

Introducing See and Learn Numbers

down syndrome education international
discovering potential • transforming lives

Introducing See and Learn Numbers

Professor Sue Buckley OBE
Director of Research
Down Syndrome Education International

Copyright © Down Syndrome Education International 1

Overview


- What is See and Learn?
 - some common design features and developmental benefits
 - how See and Learn programs fit together
- What is See and Learn Number?
- Why is it needed?
- How have we designed it?
- How do you use it?

Copyright © Down Syndrome Education International 2

What is See and Learn?


See and Learn provides practical, targeted and evidence-based approaches to promote the development of language, reading, speech, memory and number skills for children with Down syndrome and similar learning difficulties

www.seeandlearn.org




Copyright © Down Syndrome Education International 3

Introducing See and Learn Numbers

See and Learn – program design features 


- An evidence based developmental approach (draws on the latest research on how children learn and develop)
- Adapted for the learning profile of children with Down syndrome (draws on the research on how children with Down syndrome learn and develop)
- Small steps, structure, repetition and practice
- Builds on visual learning strengths – clear pictures, print
- Supports verbal learning weaknesses – simple language
- Encourages listening, attention and concentration
- Adapts to individual child's needs and progress

Copyright © Down Syndrome Education International 4

See and Learn – program design features 

- Teaches 'pivotal' behaviours which children use to learn – following directions, responding to questions, imitating, taking turns, initiating, playing with a partner
- In ways that support success, encourage problem solving, persistence and feelings of competence
- Provides graded teaching activities, in printed kit or app format, with easy to follow instructions and record sheets to chart progress
- Include suggestions for consolidating and extending learning during play and everyday activities at home or at preschool


Copyright © Down Syndrome Education International 5

See and Learn programs 


- **See and Learn Speech** – to improve speech skills and improve speech clarity
- **See and Learn Language and Reading** – to develop language by teaching vocabulary and sentences (grammar) to improve children's ability to talk and join in conversations, to develop early reading skills
- **See and Learn Number** – to teach the basics of counting
- **See and Learn Memory** – to improve memory
- **Will be used alongside each other – for short periods daily**

Copyright © Down Syndrome Education International 6


Introducing See and Learn Numbers

See and Learn Numbers 


- See and Learn Numbers is designed to help parents and educators teach children basic number skills and concepts.
- To ensure children really do understand the fundamental number concepts and processes before moving on




Copyright © Down Syndrome Education International 7

Learning early number skills 

- Learning to count and to calculate is a challenge for many children, not just those with identified learning difficulties
- To master early maths skills, children must learn a number of basic procedures and concepts – what are they?




Copyright © Down Syndrome Education International 8

Learning early number skills 

- learning number words** - learning to say the number word list - a list of words that must be kept in the correct order
- learning numerals** - learning to link spoken number words to written numerals
- linking quantities to numbers** - learning that number words and numerals represent quantities
- learning to count** - using number words in the correct order to count objects
- learning "how many"** - that we count to find out how many items we have and that when we count all of the items the last number word we say tells us "how many?"


Copyright © Down Syndrome Education International 9

Introducing See and Learn Numbers

Learning early number skills 


- **learning the cardinal principle** - learning to give a smaller quantity from a bigger set
- **understanding equivalence** - that if we share items evenly into two sets and then count the items in one set, this also tells us how many items are in the second set
- **learning ordinality** - that each number's position in the counting sequence is fixed and that each next number is one more equal unit
- **understanding the uniqueness of numbers** - that each number always represents a specific quantity
- **recognizing the relative sizes of numbers** - for example, that 9 is bigger than 5 and that 4 is twice as big as 2

Copyright © Down Syndrome Education International 10

Learning early number skills 

- **learning quantity words and concepts and applying them to numbers** - understanding the words used for the comparisons of sets - for example, same/different, more/less, bigger/smaller
- **adding items using a 'count all' strategy** - for example, if calculating $5 + 2$, counting out 5 blocks, counting out 2 blocks, and then 'counting all' 7 blocks starting from 1
- **adding items using a 'count on' strategy** - for example, if calculating $5 + 2$, counting out 5 blocks, counting out 2 blocks, and then 'counting on' from 5 - "5, 6, 7"
- **learning the inversion principle** - that adding is the inverse of subtraction - for example, if you take away 2 and then add 2 back, then you have the same number of items you started with

Copyright © Down Syndrome Education International 11

Factors influencing progress 

- **parents' number talk** involving counting sets of objects with their children including sets larger than the child can count
- **children's language, phonological awareness** (ability to hear sounds in words), **working memory, attention and motor skills**
- number and color words are learned faster when they are **the last word spoken** - for example, children learn the new concepts faster if we say "balls, there are two" rather than "there are two balls" and "the ball is red" rather than "it is a red ball"
- **teaching counting using identical counters** - at first using counters that are all the same size, shape and colour - in a line

Copyright © Down Syndrome Education International 12


Introducing See and Learn Numbers

Factors influencing progress 

- **systematic daily teaching in small steps** with repetition and practice can accelerate progress for children who are finding learning number difficult
- **computer games** designed to teach children counting and cardinality can accelerate progress




Copyright © Down Syndrome Education International 13

Number learning for children with Down syndrome 

- many (but not all) children with Down syndrome find counting and calculating difficult
- children included in inclusive education tend to progress further than children in segregated education settings
- number learning is often more difficult than reading
- some evidence to suggest that at the early stages of number development, children with Down syndrome can acquire similar skills to typically developing children at the same non-verbal mental age level
- also that children with Down syndrome had mastered a shorter number word list than the typically developing children with similar counting and cardinality abilities (Nye)

Copyright © Down Syndrome Education International 14

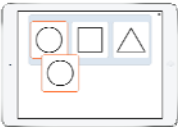
Learning early concepts 

Attributes

- **size** - big, little, tall, short
- **shape** - circle, square, triangle
- **color** - red, blue, green, yellow


Categories

- size, color and shape are **category words**
- you can **classify** (sort or group) items based on an attribute such as color, shape or size
- **more complex classification** - sorting by 2 or more attributes (for example, big red, small red, big blue, small blue items)



Copyright © Down Syndrome Education International 15

Introducing See and Learn Numbers

Learning early concepts dse 


Sequences and patterns

- red, blue, red, blue, red, blue
- red, blue, blue, red, blue, blue

Comparisons


- **quantity** - same, more, less
- **size** - big, bigger, biggest, bigger than, smaller than
- **order** - first, second, third ...last, before, after
- **position** - in, on, under, in front, behind, next to
- important for understanding numbers and calculations

Copyright © Down Syndrome Education International 16


See and Learn Numbers dse 

Designed to teach young children:

- to count, to link numbers to quantity, to understand important concepts about the number system and to calculate with numbers up to 10
- early mathematical concepts important for understanding space, time and measurement - including colour, size, shape, ordering, sorting and patterns




Copyright © Down Syndrome Education International 17

Adaptations and design features dse 

- **small developmental steps** - starting with learning the number words and proceeding through early number skills and concepts
- **clearly-defined progression** - keeping records of progress to determine when to move on and progressing when the prerequisite skills for the next step have been learned
- **practice and repetition** - activities that can hold attention and be regularly repeated
- **clear and consistent visual representations** - early use of written numerals, large black counters (kits) and simple black counters with distraction-free screens (apps), consistent horizontal 1-5 counter arrangement
- **simplified language** - minimal, clear spoken prompts with key words last, explicit vocabulary teaching

Copyright © Down Syndrome Education International 18

Introducing See and Learn Numbers

See and Learn Numbers 


Steps

- See and Learn First Counting
- See and Learn First Concepts*
- See and Learn First Sums*

When to start

- Suitable for children who understand and can say (or sign) at least 100 words. For many children with Down syndrome, this will be at around 3 or 4 years of age
- Also suitable for older children who are still learning early number concepts, learning to count up to 10, and learning to add, subtract, multiply and divide with numbers and quantities from 1 to 10


Copyright © Down Syndrome Education International 19

See and Learn First Counting 


Designed to teach children to:


- say the number words
- recognize the numerals
- link quantities to numbers
- count
- understand the concepts of cardinality and equivalence for the numbers 1 to 10

Also designed to teach the key maths language needed at this stage of number learning



Copyright © Down Syndrome Education International 20

See and Learn First Counting Guide 



Copyright © Down Syndrome Education International 21

Introducing See and Learn Numbers

See and Learn First Counting - Record sheets

Copyright © Down Syndrome Education International 22

See and Learn First Counting

Activities:

- Learning Number Words
- Matching Numerals
- Selecting Numerals
- Naming Numerals
- Linking Quantity to Numerals
- Learning to Count
- Give a Number
- Learning Equivalence

Copyright © Down Syndrome Education International 23

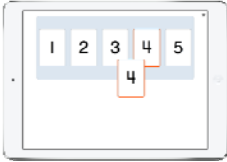
Activity 1 Learning number words

- Learning to say the words with numerals as visual prompts
- Learning to say the number words and keep them in order is a challenge
- In Activity 1 the numerals are presented one at a time and child progresses at own pace
- Learning to say 'one', then 'one, two', then 'one two three'

Copyright © Down Syndrome Education International 24

Introducing See and Learn Numbers

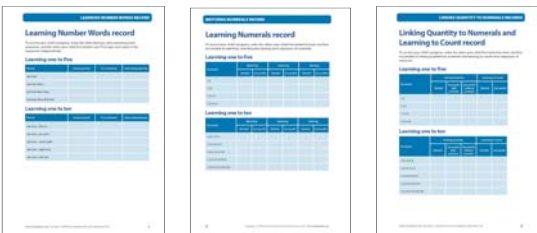
Activity 2 Learning numerals dse



- Making sure numerals have been learned
- Using matching ("put one with one"), selecting ("let's point to numbers") and naming ("let's say numbers") activities
- In small steps – working to 1 to 5 first, then 6-10

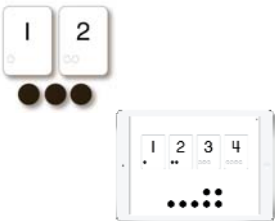
Copyright © Down Syndrome Education International 25

Record sheets dse



Copyright © Down Syndrome Education International 26

Activity 3 Linking quantity to numerals dse




- Learning that numerals represent quantities
- Starting with 1 and 2 only
- Increasing just one number at a time
- Child put correct number counters with numeral card
- On app – forced to always do in order – and complete quantity before moving to next number

Copyright © Down Syndrome Education International 27

Introducing See and Learn Numbers

Activity 4 Learning to count dse

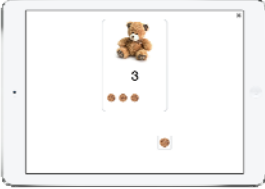


- Start with 1,2 only
- Learning one-to-one correspondence
- Start in order – count 1 counter put with 1, count 2 counters, put with 2
- Reinforcing order and increasing quantity over and over
- On app – with voice on allows counting in any order

Copyright © Down Syndrome Education International 28

Activity 5 Cardinality – Giving a number dse


- The child has to give the bear a number of cookies
- The number will be less than the number of cookies presented
- Learning to 'give a smaller number from a larger set' – step in understanding cardinality
- App does not allow error – cannot give bear too many
- Numerical prompt optional



Copyright © Down Syndrome Education International 29

Activity 6 Cardinality - Learning Equivalence dse

- Teaches children that 'same' after equal sharing means same exact number
- No need to count second set once first set counted
- App prompts equal sharing
- Child asked to share cookies then count first set
- How many does this bear have?



Copyright © Down Syndrome Education International 30

Introducing See and Learn Numbers

Summary progress record – an overview

See and Learn First Counting progress record

To record your child's progress through See and Learn First Counting, enter the date that they successfully complete each activity for each sequence of numbers.

Sequence	1-5	1-10	1-20	1-50	1-100	1-200	1-500	1-1000
1-5								
1-10								
1-20								
1-50								
1-100								
1-200								
1-500								
1-1000								

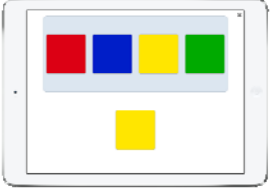
Copyright © Down Syndrome Education International 31

See and Learn First Concepts

Designed to teach children about:

- shapes
- colors
- sizes
- ordering
- comparing
- sorting
- sequences

Also teaches the language needed to talk about these concepts

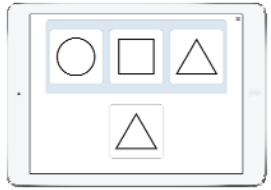


Copyright © Down Syndrome Education International 32

See and Learn First Concepts


Activities:

- Matching Sizes/Colours/ Shapes/Positions
- Selecting Sizes/Colours/ Shapes/Positions
- Naming Sizes/Colours/ Shapes/Positions
- Sorting Colours/Shapes
- Comparing Sizes
- Learning Ordering
- Learning Sequences




Copyright © Down Syndrome Education International 33

Introducing See and Learn Numbers

See and Learn First Sums 

- Designed to teach children to add, subtract, multiply and divide with numbers and quantities from 1 to 10
- Also designed to teach children more about the number system, including the relative sizes of these numbers, ordinality and inversion
- Teaches the language needed at this stage of number learning


Copyright © Down Syndrome Education International 34

See and Learn First Sums 

Activities:

- Adding One
- Taking Away One
- Race Game
- Counting Forwards
- Counting Back
- Learning Relative Number Size
- Learning Addition
- Learning Subtraction
- Learning Number Bonds
- Learning Multiplication
- Learning Division


Copyright © Down Syndrome Education International 35

See and Learn First Counting 

- **Kit contents**
- Guide book, introducing number teaching for children with Down syndrome and step-by-step instructions for each teaching activity
- Record forms
- 60 plastic counters
- 10 laminated quantity + numeral cards
- 20 (2 x 1-10) laminated numeral cards
- 4 animal cards (2 x Bear and 2 x Monkey)
- 40 animal food counter cards (20 x Cookie + 20 x Banana)

Copyright © Down Syndrome Education International 36

Introducing See and Learn Numbers

Further information 

- See and Learn web site: <http://www.seeandlearn.org/>
- Facebook: <http://www.facebook.com/seeandlearn>
- Facebook group: <http://www.facebook.com/groups/seeandlearn>

• To purchase kits:

- UK store: <http://store.dseenterprises.org/>
- US store: <http://store.dseusa.org/>

Copyright © Down Syndrome Education International 37
