01 / THE TEACHING QUESTION

Teaching Science Through Concepts

Make the connections visible. Hear the reasoning. Choose the next lesson.

A pupil writes condensation correctly. Asked where the droplets outside a cold bottle came from, they say, "Inside the bottle." The process name is right; the explanation needs another look. This fictional response is a useful starting point for teaching concepts.

Use this guide with Singapore Primary 3-6 Science topics at the level and point in the year your class is studying. It combines a worked example, labelled maps, discussion prompts and a printable pupil task. Teachers and parents can adapt the questions; the teacher remains responsible for the lesson and interpretation.

Before choosing an activity

• Write your own explanation in two or three sentences. Which ideas must connect?

• Separate the observation from the explanation. Seeing droplets is not the same as proving their source.

• Choose one question that reveals reasoning. A correct keyword, drawing and explanation give different evidence.

• Decide how to check the idea again in a fresh context. Copying a model answer is not an independent check.

Facts, vocabulary and practical enquiry belong together

Teaching through concepts does not mean leaving out facts. Learners need accurate knowledge to build explanations, and opportunities to observe, investigate and consider evidence. A concept map helps make relationships explicit; it is a prompt for discussion, not a diagnosis or a guarantee of learning.

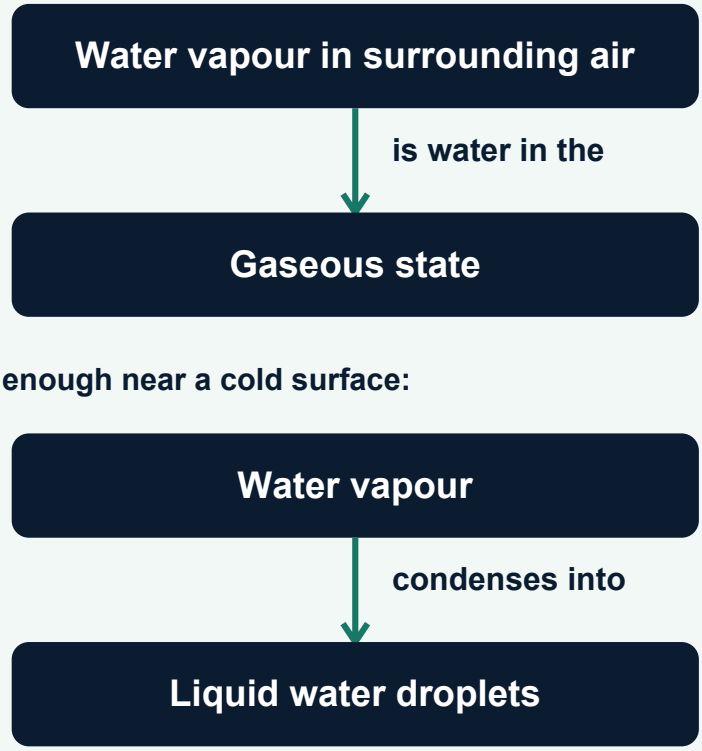
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Teaching Science Through Concepts on YouTube
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02 / A MAP THAT EXPLAINS

Read the arrows aloud

Read each link as a statement



Each link must make a meaningful statement

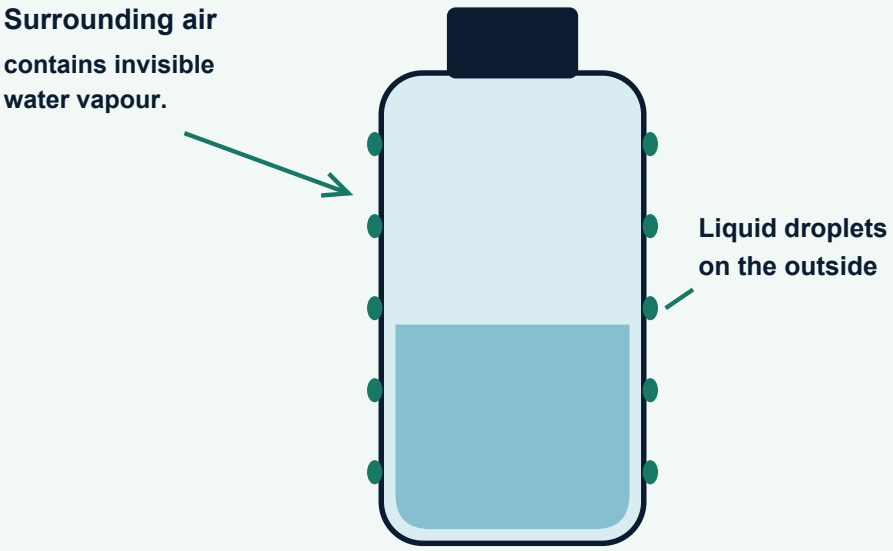
Read "water vapour is water in the gaseous state" and "water vapour condenses into liquid water droplets". The condition matters: sufficient cooling near the cold surface. Water vapour is invisible; the visible droplets are liquid.

Ask pupils: Which part tells us the source? Which words tell us what changed? Where is the cooling condition? Could you explain the same links without copying the map?

03 / OBSERVE AND EXPLAIN

The cold-bottle example

Where did the droplets come from?



Cooling near the surface allows condensation.

No water passes through the intact bottle wall. Schematic, not to scale.

Try it

Place a sealed, intact bottle of cold water, with a dry exterior, on a tray in humid room air. Observe as droplets develop. Keep water away from electrical equipment. Visible condensation depends on the surface being cold enough and sufficient water vapour in the air.

Explain it

The air supplies invisible water vapour. Near the cold surface, it cools. When cooled enough, some changes from gas to liquid water, forming droplets outside the bottle. The water has not passed through the intact wall. Discuss how you could distinguish this explanation from a leak; a photograph alone cannot establish the source.

04 / AFTER MARKING

Choose the missing connection

A. The source is unclear

Fictional response: "Condensation. The water came through the bottle."

Clarify: "Show me where the water started and the path you think it took."

Possible follow-up: Check whether the pupil means a leak or is using imprecise wording. Revisit the sealed bottle, surrounding air and external droplets.

B. The condition is omitted

Fictional response: "Water vapour in the air became droplets."

Clarify: "Why did droplets form near this surface? What was different about it?"

Possible follow-up: Acknowledge the correct source. Discuss cooling and ask the pupil to connect it to the change of state.

C. The explanation connects

Fictional response: "Water vapour in the air cooled near the cold surface and condensed into droplets."

Clarify: "Would the same explanation work for a cold spoon? Why?"

Possible follow-up: Acknowledge the linked explanation, then check independent application to a fresh context.

Ask before deciding

A short answer may omit a step, reflect difficulty expressing an idea, or show a misunderstanding. Use conversation or a drawing alongside written work. Record strengths as well as gaps. One answer does not establish a fixed misconception or secure mastery.

Teacher discussion key

The source is water vapour in the surrounding air. Cooling near the sufficiently cold surface allows condensation into liquid droplets. The spoon is a new object but the relevant source, condition and change remain. Invite more than a copied sentence: ask pupils to explain one arrow and compare the bottle and spoon.

05 / COPY FOR PUPILS

A fresh object. Your explanation.

Name or class code: _____ Date: _____

A cold metal spoon taken from the fridge develops droplets in humid air. Where did this water come from? Draw and explain your idea. Label the arrows so the links can be read as sentences.

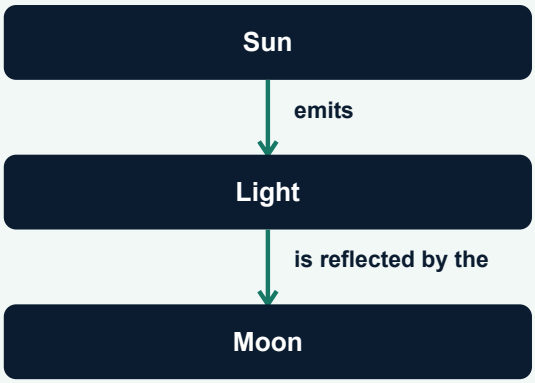
DRAW YOUR CONCEPT MAP

1. Before the droplets appeared, the water was _____
2. Near the cold spoon, _____
3. The change of state was _____
4. One part I can explain is _____
5. One question I still have is _____

06 / DEPARTMENT DISCUSSION

Use the map. Test the connection.

A second map: seeing the Moon



Some reflected light reaches our eyes.

The Moon does not make its own visible light.

Ask: which arrow explains why we can see it?

A 15-minute department conversation

Choose one topic already in the teaching plan. Write an agreed explanation. Compare two fictional or appropriately anonymised responses, identifying both strengths and the question to ask next. Agree one focused follow-up and a fresh check. Decide what evidence would change your first interpretation. This is a suggested discussion structure, not an evaluated intervention.

Sources and sharing

MOE Singapore: primary curriculum and syllabuses

USGS: Condensation and the Water Cycle

NOAA: Sweatin to the Coldies

IHMC: Concept-map propositions

NASA: Moonlight

MyScienceHOD editorial resource, 23 October 2026. Original teaching schematics and fictional responses. Independent platform, not MOE-endorsed. Share this complete guide with colleagues, retaining the branding and source links. Select examples appropriate to your class. No learning outcome is guaranteed.