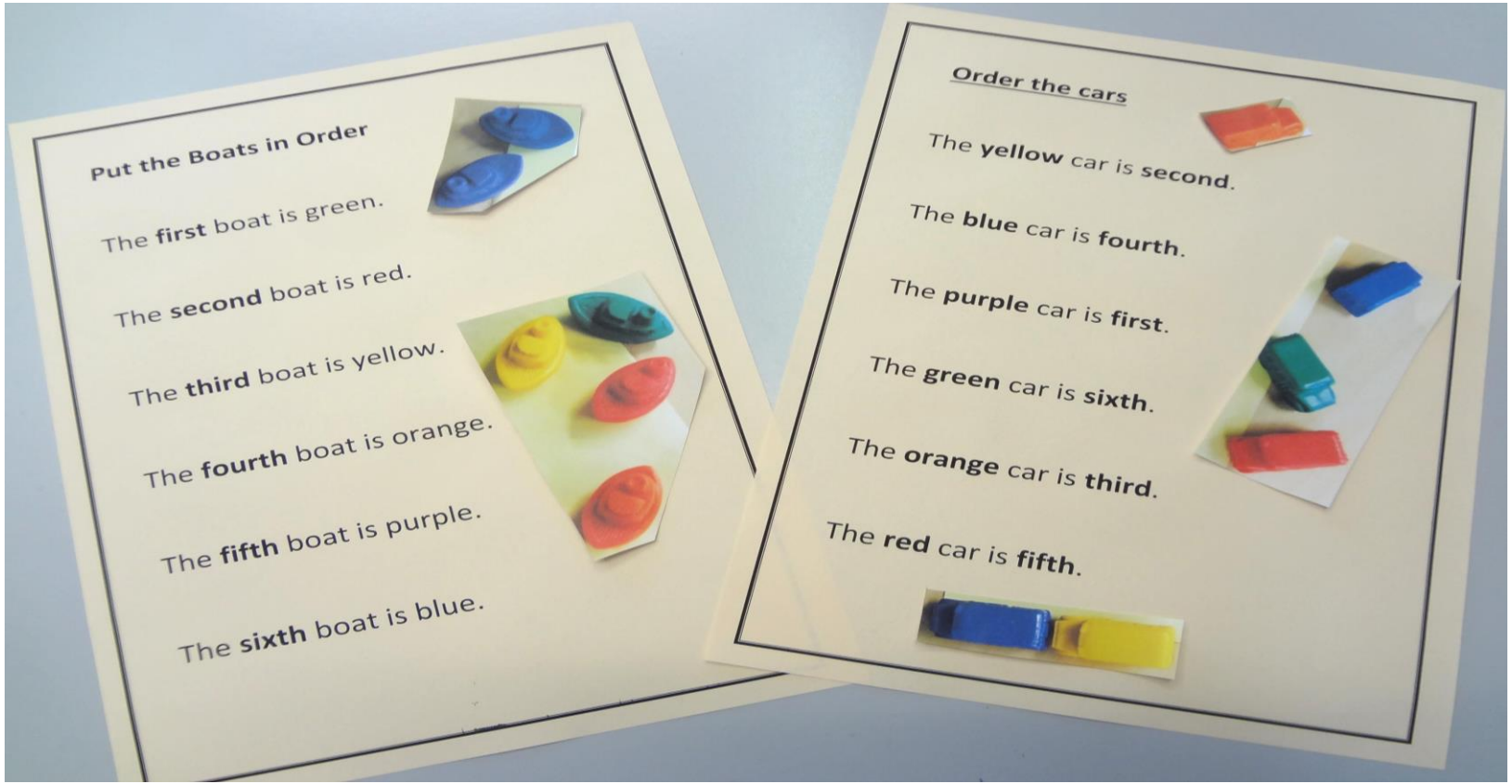

Racing Horses



# Ordinal Number- use words




first
second
third
fourth
fifth




Ordinal number activity using common resources.

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# Number- Label



# Number- Important considerations

- Language of number should emphasize ‘quantity of something’- four dolls, four toys, later- four pounds, four dollars, four miles
- There is too much early focus on the number symbol. Number symbols are abstract and children need to have the quantity picture for meaningful idea of number.
- Selecting the number symbol is the best learning experience for young children.

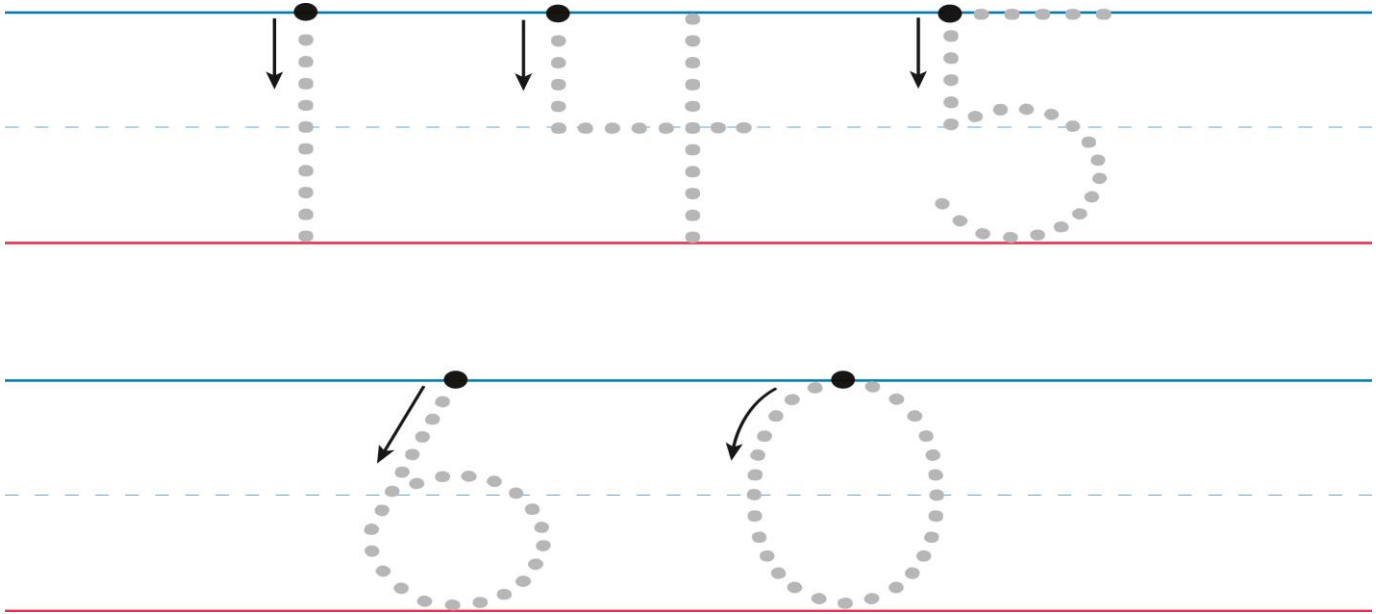

5

# Use of technology

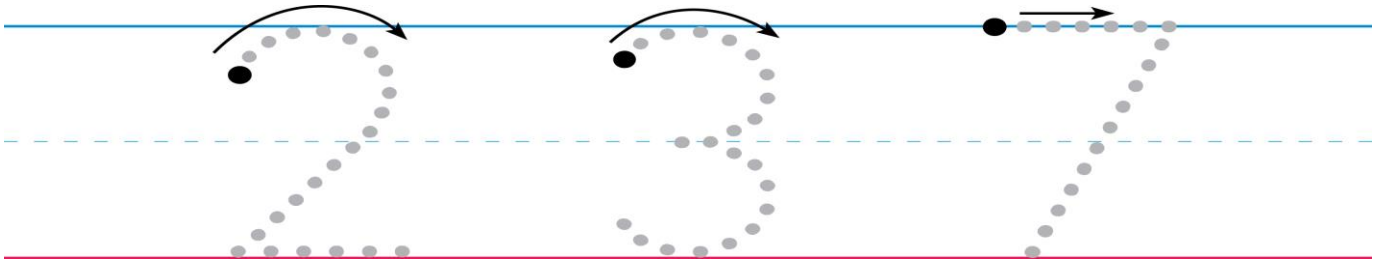
# Writing Numerals

- Writing numbers is a fine motor skill
- Teach how to make the strokes for each numeral
- Number rhymes are helpful
- Practice with water and paint brushes in an outdoor area

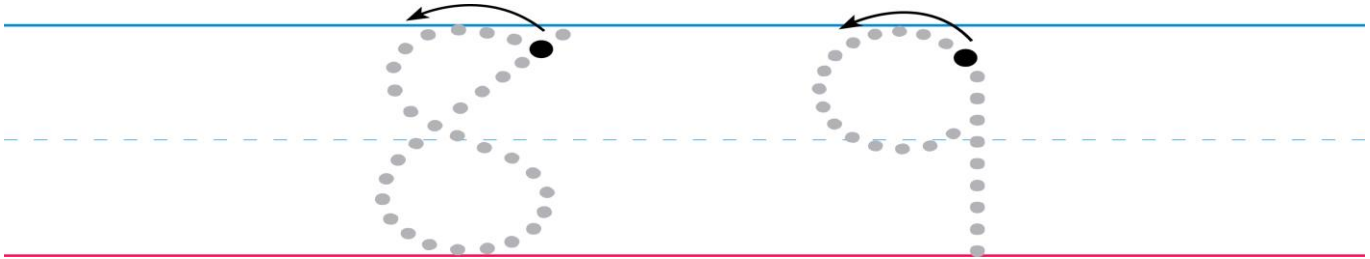
# Movement down from top to write numbers.



# Movement left to right.



# Movement right to left.



How do you know if your children are school ready?

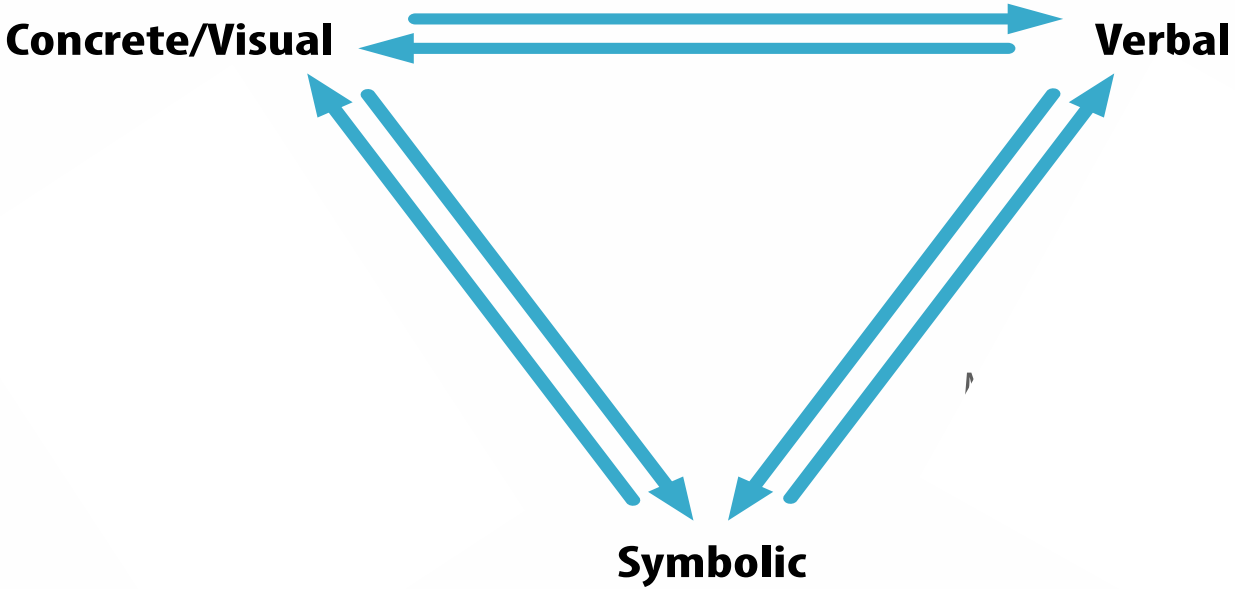
## **OUTCOME 5:** CHILDREN ARE EFFECTIVE COMMUNICATORS

| **Children begin to understand how symbols and pattern systems work** | |
|---|---|
| **This is evident, for example, when children:** | **Educators promote this learning, for example, when they:** |
| • use symbols in play to represent and make meaning<br>• begin to make connections between and see patterns in their feelings, ideas, words and actions and those of others<br>• notice and predict the patterns of regular routines and the passing of time<br>• develop an understanding that symbols are a powerful means of communication and that ideas, thoughts and concepts can be represented through them<br>• begin to be aware of the relationships between oral, written and visual representations<br>• begin to recognise patterns and relationships and the connections between them | • draw children's attention to symbols and patterns in their environment and talk about patterns and relationships, including the relationship between letters and sounds<br>• provide children with access to a wide range of everyday materials that they can use to create patterns and to sort, categorise, order and compare<br>• engage children in discussions about symbol systems, for example, letters, numbers, time, money and musical notation<br>• encourage children to develop their own symbol systems and provide them with opportunities to explore culturally constructed symbol systems |

Early Years Learning Framework (EYLF)

# Origo's Teaching Model

***Plan for representation of quantity, verbal name and selecting the number symbol.***



Children select a number.

Say the number name.

Make a group of objects.

Write the number symbol.


(Laminated card for the activity.)

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)

To learn more about our Early Years products leave a message in the chat or visit:

https://www.origoeducation.com.au/early-learning/