Developing the Role of Science Subject Leader

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Please write your name, school name and name of hub leader in the chat so that I can register you ☺

Please also state how long you have been leading science for.

Thank you

Feel free to also use the chat to chat to each other ☺

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Chartered Science Teacher
CSciTeach

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CPD MARK
LEAD FACILITATOR

CPD MARK
ONLINE FACILITATOR

Science
ACROSS THE CITY

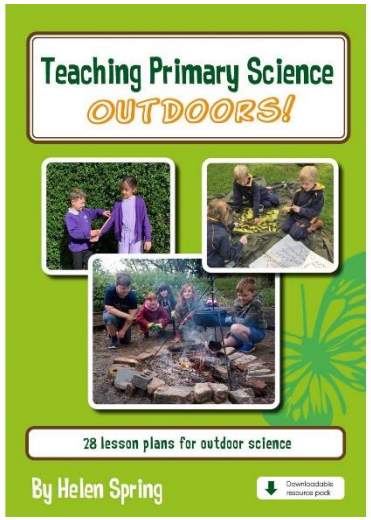
PSQM
Primary Science Quality Mark

HOWSHAM MILL
RENEWABLE HERITAGE TRUST

Explorify
Champion

fascinate

The Association for Science Education
Promoting Excellence in Science Teaching and Learning



POLAR EXPLORER
PROGRAMME

CLEAPSS
primary

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Objectives…

The session aims to:

- Compare and contrast the role of subject leader
- Explore approaches to monitoring science teaching and learning in schools
- Identify ways of developing you in your role as science subject leader
- Explore resources to support the leadership of science

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For Primary Science Quality Mark:

PSQM Science Subject Leadership Criteria

Science is valued and improved through the development of effective processes for subject leadership:

A. There is a clear vision for science, created and implemented by teachers and children, through principles for teaching and learning.

B. Strategic support for subject leadership is provided and includes:
- Focussed CPD for subject leader
- Regular release time
- Resources to facilitate development in science.

C. There is a monitoring cycle, including pupil voice, that informs actions taken and the development of science.

For Primary Science Quality Mark Gilt and Outreach:

PSQM GILT and OUTREACH Science Subject Leadership Criteria

Science is valued and improved through embedded and sustained processes for subject leadership:

A. There is a clear vision for science that is well established and consistently implemented through principles for teaching and learning which are regularly reviewed by the whole school community.

B. There is strategic support for subject leadership which is well established and reciprocal and includes:
- sustained professional learning for subject leader, including engagement with the primary science education community;
- the subject leader(s) contributing to whole school strategic planning;
- allocation of time and resources linked to strategic priorities.

C. There is a rigorous monitoring and improvement cycle using evidence and views from all stakeholders and sources to shape development in science.

PSQM
Primary Science Quality Mark®

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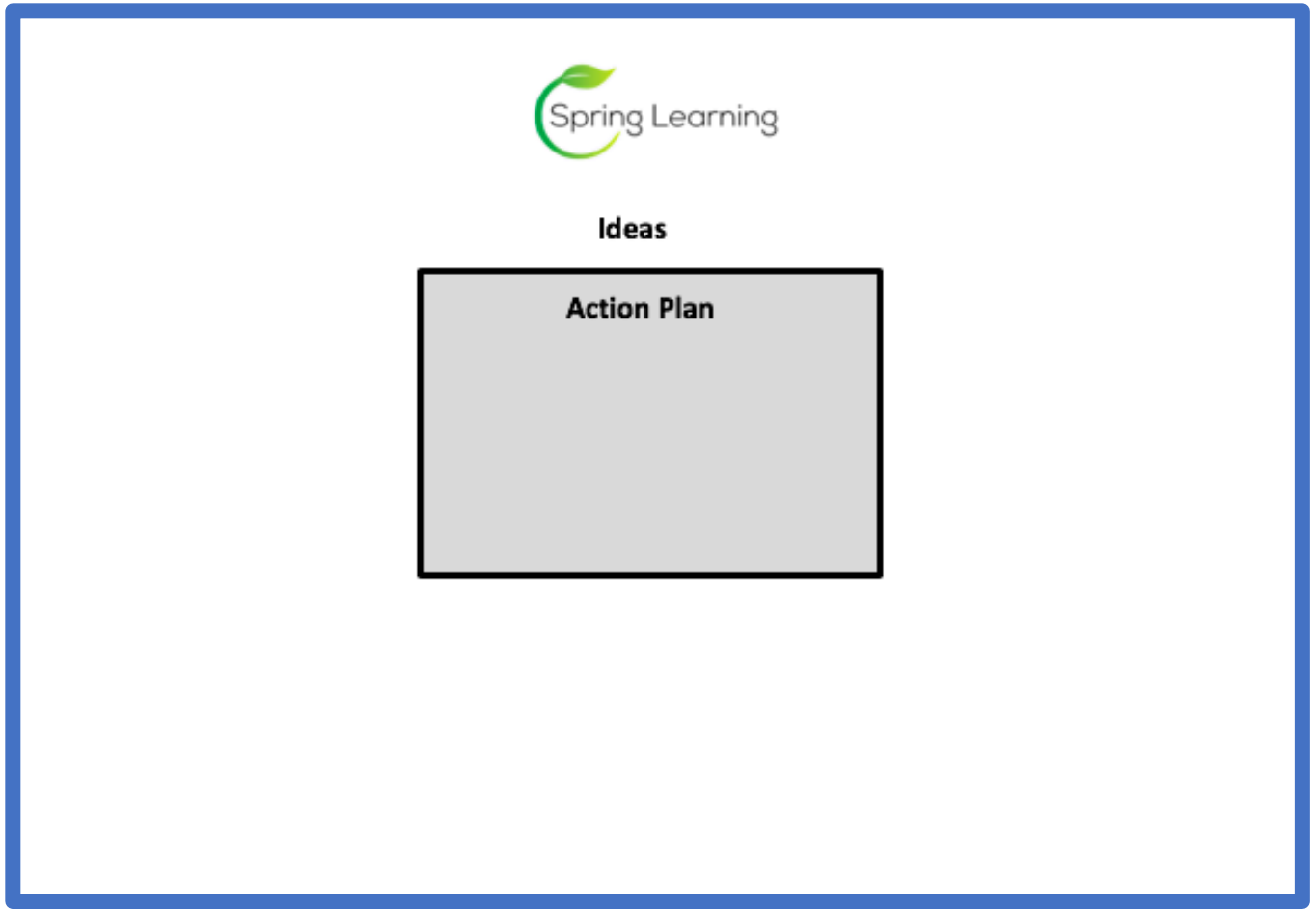
Action planning



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Welcome…

Think about the science teaching and leadership in your school

- **What is going well?**
- **What questions do you have?**
- **What isn't going well and why? Can we help?**

Write your thoughts and questions on post it notes…

padlet

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Support for subject leaders

- Which organisations have supported you in developing as a subject leader? How?

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How do we ensure that the aims of the curriculum are addressed?

Aims

The national curriculum for science aims to ensure that all pupils:

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics
- develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

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5 Types of Enquiry

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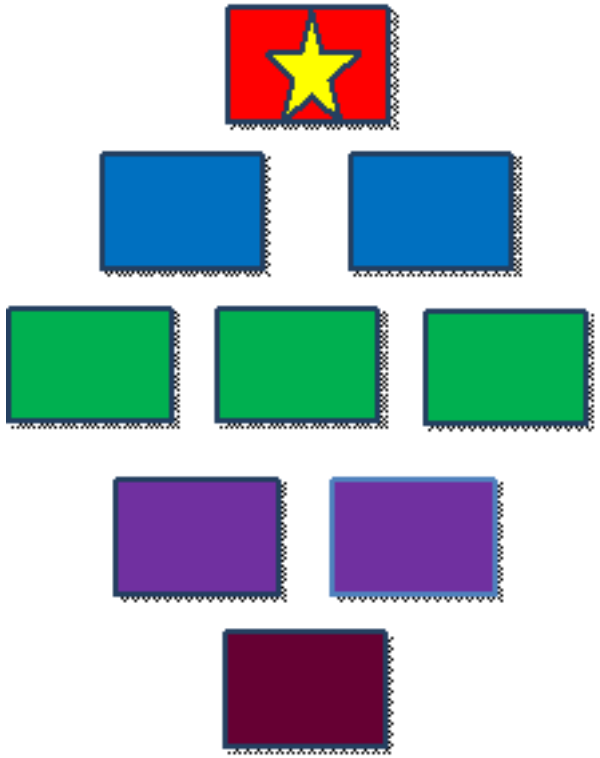
What does a science leader do?



http://www.impactfirst.co.uk/News/tabid/87/ID/24/The-Diamond-9--a-great-tool-for-creating-a-shared-understanding-in-a-team.aspx

Jamboard

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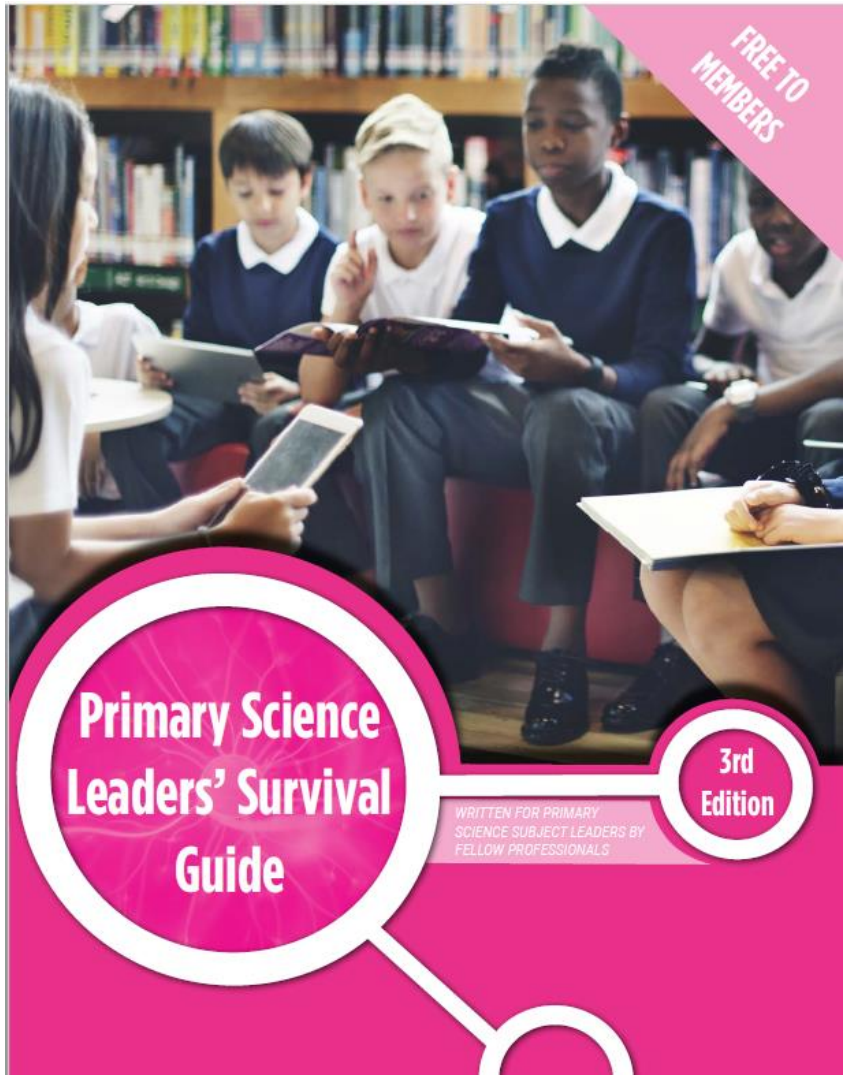
What does a science leader do?



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Monitoring Science Teaching and Learning SLC

SL Ci

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Explore national reports and guidance

- Intention and Substance, Ofsted
- Evaluation of the Primary Science Campaign, Wellcome Trust
- CLEAPSS
- Research Review, Ofsted
  - Ofsted presentation about Research Review

How do we, as science subject leaders, respond to reports and guidance?

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Ofsted Research Review – Science – May 2021

- What does it mean for me and my school?
  - What is it?
  - What is it not?
  - What should I do?
  - What shouldn't I do?

Ofsted

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Contents

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1. Curriculum progression: what it means to get better at science

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Based on the above, high-quality science education may have the following features

- The curriculum is planned to build increasingly sophisticated knowledge of the products (substantive knowledge) and practices (disciplinary knowledge) of science.
- Disciplinary knowledge (identified in the 'working scientifically' sections of the national curriculum) comprises knowledge of concepts as well as procedures.
- When pupils develop their disciplinary knowledge, they learn about the diverse ways that science generates and grows knowledge through scientific enquiry. This is not reduced to a single scientific method or taken to mean just data collection.
- The curriculum outlines how disciplinary knowledge advances over time and teaches pupils about the similarities and differences between each science.
- Pupils are not expected to acquire disciplinary knowledge simply as a by-product of taking part in practical activities. Disciplinary knowledge is taught.
- Scientific processes such as observation, classification or identifying variables are always taught in relation to specific substantive knowledge. They are not seen as generalisable skills.

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2. Organising knowledge within the subject curriculum

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Based on the above, high-quality science education may have the following features

- In the early years, pupils are introduced to a wide-ranging vocabulary that categorises and describes the natural world. These words are not too technical but provide the 'seeds' for developing scientific concepts that will be built on in later years.
- Attainment targets, specification points and the EYFS educational programmes are broken down into their component knowledge.
- Substantive knowledge is sequenced so that pupils build their knowledge of important concepts such as photosynthesis, magnetism and substance throughout their time at school.
- Knowledge is sequenced to make the deep structure of the scientific disciplines explicit. This allows teachers and pupils to see how knowledge is connected.
- Disciplinary knowledge is sequenced to take account of:
  - its hierarchical structure
  - the best substantive contexts in which to teach it.
- Once disciplinary knowledge is introduced, it is used and developed in a range of different substantive contexts.
- Planning for progression takes account of what is taught in other subjects. For example, the science curriculum should be coherent with what is taught in mathematics. Where there are differences, these are made explicit to pupils and teachers.

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3. Other curricular considerations

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Based on the above, high-quality science education may have the following features

- Sufficient curriculum time is allocated for pupils to embed what they have learned in long-term memory through extensive practice before moving on to new content.
- The component knowledge pupils need in order to read, write, represent and talk science is identified and sequenced.
- Curriculum plans consider how component knowledge introduced at one point in time influences future learning. This ensures that knowledge builds incrementally from pupils' prior knowledge and so pupils' misconceptions are less likely.
- The curriculum anticipates where pupils are likely to hold misconceptions. These are explicitly addressed, and pupils learn how the misconception is different to the scientific idea.
- Pupils know when and why models and rules can be used in science, which includes knowing what they can and cannot be used for.

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4. Curriculum materials

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Based on the above, high-quality science education may have the following features

- Online resources match what the curriculum is intending pupils to learn and are not a source of errors/misconceptions.
- If science kits are used, they help achieve the curriculum intent and the activities themselves do not become the curricular goal.
- High-quality textbooks are used as an important resource for learning and teaching science.

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5. Practical work

Based on the above, high-quality science education may have the following features

- The curriculum is sequenced so that pupils have the necessary disciplinary and substantive knowledge to carry out practical work successfully and learn from it.
- The purpose of practical work is clear in relation to curriculum content so that practical activities can be set up and managed to develop pupils' disciplinary and/or substantive knowledge.
- Practical activities form part of a wider instructional sequence that gives pupils time to connect theory to observation.
- Pupils are not expected to learn disciplinary knowledge only through taking part in practical work – disciplinary knowledge should be taught using the most effective methods.
- Pupils encounter the full range of objects and phenomena they are studying through both laboratory and fieldwork. These encounters should take pupils beyond their everyday experiences to develop a sense of wonder and curiosity about the material world.

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6. Pedagogy: teaching the curriculum

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Based on the above, high-quality science education may have the following features

- Activities are carefully chosen so that they match specific curriculum intent.
- Teachers use systematic teaching approaches, where learning is scaffolded using carefully sequenced explanations, models, analogies and other representations to help pupils to acquire, organise and remember scientific knowledge.
- Teaching takes account of the limited working-memory capacity of their pupils when planning lessons.
- Pupils are not expected to arrive at scientific explanations by themselves without sufficient prior knowledge.
- Systematic approaches, alongside carefully selected texts, are used to teach the most important vocabulary in science.
- Pupils have regular opportunities in the early years and primary classrooms to learn vocabulary through story and non-fiction books, rhymes, songs and oral rehearsal.

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7. Assessment

Based on the above, high-quality science education may have the following features

- Teachers and pupils are clear on the purpose of assessment. There is clarity about what is being assessed.
- Assessment is not overly burdensome on teachers' time in relation to marking, recording or feedback.
- Feedback is focused on the science content and not on generic features. Teachers have sufficient subject knowledge to be able to do this.
- Pupils regularly retrieve knowledge from memory to help them remember and organise their knowledge. This is coupled with feedback. Teachers think carefully about what pupils are being asked to retrieve and whether this prioritises the most important content.
- Overuse of external assessment items, such as GCSE or A-level questions, is avoided because this narrows the curriculum and leads to superficial progress that does not prepare pupils for further study.
- Systems are in place to support teachers to make accurate decisions when assessing pupils' work. This includes supporting primary teachers with statutory teacher assessment of science at key stages 1 and 2.

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8. Systems at subject and school level

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Based on the above, high-quality science education may have the following features

- Teachers, teaching assistants and technicians have access to high-quality subject-specific CPD to develop subject knowledge and pedagogical content knowledge. This is aligned to the curriculum.
- In primary schools, there is at least one teacher who specialises in teaching science and science leaders have dedicated leadership time.
- Science teachers engage with subject associations, and take responsibility, with support from the school, for developing their own subject knowledge throughout their career.
- Early-stage teachers in particular have timetables that allow them to develop expertise in one science and that do not give them too many key stages to teach.
- Timetables allocate appropriate teaching time to science, reflecting its status as a core subject in the national curriculum. There are particular concerns that pupils in some primary schools are not receiving sufficient curriculum time to learn science.
- Pupils have access to sufficient practical resources to take part in demanding practical work, either independently or in appropriately sized groups that enable first-hand experiences.

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Other key docs to read:

Primary Science Education Consultancy → Ofsted →

Just good stuff →

→

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Ofsted and Deep Dives

Intent Implementation Impact

A deep dive involves gathering evidence on the curriculum intent, implementation and impact over a sample of subjects, topics or aspects. This is done in collaboration with leaders, teachers and pupils. The intent of the deep dive is to seek to interrogate and establish a coherent evidence base on quality of education.

What is included?

- Discussions with senior leaders
- Discussions with pupils
- Discussions with teachers
- Scrutiny of pupils' work
- Discussions with curriculum leaders
- Visits to a connected sample of lessons

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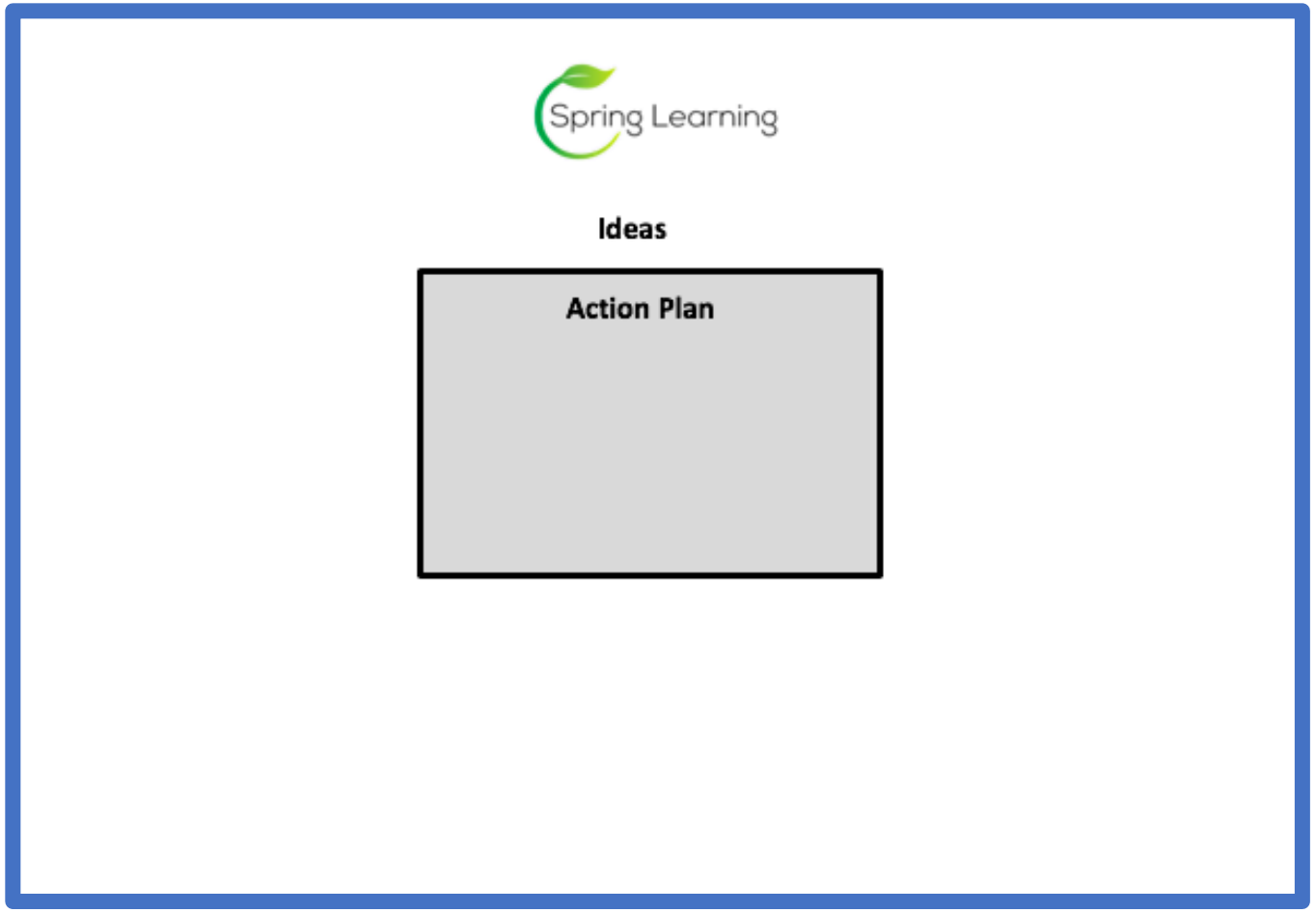
Action planning and evaluations



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