Engage Teacher Conference

Making primary science more inclusive

How to motivate, include, challenge and provide opportunities so that all pupils, particularly those with SEND, can access your lessons.

Dr Rebecca Ellis
Primary Science Mentor at the Primary Science Teaching Trust

Engage Teacher Conference

Engage

Welcome, please be aware:

- Talks are recorded
- There will be time for questions at the end
- You can send messages in the chat or raise your hand.

Making Science More Inclusive

Dr Rebecca Ellis
Rebecca.ellis@pstt.org.uk
Primary Science Mentor at the Primary Science Teaching Trust
https://pstt.org.uk/

Today we will:

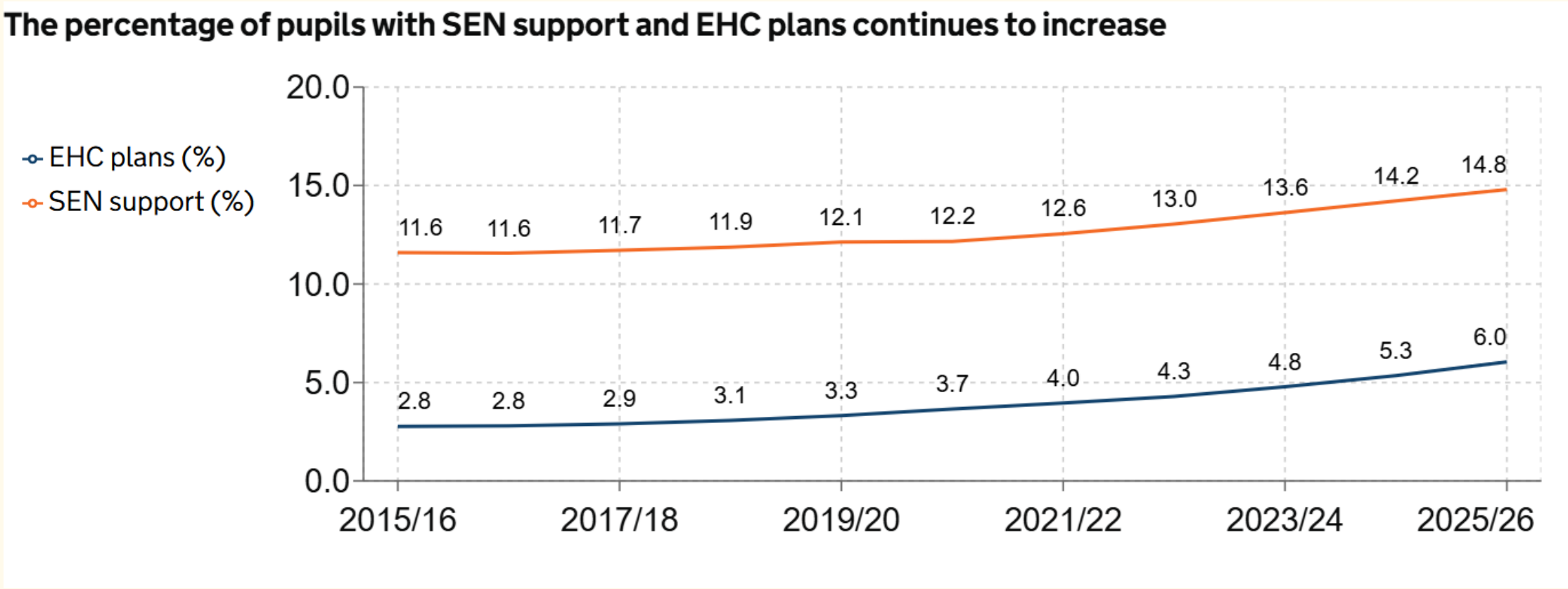
- highlight current guidance around Inclusion and Additional Learning Needs (ALN/ SEND)
- explore a range of resources and strategies to provide an inclusive classroom environment for our pupils - focus on primary science
- look at a simple planning for inclusion in science tool, sharing what is working in our schools

How many pupils?

Latest facts and figures (11 June 2026)

Over **1.8 million pupils** in England have special educational needs (SEN).

This is 20.8 % of children (19.4% in mainstream primary schools)



Special Educational Needs in England 2025-2026 Department of Education
https://explore-education-statistics.service.gov.uk/find-statistics/special-educational-needs-in-england/2025-26

SEND Reform: where are we?

- Schools are expected to adopt a **whole-school approach** to inclusion
- All schools must produce an **inclusion strategy** by the end of the calendar year
- A system of **three layers** of support above the universal offer:
  - **Targeted:** small group interventions, evidence-informed strategies, school
  - **Targeted Plus: new Experts at Hand**, (speech and language therapists and occupational therapists)
  - **Specialist Provision Packages** (SPPs) underpinning the entitlements in an EHCP

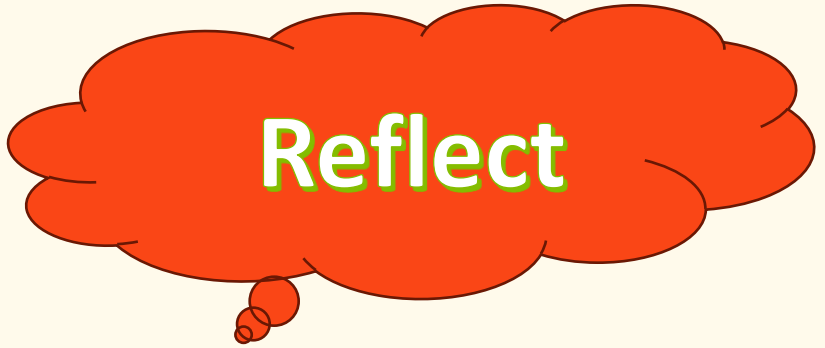
Every child achieving and thriving and SEND consultation supporting information 2026 Department for Education
https://assets.publishing.service.gov.uk/media/699c0b8abfdab2546272c0ca/Information_Sheet_for_mainstream_settings__.pdf

SEND Reform: where are we?

- New **Individual Support Plans** (ISPs) for all children with SEND
- Children who currently have an **EHCP** will keep them until they reach the next stage of their education. From 2030, children will be reassessed for EHCPs as they move up to their next stage of education
- National training on **adaptive teaching** **and creating calm classrooms**

Every child achieving and thriving and SEND consultation supporting information 2026 Department for Education
https://assets.publishing.service.gov.uk/media/699c0b8abfdab2546272c0ca/Information_Sheet_for_mainstream_settings__.pdf

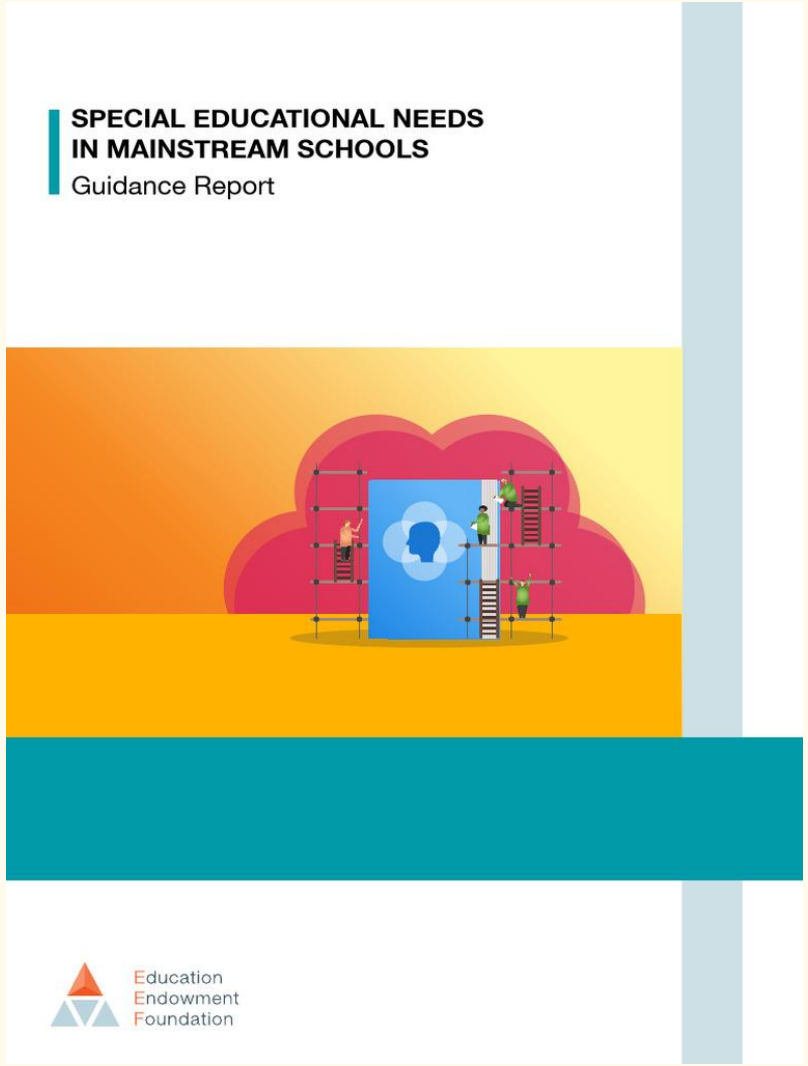
Differentiation v Adaptive teaching



What is your understanding of the difference?

Summary:
High-quality teaching ensuring **all students are supported and guided** toward the same learning goals, with **methods and scaffolding** adjusted to meet their individual needs.

Special Educational Needs in Mainstream Schools



Special Educational Needs in Mainstream Schools Guidance report(2020 updated 2025)
https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/send

Special Education eam Schools

1

Create a positive and supportive environment for all pupils, without exception

- An inclusive school removes barriers to learning and participation, provides an education that is appropriate to pupils' needs, and promotes high standards and the fulfilment of potential for all pupils. Schools should:
- promote positive relationships, active engagement, and wellbeing for all pupils;
- ensure all pupils can access the best possible teaching; and
- adopt a positive and proactive approach to behaviour, as described in the EEF's Improving Behaviour in Schools guidance report.

2

Build an ongoing, holi understanding of your and their needs

- Schools should aim to un individual pupil's learning graduated approach of th do, review' approach.
- Assessment should be re purposeful rather than a c and should seek input fro carers as well as the pupi specialist professionals.
- Teachers need to feel em trusted to use the informa to make a decision about teaching that child.

- To a great extent, good teaching for pupils with SEND is good teaching for all.
- Searching for a 'magic bullet' can distract teachers from the powerful strategies they often already possess.
- The research suggests a group of teaching strategies that teachers should consider emphasising for pupils with SEND. Teachers should develop a repertoire of these strategies they can use flexibly in response to the needs of all pupils.
  - flexible grouping;
  - cognitive and metacognitive strategies;
  - explicit instruction;
  - using technology to support pupils with SEND; and
  - scaffolding.

quality teaching
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inclusion of pupils

should reduce the
t, but it is likely
require high quality,
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ention (from universal
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e carefully targeted
and assessment

e applied using
tive implementation
s guidance report
Work: A School's Guide

5

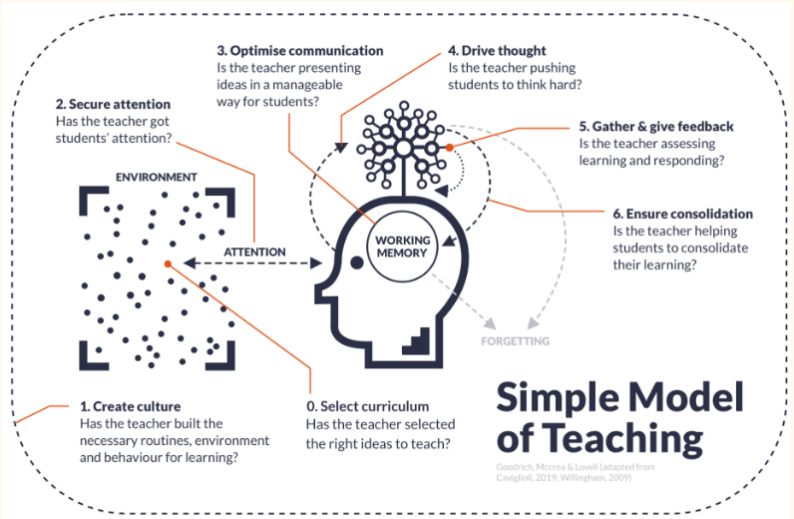
Work effectively with teaching assistants

- Effective deployment of teaching assistants (TAs) is critical. School leaders should pay careful attention to the roles of TAs and ensure they have a positive impact on pupils with SEND.
- TAs should supplement, not replace, teaching from the classroom teacher.
- The EEF's guidance report *Making Best Use of Teaching Assistants* provides detailed recommendations.

EEF - High quality teaching: ‘The Five-a- day’ principle

Aubin, G. 2022 EEF blog: ‘Five-a-day’ to improve SEND outcomes
https://educationendowmentfoundation.org.uk/news/eef-blog-five-a-day-to-improve-send-outcomes

High-Impact Core Instruction



- Select the right things to teach
- Provide structure, **routine**, strong relationships & sense of belonging.
- Secure **attention and motivation** (e.g. minimise distractions, use of voice, high-participation strategies, high success rates).
- Implement **explicit instruction**, build connections, and manage cognitive load (e.g. activating prior knowledge, using worked examples, breaking down tasks)
- Strengthen **memory and metacognition** (e.g. choral response, distributed retrieval practice), frequent checks for understanding.

Mccrea, Barker & Goodrich (2025) Inclusive Teaching—A Discussion Paper, Steplab

“When a flower doesn’t bloom, you fix the environment in which it grows, not the flower.”—
Alexander den Heijer

Do you use PowerPoint presentations? They are part of the learning environment for children. How can we optimise them for inclusion?

WABOLL: what is wrong with this slide?

How much text is too much text? and how do we show *which information is most important ?*

Which fonts are clearest and which colours support people with dyslexia or those who are colour blind?

How should we space our text and what might be distracting?

OK, WE KNOW THAT WE MIGHT HAVE GONE A BIT OVER THE TOP BECAUSE WE HAVE CHILDREN WHO LOVE DRAGONS BUT SOMETIMES NON- EXAMPLES CAN BE POWERFUL- MORE ON THAT LATER!

Dyslexia Friendly Strategies

- Readable fonts (Comic Sans, Calibri, Verdana)
- Dark coloured font size 12 or larger for printed (32 for slides)
- Avoid underlining and italics
- **Use bold for emphasis**
- 1.5 line spacing
- Simple off-white background
- Bullet points/ numbering
- Simple language (11-15 words per line)– consider supportive images

https://dyslexiascotland.org.uk/dyslexia-friendly-typed-formats/

Adaptive teaching: An evolution of differentiation

Adaptive teaching happens before the lesson, during the lesson and after the lesson.

- Where are you as a school?
- Have your science schemes of work been updated to reflect the move away from differentiation to adaptation?

Anticipate Barriers in Science Lessons

Which number are you **least** confident that you address?

2. Low science capital

1. Lack of prior knowledge

3. Less secure vocabulary

Barriers to learning in Science

6. Common misconceptions

4. A particular need

5. Confidence in core skills: reading, writing, math, language, oracy

Eaton, J. 2022 Moving from 'differentiation' to 'adaptive teaching' | EEF (educationendowmentfoundation.org.uk)

Science Capital Teaching Approach

Helps more children think “Yes! Science is for me!”

Involves a small change in teaching mindset:

- broadening the ways in which science is represented
- valuing what **all** children bring with them
- **connecting science** with **children’s identities, experiences** and what matters to them

There are 3 main pillars:

- **Personalising** and localising science
- Finding out and valuing children’s outside school experiences
- Tweaking plans so that **children see science in their daily lives**

The Science Capital Teaching Approach Animation 2019 UCL Institute of Education
https://www.youtube.com/watch?v=hWWPUIK3xZ0

How can we adapt our science lessons?

Low prior knowledge and/or science capital	Pre-teach or a pre-task: link science to real life
	Contextualise information: pictures, videos, books
Less secure vocabulary	Teach new vocabulary explicitly: symbols, working wall and discussing polysemous words
	Practice vocabulary: songs, games, or discussion
Common misconceptions	Identify the common misconceptions

How can we adapt our science lessons?

Confidence in core skills: reading, writing, math, language, oracy	Introduce the concept: discussion, demonstration or question
	Plan scaffolds, stem sentences
	Prepare/plan model to share on a visualizer, whiteboard
A particular need	Targeted support- LSA, peer, scaffold

Planning for inclusion

Topic: Materials Year: 1

Pre-teach or a pre-task: link science to real life	
Contextualise information: pictures, videos, books	
Teach new vocabulary explicitly: symbols, working wall and discussing polysemous words	
Practice vocabulary: songs, games or discussion	
Common misconceptions	
Introduce the concept: discussion, demonstration or question	
Plan scaffolds, stem sentences, ways of recording	
Prepare/plan model to share on a visualizer, whiteboard	
Targeted support- LSA, peer	

Materials Year1: Linking Science to real life

Monster munchers: only eat one sort of material.

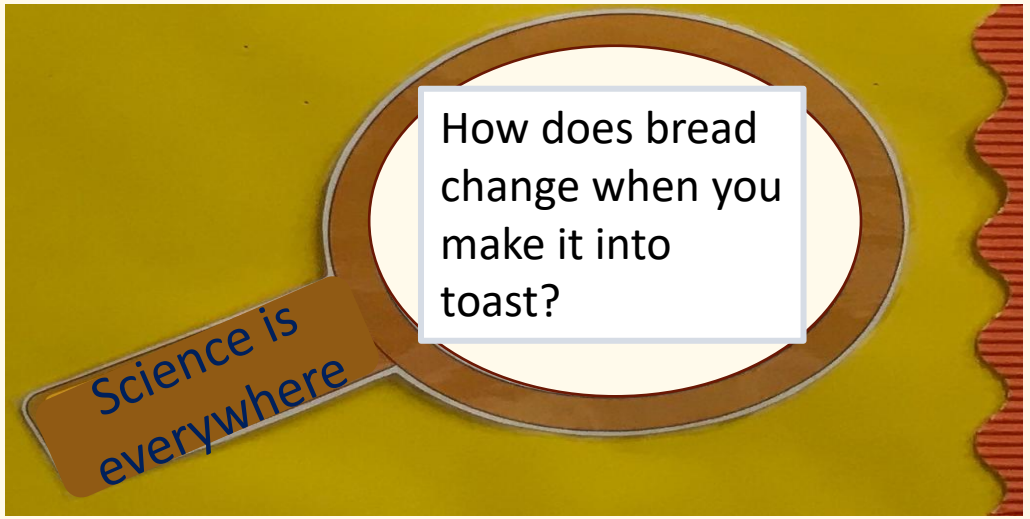
Children bring examples from home into the classroom

Waller, N. 2017 A Creative Approach to Primary Science. Bloomsbury Publishing.

Linking Science to real life

Encourage children to think about science outside the classroom by setting SIMPLE ‘Science is everywhere challenges’

- Can you find/ draw/ take a photo of something alive, dead or never living to add to our display?
- Add to our collection of seeds… inside fruit, fallen from trees
- When you go underwater in swimming lessons- can you hear anything?

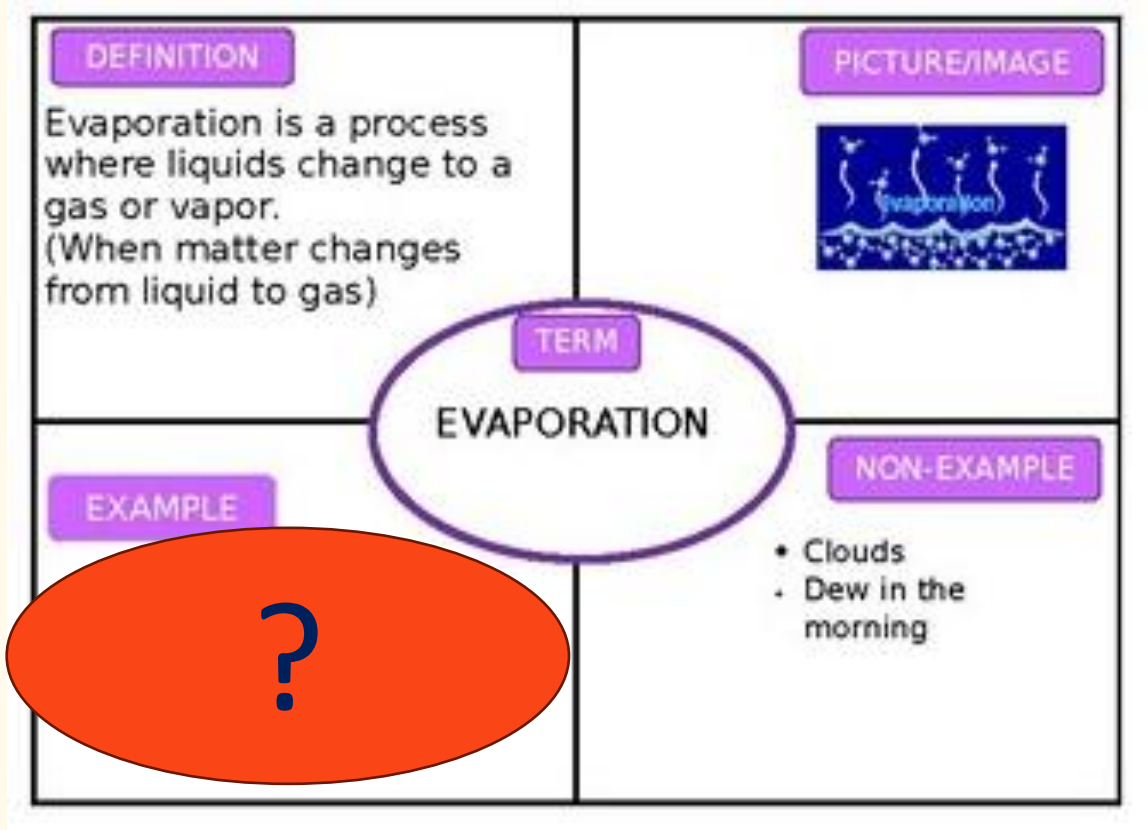


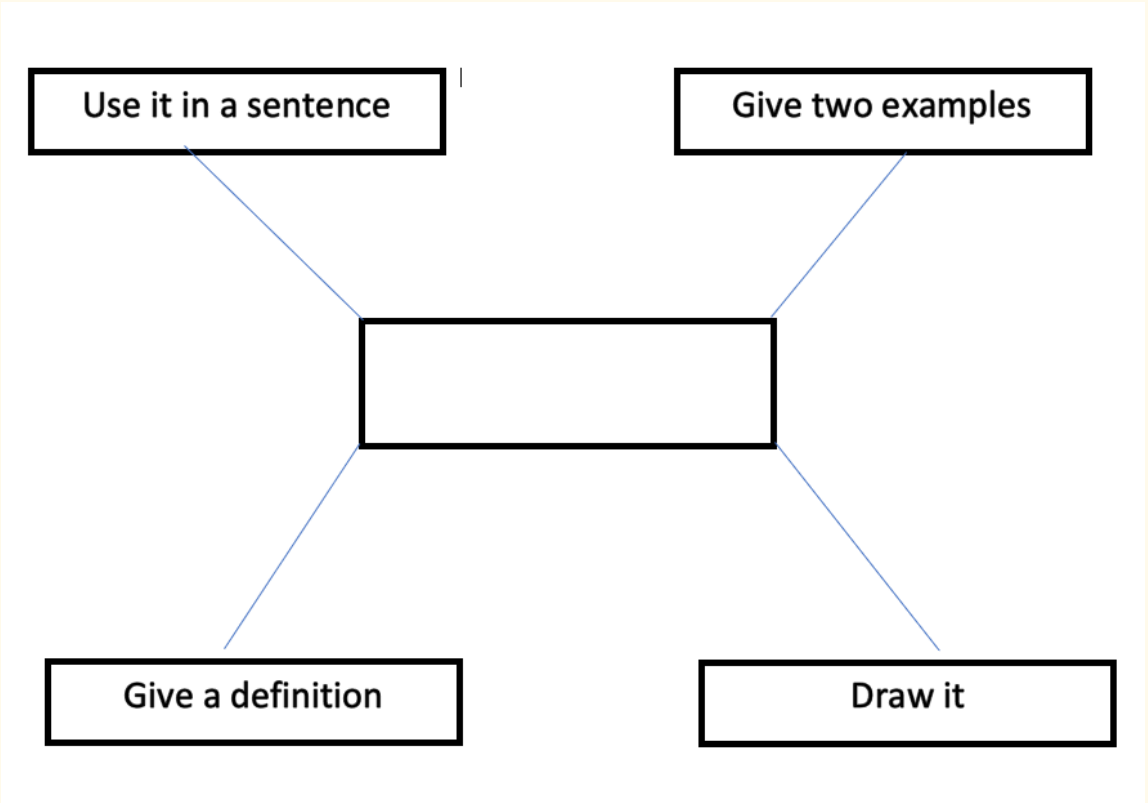
Planning for inclusion- Materials Year 1

Pre-teach or a pre-task: link science to real life	Bring in examples of materials to feed to monster munchers – table display
Contextualise information: **pictures, videos, books**	Read books e.g. Three Little Pigs, Scarecrow's Wedding, That's not my Puppy! Odd One Out Explorify: A bowl full
Teach new vocabulary explicitly: symbols, working wall and discussing polysemous words	Widget word cards on working wall: Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, card/cardboard (2-3 lessons) I say, you say. Point to… Children often confuse the word **fabric and material**
Practice vocabulary: songs, games or discussion	https://www.youtube.com/watch?v=WinXpFTempo&list=RDQM6_aGSOZHBrQ&start_radio=1 CBM The Materials Song

Frayer models

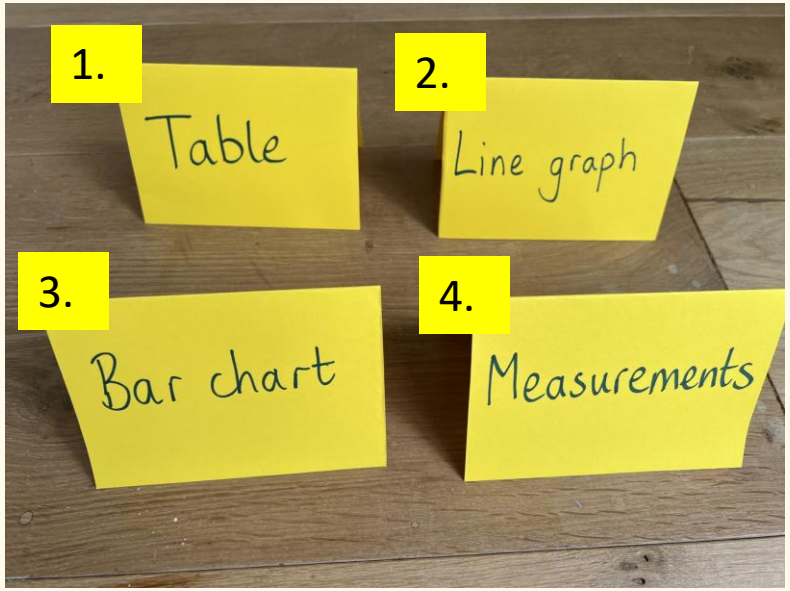
- Have you heard of them?
- Have you used them?
- How did you use them?





Splat games

- Place words around the room
- Read definition
- Teams decide together which word is being described- consensus
- ‘Splatter’ selected and stands up
- SPLAT! Go to word



You can record your results on one of these. It has words on one axis and numbers on the other

Goldsworthy, A. and Ponchard, B., 2007 Science Enquiry Games Millgate House Publishers and Consultancy https://www.millgatehouse.co.uk/product/ages-8-12-science-enquiry-games/

Planning for inclusion- Materials Year 1

Common misconceptions	Children can find it very difficult to identify plastic because it can be made to look like other materials such as wood or metal.
Introduce the concept: discussion, demonstration or question	Which materials can we find around school? Material hunt
Plan scaffolds, stem sentences	This object is a …… and it is made from …… (Chatterpix?)
Prepare/plan model to share on a visualiser, whiteboard	Material hunt sheet Zoom In, Zoom Out https://www.stem.org.uk/explorify/activities/in-disguise
Targeted support- LSA, peer	Use talk partners for material hunt. Temporary group - adult

ChatterPix Kids

1. Take a photo
2. Draw a line to make a mouth
3. Record your voice (30 seconds)
4. MP4 file easy to share

Ways of recording when writing is a barrier

https://vocaroo.com/

What do these children know about drying?

Practical Safety

- Do you know who your health and safety advisor is?

CLEAPSS – Primary

- Clear planning, preparation and modelling
- Do you explain how to use scientific equipment? When?
- Using Social Stories

Using Assistive Technology

Assistive Technology (AT) in education refers to tools, devices, or software designed to help students with disabilities or special needs access learning, participate fully, and demonstrate their knowledge effectively

- Allowing typing or voice typing/voice recognition software
- Screen magnifiers
- Using a screen/pen reader/text to speech software

- Braille displays
- Alternative keyboard and input devices
- Eye tracking devices

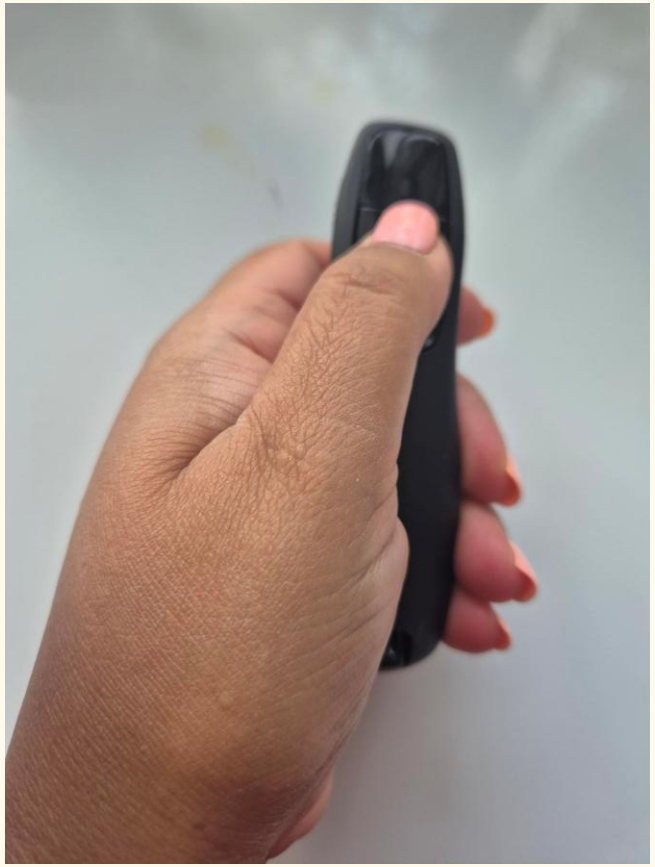
Edyburn, D. Rapid literature review on assistive technology in education - Research report 2020 Department for Education
https://assets.publishing.service.gov.uk/media/5fbb9e83d3bf7f573228a3b2/UKAT_FinalReport_082520.pdf

Using a Clicker

Aids mobility of staff

Highlighting to groups/individuals

Refocusing



Impact of Assistive Technology

2021 unpublished survey by Cranfield University, Ace Centre and TechAbility polled staff at special schools on the impact of AT use in their settings and found a wealth of benefits were being reported. The sample was not fully representative but do give an indication of the **benefits possible when AT is used well**.

- 96% of respondents said AT had a positive impact on learner **engagement**
- 96% said AT positively impacted learner well-being and **mental health**
- 93% said AT had a positive impact on **learner independence**
- 89% said AT had a positive effect on **learning and attainment**
- 89% said AT positive affected **student behaviour**
- 59% said AT had a positive impact on **teacher time** in lessons

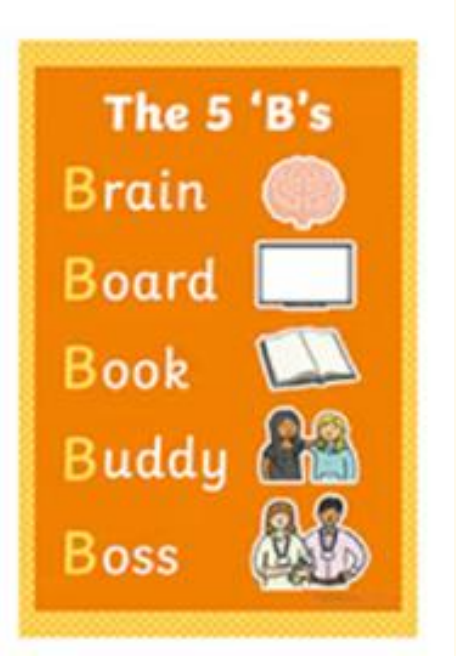
AT Leadership considerations 2020 Nasen https://asset.nasen.org.uk/AT_Leadership_considerations23.docx

Strategies- If it's good for some, it may benefit all

- Visual timetable – now, next boards
- Regulation for all- Doodlebooks, Daily Mile, Zones (check in?)
- Symbols for all
- Target setting (linked EHCP, ISP)
- Time + visual timers?
- Supportive seating plan
- Think, pair, share

More strategies…

- Mixture of types of activity (independent, paired, group, speaking and listening, practical, movement)
- Give pupils options and choices
- Self-assessments (metacognition)
- Brain, board, buddy, book, boss



https://montessorisoul.com/product/brain-book-buddy-boss-poster/

- Roles and responsibilities
- Access to individual workstation
- Reasonable adjustments

Using research to select support

‘Evidence is often hard to access. As a result, we can sometimes end up adopting approaches which are less effective than we initially think’ Peps Mccrea, 2026.

#	Intervention	What the evidence shows	Evidence quality
1	Fidget spinners	Classroom studies find negative effects on attention and academic performance, regardless of ADHD traits.	Low–moderate, converging
2	Coloured overlays and tinted lenses	Systematic reviews find no reliable benefit on reading; apparent effects are largely placebo.	Moderate
3	Zones of Regulation	Most rigorous independent review found it does not meet evidence standards; two best RCTs found null effects.	Very thin
4	Universal mindfulness in schools	Largest UK trial found null effects on adolescent mental health, with possible harm for at-risk students.	Strong (against; possible harm)
5	Working-memory training	Improves trained tasks but does not transfer to academic outcomes or ADHD symptoms.	Strong (against transfer)
6	Weighted vests and weighted blankets	Not an evidence-based practice for autistic students.	Low–moderate (against)
7	Sensory diets and sensory circuits	Few positive effects in the small literature; too thin to support as routine provision.	Thin
8	Learning styles and VAK matching	No evidence that matching instruction to a preferred style improves outcomes.	Strong (against)
9	Brain Gym	Educational claims not supported; neuroscience framing is pseudoscientific.	Strong (against)
10	Ear defenders	A reasonable adjustment for a specific noise barrier, not an autism intervention.	Limited; framing matters

‘Evidence here is about **average effects in mainstream classrooms**.

What are we already doing… What problem is it solving? What does the evidence say?

Is it actually working for the students we're using it with?’

Peps Mccrea, 2026

Mccrea, P and Barker, J., 2026. Common SEN (Mis)Interventions - An Evidence Summary. Steplab https://steplab.co/news/common-sen-mis-interventions-an-evidence-summary/6a0cc0325a4b9b00017ae3ed

Try, Refine, Ditch

What will you **try**?

What will you **refine**?

What will you **ditch**?

Amjad Ali, 2024. A little guide for teachers: SEND in Schools. Corwin, UK

Primary Science Teaching Trust

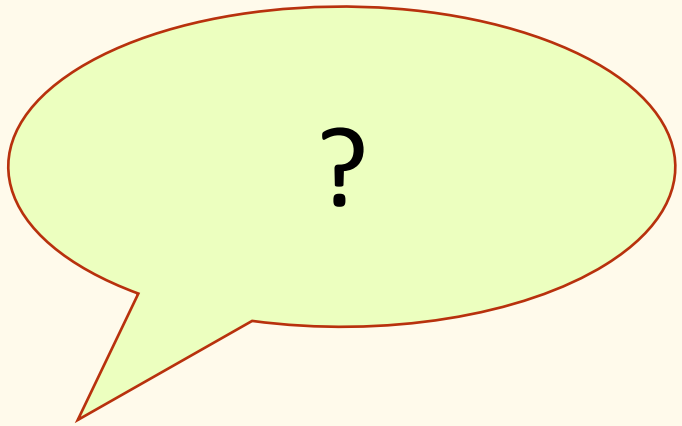
For more information on the Primary Science Teaching Trust and access to:

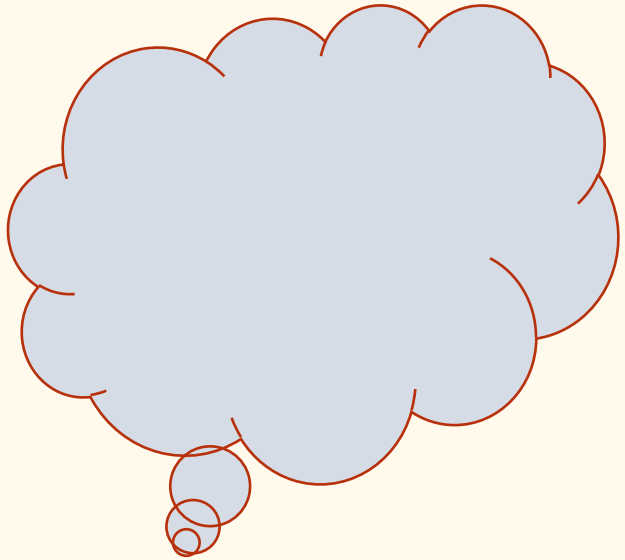
- A large selection of free **resources**
- **Access to events and support** including local Primary Science experts who can provide 1:1 subject leader support and CPD
- Collaborations and research informed programmes including **Thinking, Doing, Talking Science and TAPS**

Visit our website: www.pstt.org.uk

/PrimaryScienceTeachingTrust /company/primary-science-teaching-trust /PSTT_whyhow

Questions, thoughts and comments





Dr Rebecca Ellis
Rebecca.ellis@pstt.org.uk

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