



# Developing shared understanding

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# Teacher Assessment in Primary Science (TAPS)

- Assessment as **embedded** part of teaching and learning
- Building a **shared understanding** of progression in primary science
- Working with teachers since 2013 across the UK to develop:

Pyramid model: egs of wide range of approaches

Focused Assessment activity plans & pupil work egs



Teacher Assessment in Primary Science Pyramid Tool

**RESPONSIVE TEACHING**  
Eg. Clear focus, questions, feedback

Teachers gather evidence of their pupils' learning through study of the products of activities and tasks (T4)  
E.g. focused recording, models, sorting

**FOCUS ON PRESENTING FOR RESEARCH**

**FOCUSED RECORDING**

**CHOICE IN PRESENTING CRATERS INVESTIGATION**

**SKELTON MODELLING**

**SHARING HOME LEARNING**

**POST-IT PLANNERS**

TAPS Plan for Focused Assessment of Science

Topic: Properties and changing materials Year 5 Age 9-10 Title: Sugar cube stacks

**Working Scientifically**  
Do: Gather and record data of increasing complexity using tables

**Concept Context**  
Know that some materials will dissolve in a liquid to form a solution.

**Assessment Focus**  
• Can children create their own table for recording results?  
• Can children record data clearly and accurately?

**Activity**  
Ask children to explore what happens when they place a stack of three sugar cubes in a small pool of coloured water (water with a small amount of food colouring). Pause and discuss what they notice and what they could investigate e.g. does the number of cubes/amount of water make a difference? What if you place a material between the cubes (e.g. paper/folding foil)? How will you know if it makes a difference – what should we measure? (e.g. time for water to reach x time to fall). Ask groups to investigate one of their ideas and create their own table to record their findings. (Use fresh water each time if possible to avoid a saturated sugar solution). Share recorded results, discussing what has been found and reflect on what makes a good table.

**Adapting the activity**  
Support: Question children to ensure they are clear about what they are changing and what they are measuring. Remind children to provide table titles so that they can be understood by others.  
Extension: Repeat readings or try a different measure to check results.  
Other ideas: Investigate different types of sugar: different temperatures of water...

**Questions to support discussion**  
• What are you changing?  
• What are you measuring?  
• How are you recording your results?  
• What are you putting in this column?  
• Can you explain what your table shows?  
• How clear is this table?  
• How could the table be made more clear?

**Assessment Indicators**  
Not yet met: Children note times, but recording is not clear, e.g. measuring time to absorb or time to fall/dissolve.

**Meeting:** Pupil recordings clearly show what was investigated. Results are recorded systematically in a table.

**Possible ways of going further:** The results table follows the science format of 'change' in the left column and 'measure' in the right column(s). Pupils recognise the need to repeat measures if they had more time and/or problems with the reliability of their data e.g. it was hard to tell when it had fallen so we should have done it again to check.

TAPS Cymru Focused Assessment example

Topic: Properties and changing materials Year 5 Age 9-10 Title: Sugar cube results tables

**Enquiry Focus**  
Do: Gather and record data of increasing complexity using tables

**Concept Context**  
Know that some materials will dissolve in a liquid to form a solution.

**Example**  
Children were asked to record data in their own table when investigating sugar cube stacks (see TAPS lesson plan).

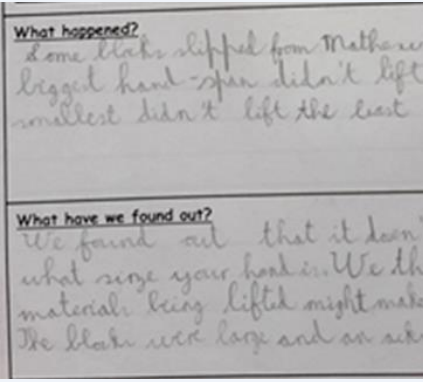
**Children meeting the objective would be able to record results in a table which could be understood by someone who was not in their group. They recognise the need for repeat readings (even if they ran out of time to record them).**

Example from St Fagans Primary School, Cardiff

# TAPS Focused Assessment approach

Skills focus in the context  
of a whole enquiry

Evaluate



Ask Qs

Interpret results >  
draw conclusions

Accurate measurements

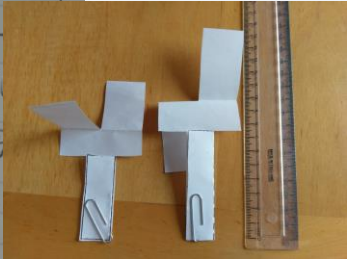
Close  
observation



FALL (Seconds)

Does the shape affect the time it takes to fall?

Shape of Wings	1	2	3	4	AV
Wiggly line	1.15	0.59	0.92	0.35	0.77
Straight	0.90	0.79	0.50	1.19	0.845
Spiky	2.12	1.33	0.30	0.9	1.0875
Gagedy	0.73	2.41	0.99	1.03	1.29



Control  
variables

Ideas

Variables we could change:

Our Method

We will change:

We will measure or observe:

We will keep these things the same:

Question: will a upside be

Prediction: I think an upside

How will we test this? we will drop two be same height as the down and one up

What we did:





# TAPS Working Scientifically Cycle



# Our science skills working wall

Remember when we planned our own Rocket mice investigations?



Remember when presented our research about life cycles?



Remember when we measured which material let through the least water?



Material	Number of drops
Paper	18
Cling Film	100
Tin Foil	100
Kitchen Roll	22
Tissues	2
Socks	2
Blue Paper	56
Cotton Wool	43

Remember when we evaluated the way we dunked biscuits?

Would something like this wheel help with WS coverage?



Ongoing formative assessment  
can be summarised more easily  
if there is a FOCUS

Whole sch  
processes

Summative reporting

Ongoing rich  
formative  
assessment can be  
summarised from a  
range of contexts

Shared understanding

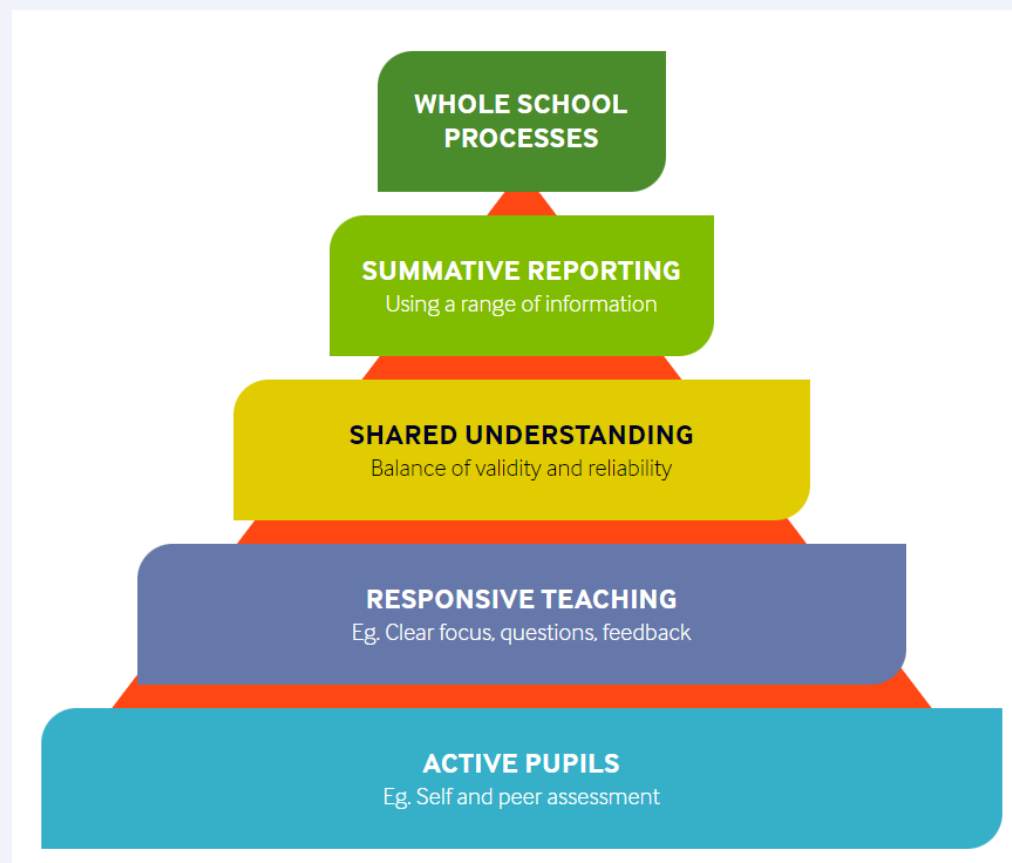
Assessment  
to support  
learning

Responsive teaching

Active pupil involvement

Key principles of TAPS

# Developing shared understanding



Key to supporting progression and utilising assessment info



# ShU5

## Manageable recordkeeping





# Judgements draw on range of activities

ShU1  
Range of  
activity

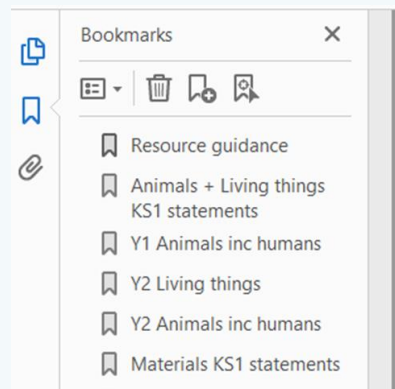
- Judgements can be more valid if based on a range of information.
- Range activities can provide information which can be used formatively or summatively.
- For example, during the latter half of a Year 3 topic on healthy eating the pupils:
  - investigated egg shells, predicting and collecting results about which liquid would stain teeth;
  - made models of teeth and 'chatterboxes' to name teeth and their functions;
  - and designed posters to promote healthy eating and dental care.
- The teacher used information from these tasks and her own observational notes to support her summative judgements.



Year 3  
Edwardsville Primary, Merthyr Tydfil

# NEW: Stoke exemplification for primary science (SEPS)

- Pupil work collections for KS1 and KS2
- Support for end of KS judgements
- Use bookmarks on left to jump to your topic or year group



Science Across the City Stoke exemplification for primary science (SEPS) BATH SPA UNIVERSITY

Topic: Materials	Year 1 Age 5-6	Title: Property sort
<b>Working Scientifically</b> Do: gather and record data (grouping and classifying)		<b>Science content</b> describe the simple physical properties of a variety of everyday materials

**Context:** After discussing some examples of materials and different properties, children were asked to do their own sorting with hoops and property cards (rough/smooth, transparent/opaque, soft/hard, stretchy/nonelastic, bendy/rigid etc).

Children meeting the objective would be able to group materials by their properties.



<https://tinyurl.com/SEPSwork>

Science Across the City Stoke exemplification for primary science (SEPS) BATH SPA UNIVERSITY

**Key Stage 1: Materials**

Teaching of the National Curriculum (NC) leads to a summative teacher assessment judgement against the Teacher Assessment Framework (TAF) of 'meeting' or 'not yet meeting'. These exemplification materials provide examples of the kinds of things pupils could do in class to support ongoing assessment.

**NC Year 1: Everyday materials**

Pupils should be taught to:

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials
- compare and group together a variety of everyday materials on the basis of their simple physical properties.

**NC Year 2: Uses of everyday materials**

Pupils should be taught to:

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

# Moderation discussions

Look at a snapshot (single activity):

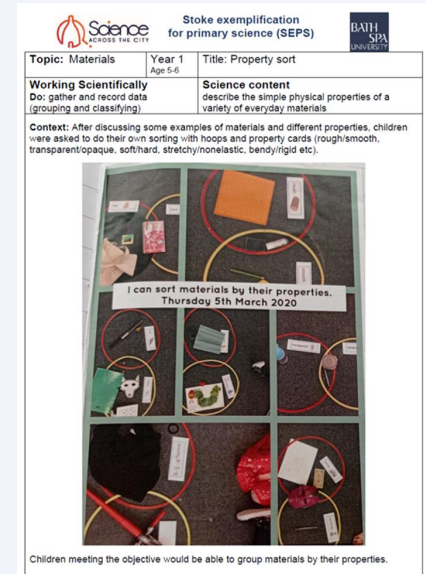
- Can a judgement be made?

Look at a collection > summary:

- What feeds into an overall judgement?

Look at examples from different year groups:

- Is there progression?
- What evidence can you see for WS?

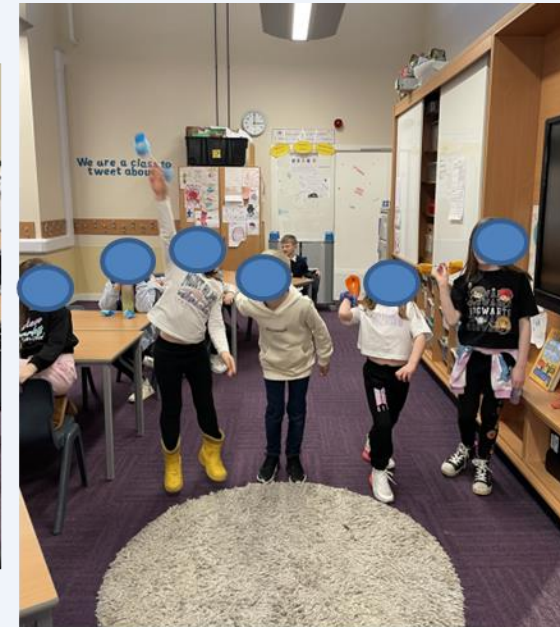
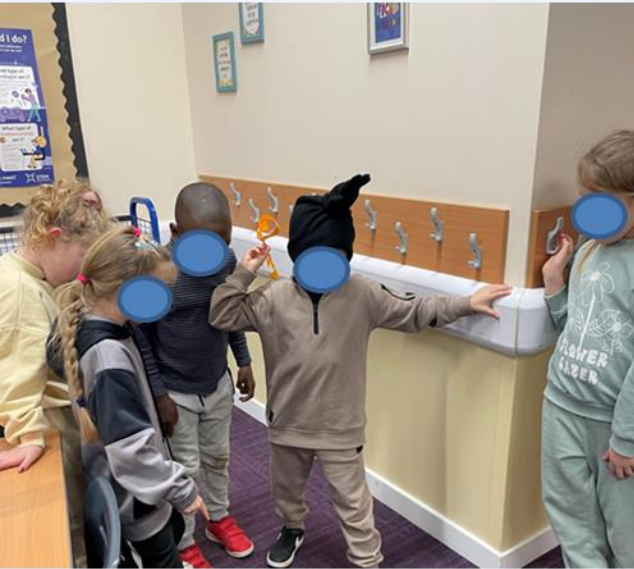
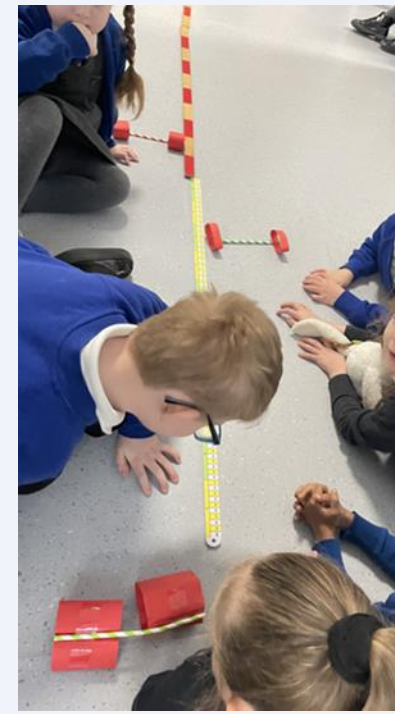




# Whole school investigations

- New example from Scotland
- O wings across the school
- Shows increasingly systematic control of variables

ShU3  
Understand  
progression



Sidlaw View Primary School, Dundee, Scotland



ShU4  
Pupils aware  
of criteria



Taste testing FS St Colmcilles

### EVALUATING

From: talking about what they have done...  
To: drawing conclusions and explaining accuracy



Shades of colour FS Ballyclare

### OBSERVATION

From: describing using senses...  
To: suggesting reasons



Separating colours KS1 Doagh

### QUESTIONING

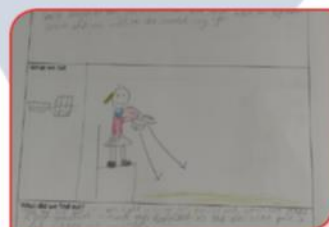
From: being curious...  
To: asking questions which build on ideas



Bottle flipping KS2 Fairview

### COMMUNICATING

From: simple recording...  
To: selecting most appropriate methods for task and audience



Cupcake parachutes KS1 Thompson

### PLANNING

From: talking about what to do...  
To: selecting most appropriate method



Titanic pulleys KS2 Fairview

### DOING

From: using simple methods to compare data...  
To: choosing appropriate techniques and carrying out tests.



Brown apples, Kilonan

### PREDICTING

From: seeing possibilities...  
To: making, testing and evaluating predictions



# Science expectations on display



# New PSTT website

Guidance, Lesson plans, Pupil work examples



**TAPS Scotland**  
Focused assessment of scientific skills

Topic: Forces  
Primary 7  
Age 10-11  
Activity title: O-wing

**Scientific skills focus**  
Carry out: Manages identified control variables to ensure validity of results.

**Curriculum link**  
By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects. SCN 2-07a

**Assessment focus**  
• Can children identify what is changed (independent variable), measured (dependent variable) and kept the same (control variables)?  
• Can children pay attention to the control variables during testing?

**Activity** Today we are aerospace engineers. Make and fly an o-wing: small loop (wing) at front, larger loop at back. Straw between (fuselage). Give children some time to make their own and explore how it flies. Pause to discuss variables e.g. wing size, fuselage size. Identify how to measure if changing one (independent variable) of these would make a difference (dependent variable) e.g. flight time or distance. Small groups to choose 1 change (indep.), 1 measure (dep) and list variables which they need to keep the same (control). A **planning board** could help with this. Observe groups as they carry out their investigation and support as necessary. Discuss which variables are possible to control.

**Adapting the teaching**  
Support: Use planning boards or planning questions.  
Extension: Repeat readings. Consider different numbers of loops or different designs.  
Other ideas: Explore paper planes.  
Linked scientists: Wright brothers, William Froude from Wales, Emma England (current girl)

**Questions to support discussion**  
• What are you changing (independent variable)?  
• What are you measuring (dependent variable)?  
• Which variables do you need to control?  
• Which control variables are hard to keep the same?  
• Did your independent variable make a difference to the dependent variable?

**Benchmark indicators**  
Working towards: Pupils need to be continually reminded to keep their control variables the same.  
Achieved: Pupils can identify the variables when asked. They make a reasonable attempt at controlling the variables when carrying out and recording their results.  
Possible ways to go further: Pupils recognise that some variables are harder/easier to control and/or some variables are more/less important for the outcome.

Teacher box 5 - adapt teaching. See TAPS pyramid for more examples.

**BATH SPA UNIVERSITY**  
Focused Assessment of Science

Topic: Forces  
Year 3  
Age 7-8  
Title: Car track conclusion

**Working Scientifically Focus**  
Review: using results to draw simple conclusions

**Conceptual Knowledge Focus**  
Compare how things move on different surfaces

**Example**  
Children worked in groups to release a car down a ramp and measure the distance it travelled on different surfaces at the bottom. They then individually wrote a short conclusion to explain which surface they thought had the most friction.

**Conclusion 3216**  
With surface still  
friction the most  
The sandpaper had  
the most friction  
because the car  
didn't go as far  
as the smooth  
surface.  
The smooth surface  
friction was less.

Children meeting the objective would be able to relate their results to the properties of the materials or the slowing/stopping caused by the material. For example, above the child relates the car only going 4cm to the 'rough and sticky' properties of sandpaper.

Example from Shaw Primary School, Melksham

**Primary Science Teaching Trust**

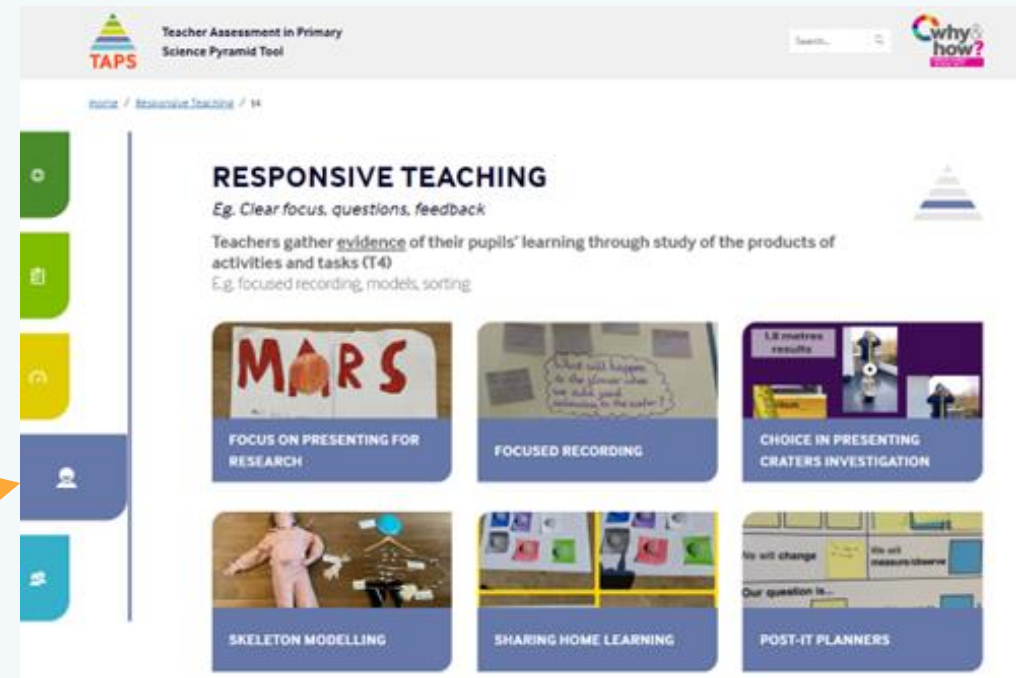
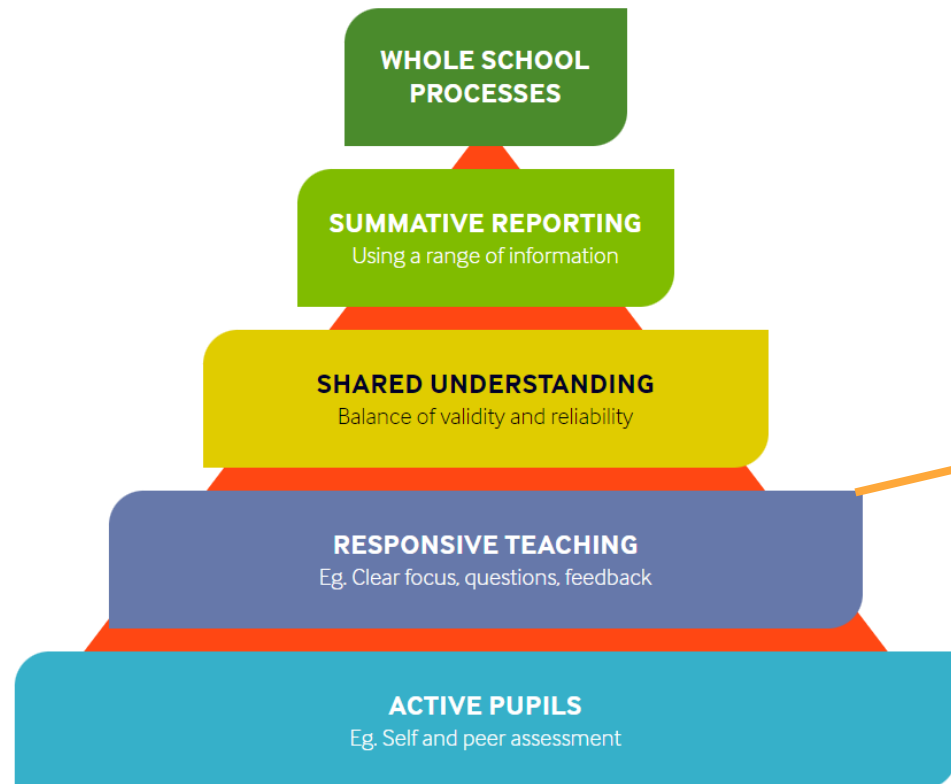
Focused Assessment Plans, Examples and Guidance documents

- All Types of resource
- All Age Ranges
- All Topics
- All Enquiry
- Country / Language

<https://pstt.org.uk/unique-resources/taps/>



Plus pyramid site with examples of practice from across the UK



<https://taps.pstt.org.uk/>

# Any questions?

- To offer new examples:
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