

Teaching Strategies for Science

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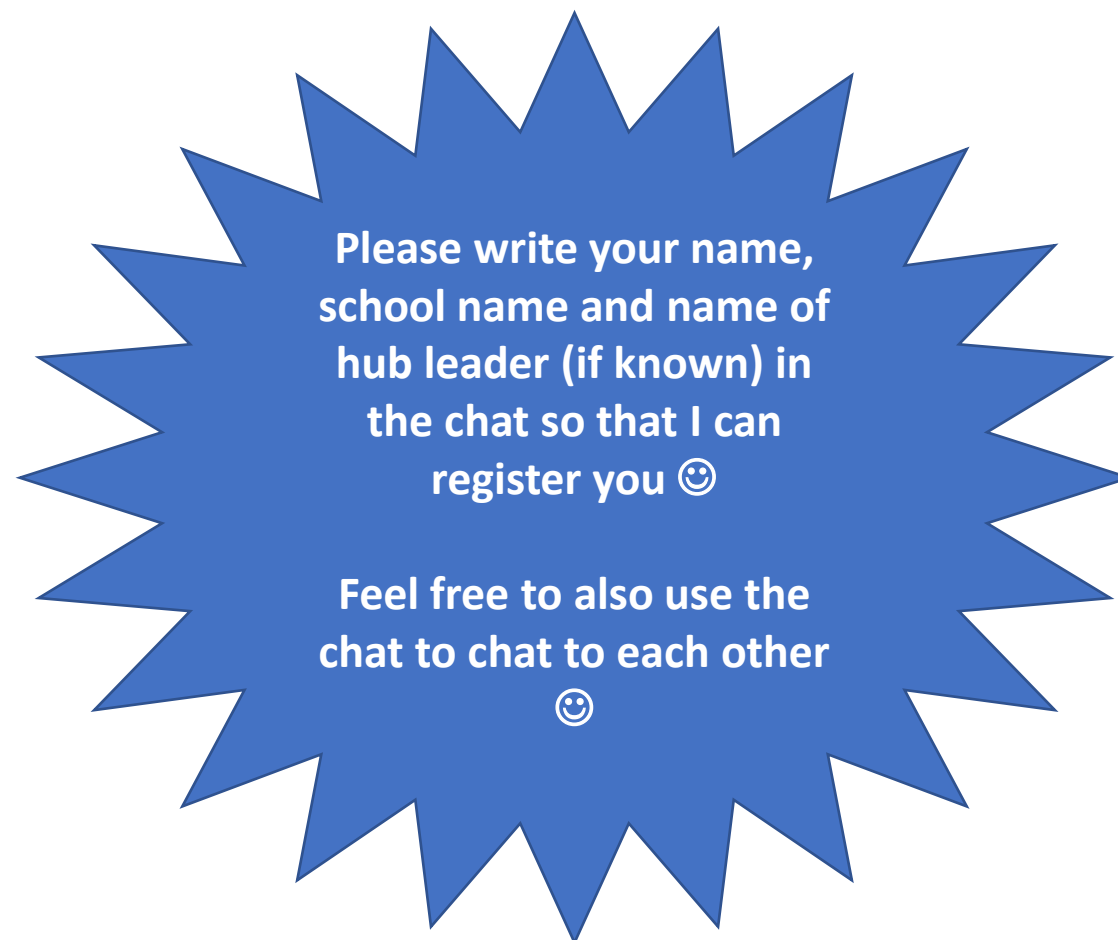
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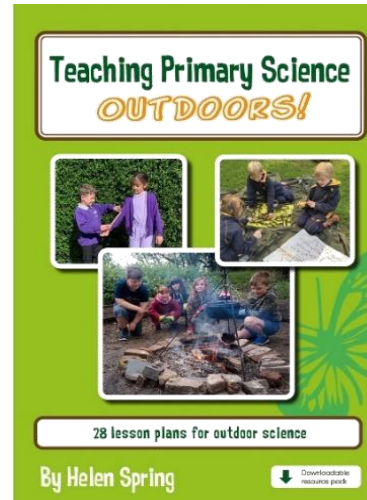
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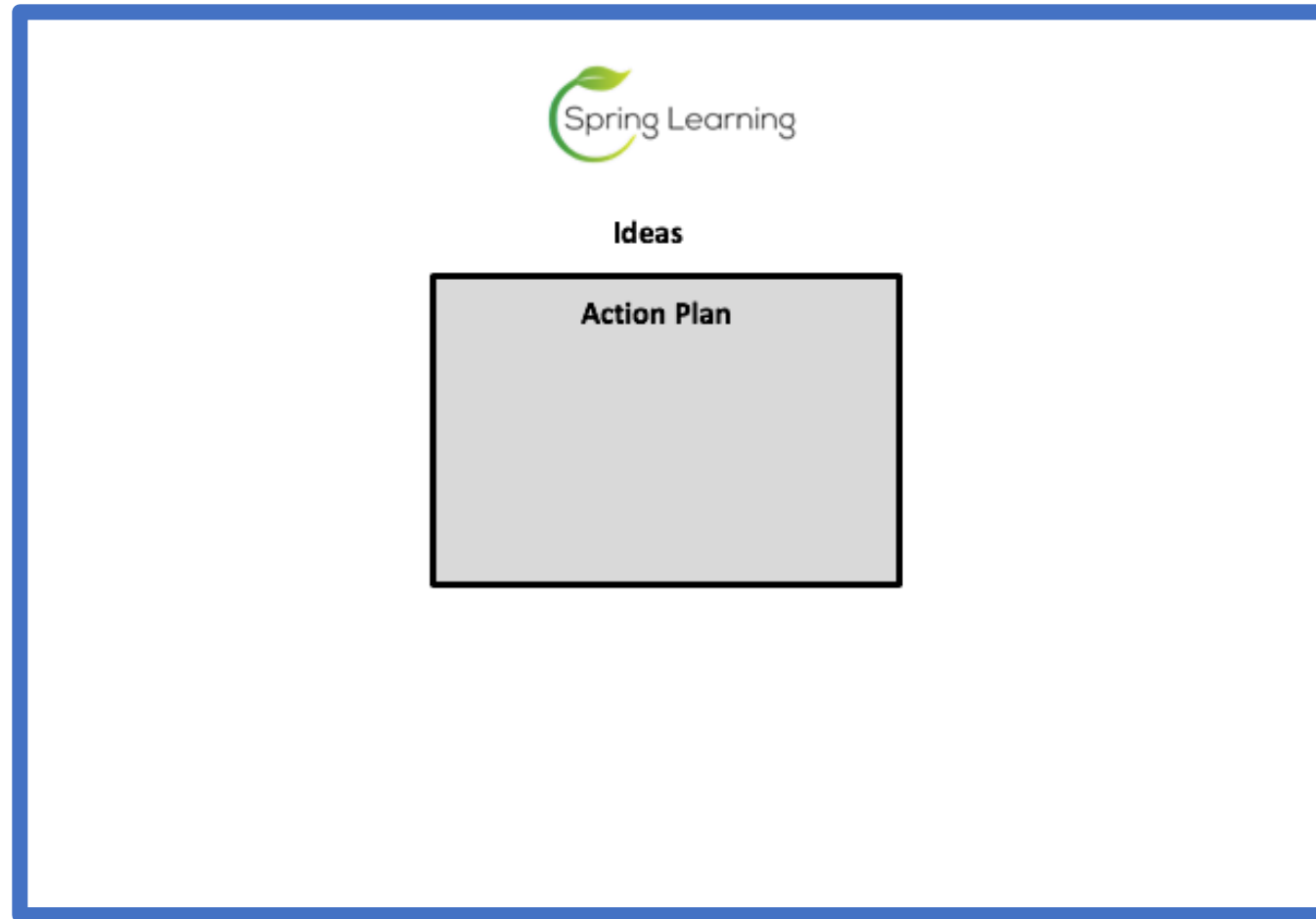


Objectives...

The session aims to:

- Explore a range of teaching and learning strategies to support the teaching of science.
- Explore which strategies support different groups of learners
- Consider how strategies can be developed and evaluated
- Discuss the differences between resources and a strategies

Action planning



Explorify



SCIENCE TEACHING

PSQM Science Teaching Aim

Science teaching is strengthened and developed through:

- A. engagement with professional development;
- B. use of a range of effective teaching and learning strategies;
- C. regular and safe use of up-to-date quality resources.

These aims are expressed through the following PSQM Science Teaching criteria, which define the evidence required to meet them and achieve PSQM, PSQM Gilt and PSQM Outreach.

For Primary Science Quality Mark:

PSQM Science Teaching Criteria

Subject leadership responds to development needs in science teaching:

- A. There is provision and signposting of relevant internal or external professional development and support with which staff engage.
- B. Teachers are supported to use a range of effective strategies for teaching science which challenge and support the learning needs of all children.
- C. Resources are audited annually, well-organised and accessible, so that children can regularly and safely use appropriate practical and digital resources, information texts and the outdoor environment.

For Primary Science Quality Mark Gilt and Outreach:

PSQM GILT and OUTREACH Science Teaching Criteria

Subject leadership responds to development needs in science teaching:

- A. There is provision and signposting of a sustained programme of internal or external professional development and support with which staff engage.
- B. Teachers use and evaluate a developing and extending range of evidence-based strategies to challenge and support the learning needs of all children.
- C. Resources are systematically audited and acquired (purchased or borrowed/sourced from outside agencies) so that children can regularly and safely use a wide range of appropriate practical and digital resources, information texts and the outdoor environment.

SCIENCE LEARNING

PSQM Science Learning Aim

Science learning is strengthened and developed through a shared understanding of:

- A. the purposes and process of science enquiry;
- B. the purposes of science assessment and current best practice;
- C. the importance of, and strategies for, developing all children's science capital.

These aims are expressed through the following PSQM Science Learning criteria, which define the evidence required to meet them and achieve PSQM, PSQM Gilt and PSQM Outreach.

For Primary Science Quality Mark:

PSQM Science Learning Criteria

Subject leadership develops teachers' practice:

- A. Children are taught to use different enquiry types to answer scientific questions about the world around them, through the use of scientific enquiry skills.
- B. A range of strategies and processes for formative, summative and statutory assessment are used, which reflect a shared understanding of the purposes of assessment in science and current best practice.
- C. Initiatives that encourage all children to think that science is relevant and important to their lives, now and in the future, are supported and promoted.

For Primary Science Quality Mark Gilt and Outreach:

PSQM GILT and OUTREACH Science Learning Criteria

Subject leadership develops and evaluates teachers' practice:

- A. Children develop independence in the full range of enquiry types, using scientific enquiry skills appropriately to answer scientific questions about the world around them.
- B. There is a school-wide commitment to continually improving assessment practice and processes for formative, summative and statutory assessment, through regular evaluation which ensures that they reflect the shared understanding of the purposes of assessment in science and current best practice.
- C. The whole-school community supports and promotes initiatives that encourage all children to think that science is relevant and important to their lives, now and in the future.

Strategies and PSQM

B. Teaching and learning strategies

Required tasks

- Collect examples (planning, photographs and children's work) of different teaching and learning strategies teachers use to help children develop scientific understanding. These will be needed to illustrate your principles in your PSQM submission.

Recommended activity

- Start a list of different strategies teachers use in science lesson e.g. Concept Cartoons, drama, role cards, news stories. Use it to foster discussion in a staff meeting, about what works well, when and where. How do teachers describe what they do? Where do they find new ideas? Which strategies support the Principles of Good Science they agreed?
- Encourage teachers to register for Explorify <https://explorify.wellcome.ac.uk> and to try an activity every week. Talk to them about it- what was different about what they did, how did the children respond?
- Use staff meetings to share different strategies:
 - Play a game from Science Enquiry Games, Goldsworthy, A and Ponchaud, B. www.ase.org.uk/bookshop/science-enquiry-games-8-12-year-olds,
 - Provide an object for discussion. Where is the science in it e.g. odd kitchen utensils (vacuvin, zesters, egg slicers etc),
 - Use an Explorify activity.
- Share an approach each half term to be trialled at least once in the half term. What impact was observed?

Recommended PSQM resources (downloadable from the VLE)

PSQM Criterion Activities

- Criterion Activity: T Bi Reflecting on science teaching strategies + cards

PSQM Spotlights

- Developing a range of teaching strategies

PSQM CPD resources for subject leaders

- Practical Science Whilst Socially Distancing - guidance for post lock down
- Explorify workshop summer 2020 – presentation with notes and activities to use in staff meeting.

Modelling

Science often involves pupils learning abstract concepts that might be contrary to what they expect. Teacher effectiveness, underpinned by strong subject knowledge, is therefore particularly important in science. Research highlights the importance of clear teacher explanations that carefully build on what pupils already know. Alongside this, pupils benefit from time to discuss ideas, answer questions and practise using the knowledge.

Teaching models and analogies can be particularly helpful tools in science classrooms. When these models are used alongside clear explanations, they can help pupils to learn connected knowledge. However, all models need to be used with caution because they can lead to misconceptions.

Ofsted, Finding the Optimum, 2023.



Modelling



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'Teaching Primary Science
Outdoors'
by Helen Spring



Job roles during investigations



Health and Safety Manager

© Centre for Industry Education Collaboration



Communications Officer

© Centre for Industry Education Collaboration



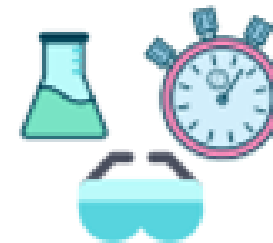
Administration Officer

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Personnel Manager

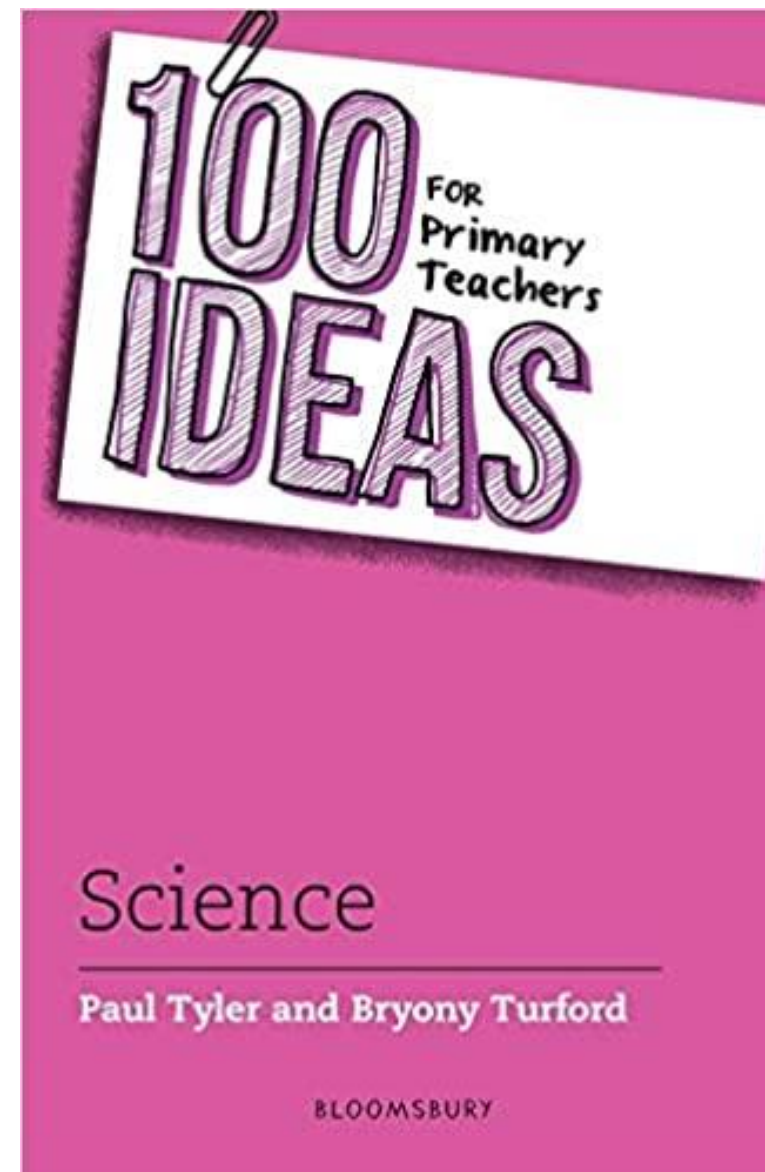
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Teaching Strategies



Finding the Optimum

- Ensure that appropriate teaching and learning approaches are selected for specific content.

Pupils with SEND were generally well supported in science lessons, and were expected to learn the same curriculum as their peers. This often involved adults building up explanations slowly, or giving pupils resources that provided additional scaffolding to meet their specific needs. In a few schools, pupils with SEND received additional support before a lesson, for example through pre-teaching of specific vocabulary. However, occasionally, strategies used to support pupils were not helpful. For example, in one school, some lesson outcomes were not expected to be achieved by all pupils. This was even though the planned lesson outcome was one that was possible for all pupils in the class. This, unintentionally, limited what some pupils with SEND were expected to learn.



Questioning

Why...?

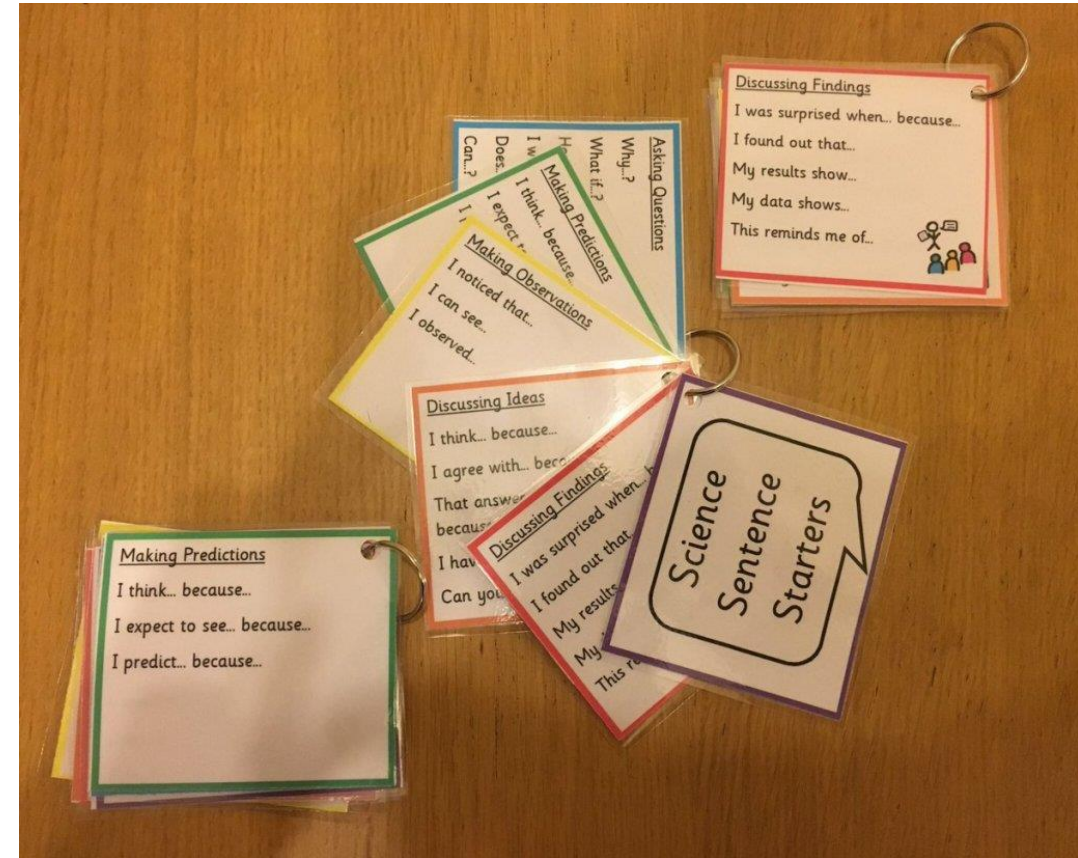
What if...?

How...?

I wonder...

Does...?

Can...?



Active Learning

Active learning takes place when pupils:

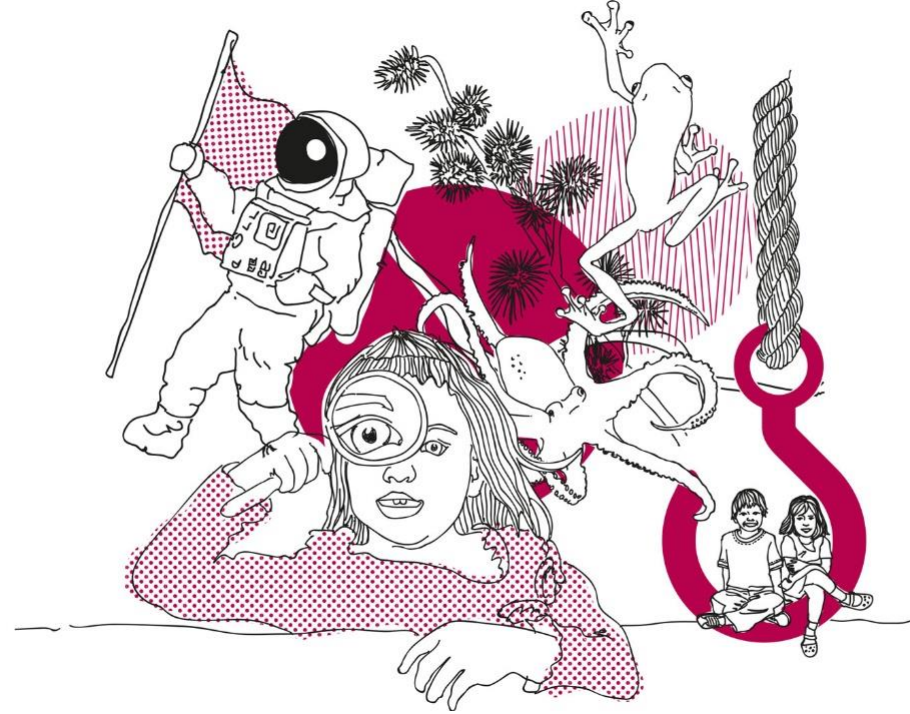
- have personal involvement in their learning
- make decisions about the outcome of their work
- discuss and work purposefully with others using scientific vocabulary
- plan and design their own activities
- test their own ideas to solve problems
- communicate to others
- ask questions that can be investigated and questions that can extend their learning
- think about, reflect on and evaluate what they are doing



Figure 1

An A-Z Guide

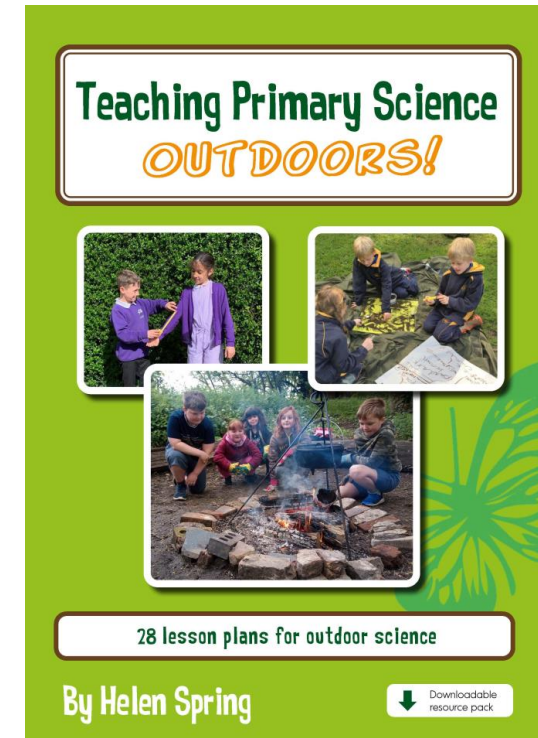
D – Discussion and Debate
F – Frameworks for Thinking
I – Independent Learning
M - Motivation



Outdoor Learning

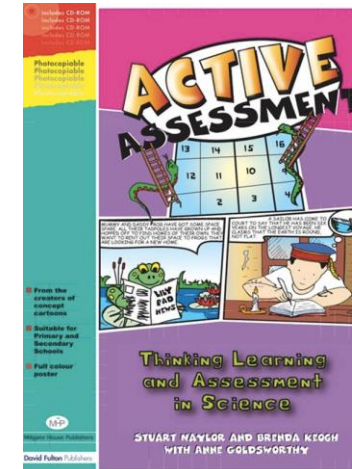


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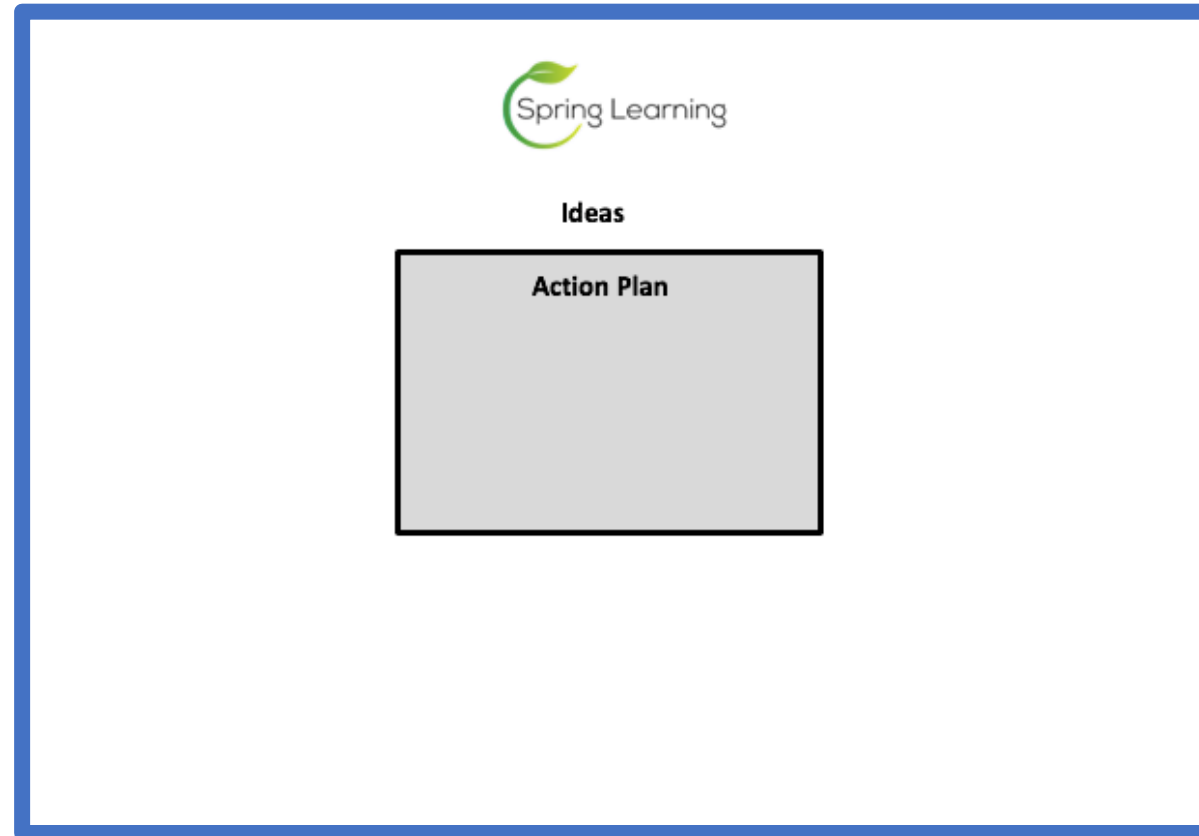


Evaluating Strategies in my school

- Criterion Activity T Bi
- Pocket monitoring T Bi
- T Bi activity - cards



Action planning and evaluations



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