



# NUMBERS IN EVERYDAY LIFE

Developing young children's understanding of the social uses of numbers in the world around them

Dr Charis Voutsina and Dr Debbie Stott

29<sup>th</sup> October 2022



# Today's event outline



## Part 1

### Research Team presentation

Aims of the project and what we have found out so far

(55 minutes)



## Part 2

### Number hunt game!

(30 minutes)

Ground floor of this building and campus grounds



## Part 3

### Plenary discussion

(30 minutes)

Back to this room

# The Number Spotting Project

- \* How preschool children understand the *multiple meanings* that written numbers in everyday life.
- \* How young children interpret and express the *social uses of written numbers* in the world around them.



# Why is this important?



# Written numerals

- \* Cultural tool
- \* Recognise that numerals communicate specific information
  - \* Not always in an arithmetical context



# However

Children also need to understand the **Cultural Rules** that tell us how to use a system and what its role is in our culture.

- **What** numbers are used for
- **How** they are used and
- **Who** uses them

This fundamental understanding is often overlooked by the early years curriculum and research in education



# Brief outline of our Number Spotting project

## Participants:

37 preschool children (3-5 years)

We collected data three times over one year



# Collecting data from the children

Number Spotting Game played by families and children

produced 'Experience snapshots'

+

Researchers' photo bank

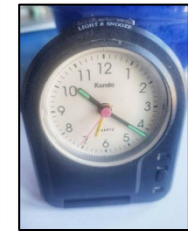


Brief conversations with children



Data

Verbal reports  
and non-verbal behaviour (pointing, hesitations)

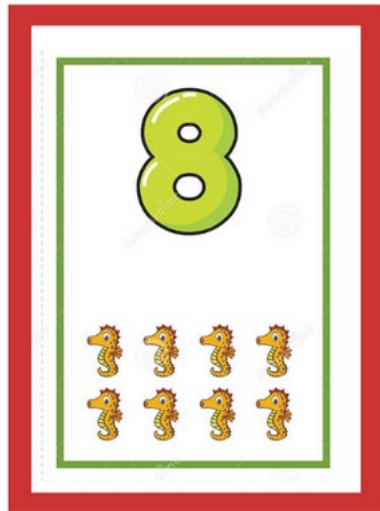
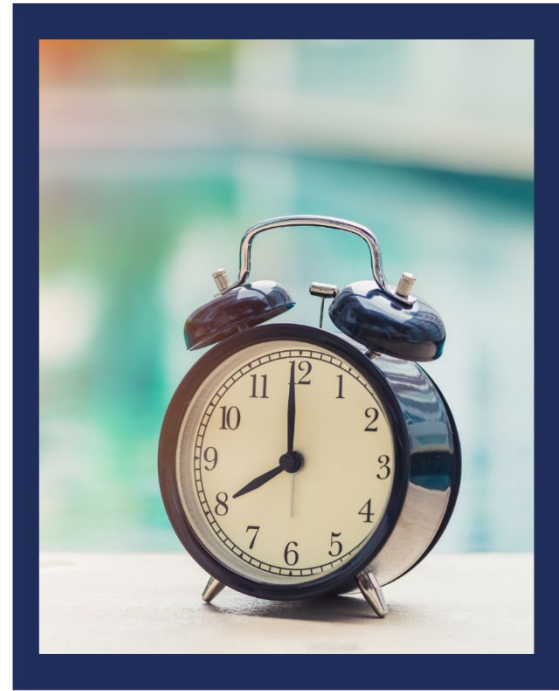




# Discussions with children

We had brief, video-recorded conversations with children discussing photographs sent by the family plus a selection from our researchers' photo bank where necessary.





# We spoke about these types of written numerals

Type	Examples
Quantity	quantity of items inside food packaging
Identifiers	house, bus and bin numbers, car licence plate
Order	race position, lift numbers
Measurement	speed sign, time on clock, price on items, length, clothing size, capacity etc.



# Discoveries from analysing the data

To make sense of the purpose of the written numeral and to communicate their understanding, **children drew from their awareness of three main elements**

3



# Object

The **Object** on which a written number appears

**Example:**  
Price sticker on a shelf



# Context

Something about the **situation** or **activity** shown in the photo that shows a written number

**Example:**  
Supermarket shelves

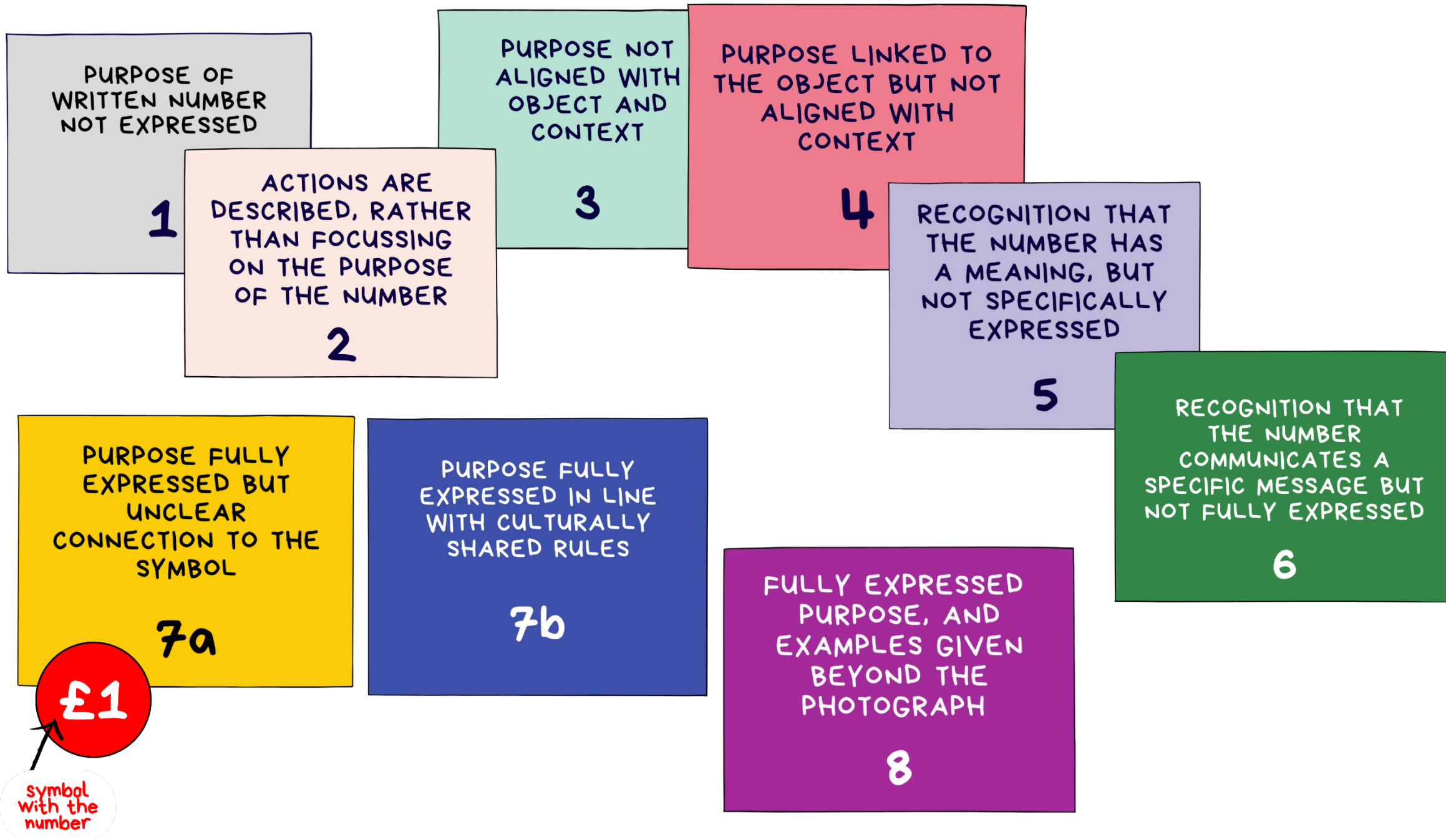


# Symbol

**Symbols** other than number which help to understand the meaning of a number

**Example:**  
£ Pound sign

Discovering children's range of responses



Expanding awareness: through various ways of attempting to express the purpose of number one and £ symbol on a price sticker

PURPOSE OF WRITTEN NUMBER NOT EXPRESSED

1

C. Um, it's ... it's a free and a one.

R. OK, do you know why it's on the bag of sweets?

C. Yeah, but I ... I don't know that

PURPOSE LINKED TO THE OBJECT BUT NOT ALIGNED WITH CONTEXT

4

R. Why do you think that's on the Skittles?

C. Hmm... I don't know. There's so many Skittles ... like that ... like there's a 100 Skittles in there.

RECOGNITION THAT THE NUMBER COMMUNICATES A SPECIFIC MESSAGE BUT NOT FULLY EXPRESSED

6

R. So why is there a one there by the bread?

C. Because the bread costs one.



PURPOSE FULLY  
EXPRESSED BUT  
UNCLEAR  
CONNECTION TO THE  
SYMBOL

7a

R. What else could it be?

C. Aah, its one pound

R. Ha! How do you know that?

C. Because I do!

PURPOSE FULLY  
EXPRESSED IN LINE  
WITH CULTURALLY  
SHARED RULES

7b

C. Because there is that sign before the one, it is saying how much it is, so how much money it is, and it is like £1.

R. Okay, so you said it would be £1. So, is the bread £1?

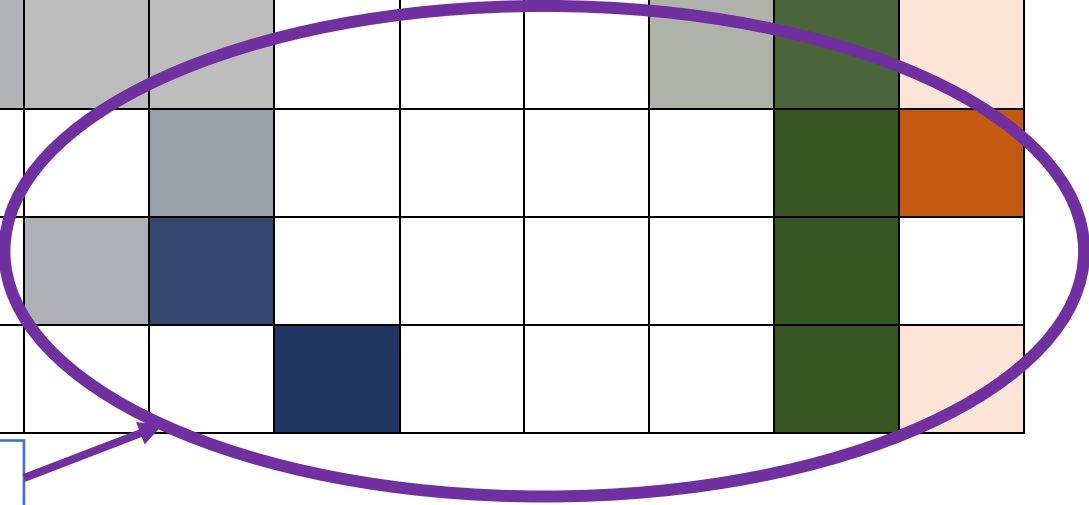
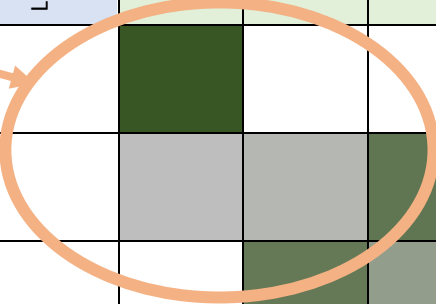
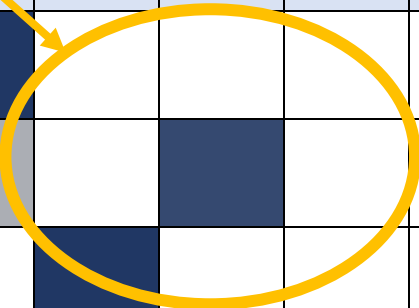
C. So you would only have to give £1 of your pocket money to buy it.





Categories	Context							Object				Symbol
	No link	Misaligned but in line with broader cultural rules	Loose link	Linked to personal occurrence	Linked & situation or activity-specific	Linked & universal	Linked & universal with examples	No link	Misaligned	Loose link	Linked	Awareness implicit
1 - Purpose of written number not expressed	Dark Blue	Dark Blue						Dark Green				
2 - Actions are described, rather than focussing on the purpose of the number	Grey	Dark Blue	Dark Blue					Grey	Dark Green	Dark Green	Grey	Light Orange
3 - purpose not aligned with object and context		Dark Blue						Dark Green	Grey	Grey		
4 - purpose linked to the object but not aligned with context		Dark Blue								Dark Green	Dark Green	
5 - Recognition that the number has a meaning, but not specifically expressed	Grey		Dark Blue	Grey	Grey	Grey				Dark Green	Dark Green	
6 - Recognition that the number communicates a specific message but not fully expressed shared rules			Dark Blue	Grey	Grey	Grey				Dark Green	Dark Green	Light Orange
7a - Purpose Fully expressed but unclear connection to the symbol			Dark Blue								Dark Green	Dark Orange
7b - Purpose Fully expressed in line with culturally shared rules				Grey	Dark Blue						Dark Green	
8 - Fully expressed purpose, and examples given beyond the photograph						Dark Blue					Dark Green	Light Orange

**Partial connections with only some aspects linked with written number**



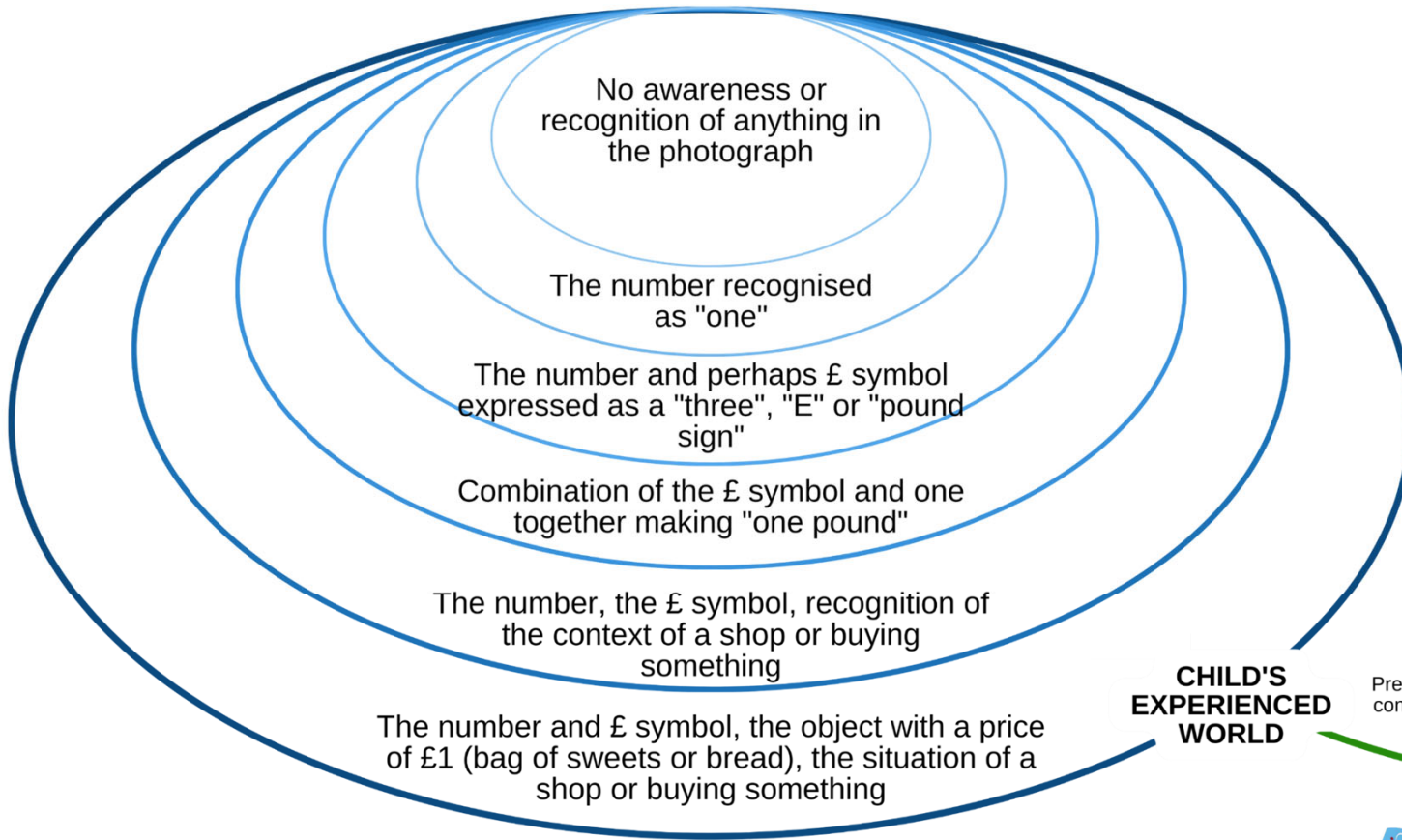
**Connections that include more of the critical aspects**

# 4 Critical Aspects

Whether the child:

1. ***recognises and is aware of*** the written numeral as a number and ***recognises and is aware of*** the object, context and/or accompanying symbol.
2. ***makes a connection*** between the object, context and/or symbol and the meaning and purpose of the written numeral ***and uses this connection*** to determine or express meaning.
3. ***makes connections that are aligned with*** the object, context or symbol dimensions for the ***specific*** occurrence of the numeral (in this case, photograph that is discussed).
4. ***makes connections that are aligned with the broader, culturally shared rules*** that underpin the meaning and purpose of the numeral in everyday life

Aspects that may be simultaneously in focus in any moment



**CHILD'S EXPERIENCED WORLD**

Previous experiences and encounters with buying items in shops and conversations with others about the meaning of the £ symbol, money and price, and perhaps pocket money



Economic and Social Research Council

LEVERHULME TRUST



Based on research funded by a Leverhulme Trust Research Project Grant

# Implications for early years education and family discussions at home

- ❖ How can discussions at home and in preschool/school expand children's awareness and understanding of the multiple meanings and social uses of numbers?
- ❖ How can the *critical aspects of understanding* emerging from our analysis inform and focus these discussions



# Instructions for the Number Hunt

See if you can spot the Bonus Numbers!

## Inside and outside numbers

### INSIDE NUMBERS

**Look for 2 rooms that have numbers**

What numbers are they?

Why are they there?

Tick if you find it!

### OUTSIDE NUMBERS

**Find a number: On a window or piece of glass**

Where was the number?

What does that number tell us?

Tick if you find it!

Answer the questions

Tick here when you find the number

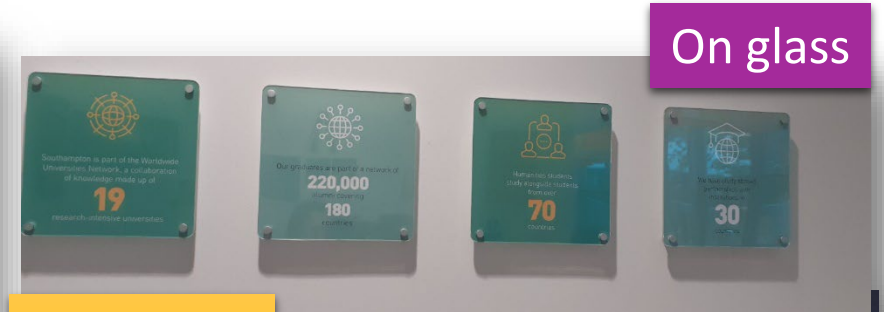
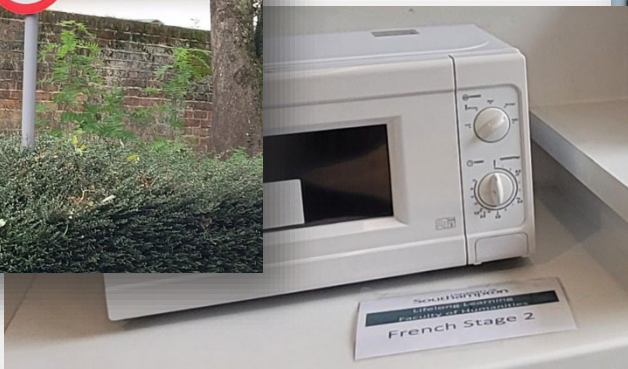
# Plenary Discussion



# Your Number Hunt Game

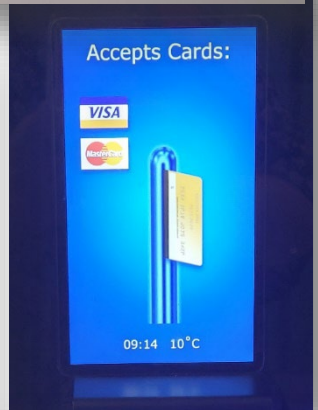


On something round



On glass

On red, green, blue, black, yellow



# Your Number Hunt Game




On  
keypads



On a  
sign

Big  
numbers

**A new picture of Neanderthals**



Archaeologists at the University discovered the first major evidence that Neanderthals made cave paintings.

Professor Alistair Pike and his team used uranium-thorium dating techniques to show that paintings in three caves in Spain were created more than 64,000 years ago – 20,000 years before modern humans arrived in Europe.

This means that the Palaeolithic cave art – including depictions of animals, dots and geometric signs – must have been made by Neanderthals, a 'sister' species to Homo sapiens, and Europe's sole human inhabitants at the time.

**Looking to the past of the Black Sea**

at the University lead on the Black Sea one of the largest multi-disciplinary ecology projects ever attempted.

and a treasure trove of over 60 remarkably shipwrecks, spanning a period of 2000 years in history, and including the world's oldest shipwreck, which was dated to 400BC.



How much  
something costs



On the  
ground / on  
something  
bumpy

Our graduates are part of a network of

**220,000**  
alumni, covering  
**180**  
countries

**Dr Helen Farr** is investigating global colonisation in deep time. This project intertwines early seafaring and submerged landscapes with archaeogenetic studies to explore the peopling of Australasia c. 60,000 years ago.



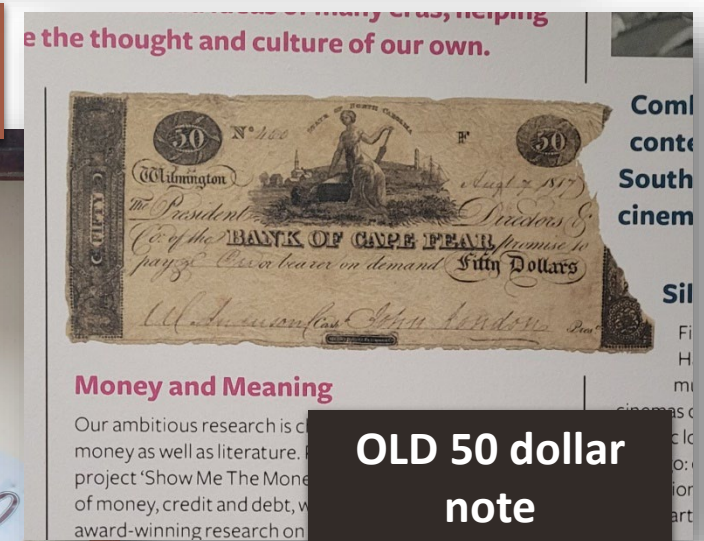
# Your Number Hunt Game – Bonus Numbers

A 4-digit number with the same 4 digits

The bonus number 33 by a famous person

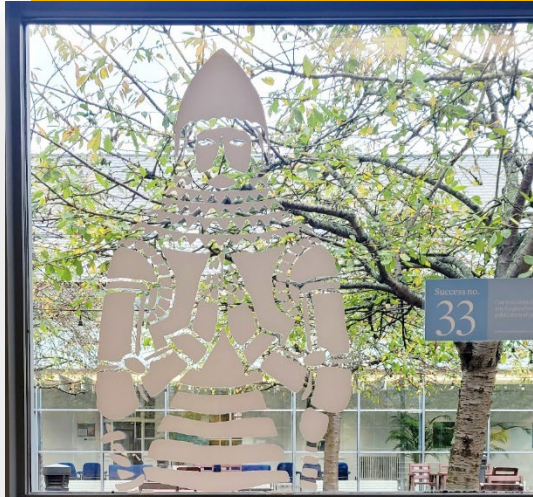


BIG 10-pound note



OLD 50 dollar note

The bonus number 33 by the Medieval knight



its potential for change.

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the exc  
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Lucy Joyner  
Television producer

# 4 Critical Aspects

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# Number Spotting Game experiences

We asked:

**Has there been a change in the way YOU engage with your child with regards to numbers by participating in the project?**

“We only used to think about adding and counting and now we see numbers all around us and explain more about what the numbers we see mean.

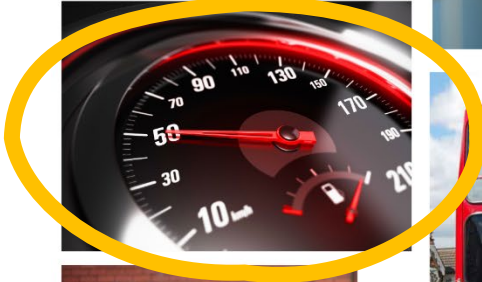
We have changed our thinking about the relationship with numbers and it isn't just about counting.”

# Number Spotting Game experiences

We asked:

Has there been a change in the way YOU engage with your child with regards to numbers by participating in the project?

**“We have much more conversations on our walks and when driving. Not just lead by myself but Harper and his brother too.”**



# Triggering children's curiosity about numbers in every day life

Using the number hunt experience, what further discussions could you have with children about the meanings and purposes of the numbers you found today?

- Keep Number Hunting!
- Notice numbers around you
- Ask questions
- Be curious

University of Southampton  
Cultural rules and uses of written numerals in children's everyday environments  
Dr Charis Voutina and Dr Debbie Stott, Southampton Education School.

**This research is The Leverhulme**  
The project addresses exploring the depth of understanding of the use of numerals in a museum.

We know that many children are very good at counting in 1s, 2s, 5s and 10s. The findings will help the cultural knowledge, understanding and based in mathematics.

How can we use this knowledge to support children's learning in everyday life and de

What we've le

**They:**

- Can identify numerals in their environment and understand the meaning according to their level of ability. For example, a child may be able to read a sign for 'one' or 'two' but not 'one and two' or 'three and two'.
- Might also know the object the number is on, such as a book, a postage stamp, a sign, etc.

**May or may not recognize:**

- The number (e.g. 'two') with which the numeral is used, numbers of objects that show speed (km, numbers that show time (e.g. 'two o'clock'), or numbers that show quantity (e.g. 'two apples').
- Symbols that appear near the number (e.g. '£', 'L', 'm', 'g', etc.).

**Interactions and discussions in the home:**

- Not all children have the same level of understanding of the meaning of numerals. It is important to have conversations with children about the meaning of numerals in their everyday life. For example, a child may be able to read a sign for 'one' but not understand what it means.
- It is important to have conversations with children about the meaning of numerals in their everyday life. For example, a child may be able to read a sign for 'one' but not understand what it means.

**In everyday environments:**

- Written numerals can often be seen in everyday life. For example, a child may see a sign for 'one' on a door or a sign for 'two' on a signpost.
- Consider the examples of the number in their everyday life. For example, a child may see a sign for 'one' on a door or a sign for 'two' on a signpost.
- Which the number is on (e.g. 'two' on a signpost).
- What the number is for (e.g. 'two' on a signpost).
- Where the number is used (e.g. 'two' on a signpost).

For general, the number can be only a sign. It is important to have conversations with children about the meaning of numerals in their everyday life.

**Pick up one of our A5 cards on the way out**

University of Southampton  
Leverhulme Trust  
Economic and Social Research Council

Many thanks for  
attending this event!  
We appreciate your time  
and engagement

Keep in touch with Charis and Debbie  
At [numberspotting@soton.ac.uk](mailto:numberspotting@soton.ac.uk)