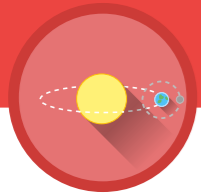


1

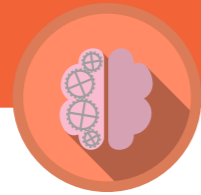
**Preconceptions: Build on the ideas that pupils bring to lessons**



- 1a: Understand the preconceptions that pupils bring to science lessons
- 1b: Develop pupils' thinking through cognitive conflict and discussion
- 1c: Allow enough time to challenge misconceptions and change thinking

2

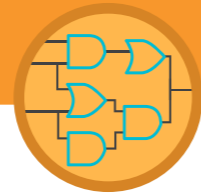
**Self-regulation: Help pupils direct their own learning**



- 2a: Explicitly teach pupils how to plan, monitor, and evaluate their learning
- 2b: Model your own thinking to help pupils develop their metacognitive and cognitive knowledge
- 2c: Promote metacognitive talk and dialogue in the classroom

3

**Modelling: Use models to support understanding**



- 3a: Use models to help pupils develop a deeper understanding of scientific concepts
- 3b: Select the models you use with care
- 3c: Explicitly teach pupils about models and encourage pupils to critique them

4

**Memory: Support pupils to retain and retrieve knowledge**



- 4a: Pay attention to cognitive load—structure tasks to limit the amount of new information pupils need to process
- 4b: Revisit knowledge after a gap to help pupils retain it in their long-term memory
- 4c: Provide opportunities for pupils to retrieve the knowledge that they have previously learnt
- 4d: Encourage pupils to elaborate on what they have learnt

5

**Practical Work: Use practical work purposefully and as part of a learning sequence**



- 5a: Know the purpose of each practical activity
- 5b: Sequence practical activities with other learning
- 5c: Use practical work to develop scientific reasoning
- 5d: Use a variety of approaches to practical science

6

**Language of Science: Develop scientific vocabulary and support pupils to read and write about science**



- 6a: Carefully select the vocabulary to teach and focus on the most tricky words
- 6b: Show the links between words and their composite parts
- 6c: Use activities to engage pupils with reading scientific text and help them to comprehend it
- 6d: Support pupils to develop their scientific writing skills

7

**Feedback: Use structured feedback to move on pupils' thinking**



- 7a: Find out what your pupils understand
- 7b: Think about what you're providing feedback on
- 7c: Provide feedback as comments rather than marks
- 7d: Make sure pupils can respond to your feedback