



Teaching Through Questions

How better questions can deepen thinking, reveal misconceptions, and improve learning

Prakhar

Questions are not just tools to check learning.

They are tools to cause learning.

Pause and reflect

Think of the last 10 questions you asked in class.

Which of these did they mostly do?

In many classrooms, questions are used to:

- Check answers
- Keep students engaged
- Control behaviour
- Finish the lesson

OR

In stronger classrooms, questions are used to:

- Reveal misconceptions
- Make students think deeply
- Help students explain ideas
- Guide your next teaching step

Your questions reveal your pedagogy.

The landscape of questioning

395

questions asked per teacher per day

Stevens, 1912 — replicated every decade since

~80%

of those questions require recall only

Cotton 1988; Wragg & Brown 2001

0.9 sec

average wait time before re-prompting

Mary Budd Rowe, 1986 — 900+ recordings

1

student question per week in a traditional classroom

Graesser & Person, 1994

25%

of students answer 75% of all questions

Sadker & Sadker, 1994

d=0.82

**effect size for classroom discussion — top
15 of 252 influences**

Hattie, Visible Learning 2023

sec

Why This Matters Now

Classrooms are full of questions. But questions alone do not guarantee thinking. Three realities shape why this matters more than ever.

Reality 1

Classrooms are full of questions – but not always full of thinking. Activity is not the same as cognitive engagement.

Reality 2

In the age of AI, recall matters less than reasoning, explanation, and judgement. Machines can retrieve. Only minds can interpret.

Reality 3

Curriculum goals increasingly value application, interpretation, and transfer – not mere reproduction of information.

The real question is not whether we ask questions. It is whether our questions build minds.



The IRE Pattern: The Default Trap in Every Indian Classroom

I — Initiate	R — Respond	E — Evaluate	What's Lost
<i>"Photosynthesis happens in which part of the plant?"</i>	<i>"The leaves, ma'am."</i>	<i>"Good. Now, what is chlorophyll?"</i>	Extended thinking. Reasoning. Student voice. Curiosity. Surprise.

Hugh Mehan (1979) described the dominant pattern of classroom discourse as IRE
Initiate, Respond, Evaluate
Every teacher uses it. But overusing it kills independent thinking.

Five Common Questioning Traps

Most teachers ask hundreds of questions each day. Yet many of those questions quietly undermine the thinking they are meant to generate. Recognising these traps is the first step to escaping them.

The Attendance Check

Questions used to confirm presence, not probe understanding. Every hand goes up. No thinking happens.

Guessing the Teacher's Mind

Students search for the "right-sounding" answer rather than reasoning through the problem honestly.

The Same Few Voices

Three or four confident students answer every question. The rest are passengers.

No Wait Time

Questions answered in under one second reward speed, not thought. Slower, richer reasoning is never invited.

Answer Ends Discussion

The first correct answer closes the conversation. The opportunity for deeper thinking is abandoned.

A weak question often fails not on paper, but in how it is handled.

The Questioning Engine

Effective questioning is not a single act. It is a three-part process. Each gear serves a distinct purpose — and a strong question moves through all three.



⚙️ Gear 1: Diagnose

Surface what students already think — including misconceptions. A question before teaching is as powerful as one after it.

⚙️ Gear 2: Generate

Design questions that cause mental work — connecting, comparing, explaining, predicting. The work is the learning.

⚙️ Gear 3: Deepen

Use the first answer as a starting point, not a finish line. Probe, press, and invite others in.

A strong question moves through all three gears.

Gear 1 – Diagnose: The Hinge Question

A hinge question is a precisely designed mid-lesson question that reveals whether students are ready to move forward – or whether teaching needs to change direction. It is not a mini-test. It is a steering wheel.

What makes a hinge question work?

- It targets the concept the entire lesson turns on
- Each wrong option represents a real misconception – not a random distractor
- It can be answered and analysed in under two minutes
- The teacher has a clear response plan for each answer pattern

Used well, hinge questions make invisible thinking visible – giving teachers real-time data about what students actually understand.

Hinge Question Planning Card

Concept the lesson hinges on: _____

Misconception to detect: _____

Question: _____

Options A / B / C / D: _____

If many choose B or C, I will: _____

If most choose A, I will: _____

Q Which of the following is a triangle?

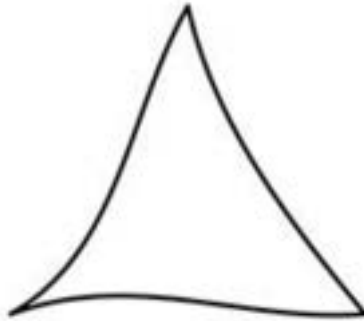
25



Shape 1



Shape 2



Shape 3

- A** only Shape 1
- B** only Shape 2
- C** only Shape 3
- D** all - Shapes 1, 2 and 3

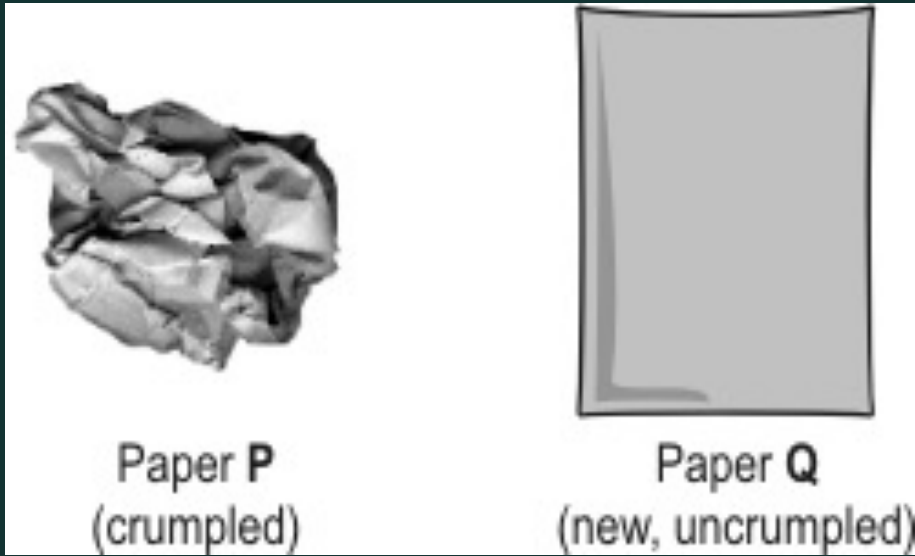
School Performance

Papercode	Qno	Option A	Option B	Option C	Option D	No. of Students
23124	25	18 %	6 %	51 %	17 %	142

National Performance

Papercode	Qno	Option A	Option B	Option C	Option D	No. of Students
23124	25	33 %	5 %	38 %	17 %	8522

Anupam takes papers P and Q, which are exactly the same. He crumples P as shown in the figure.



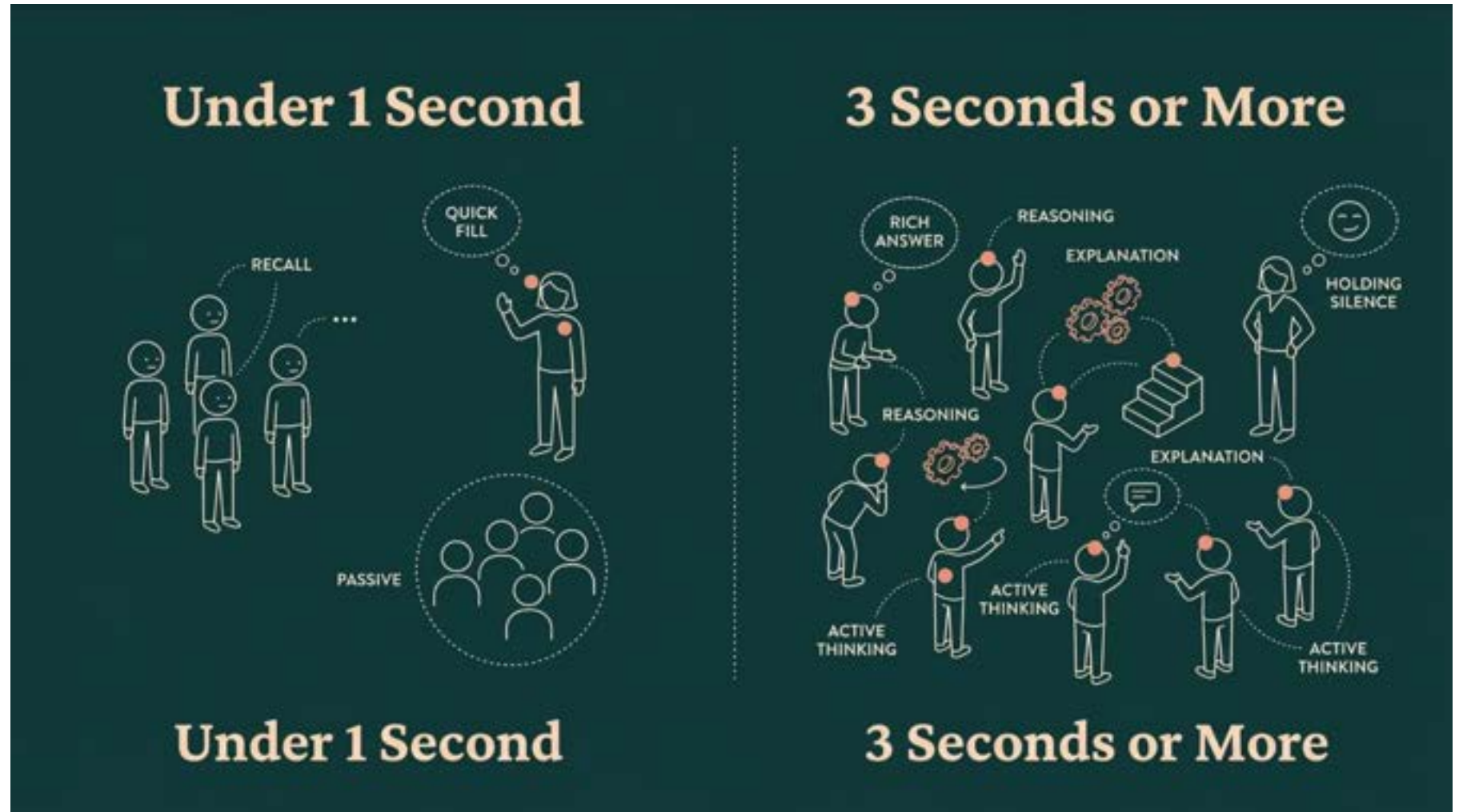
Which of the following statements about P and Q is true?

- A. P has more weight than Q. **(44.4%)**
- B. Q has more weight than P. **(9.5%)**
- C. P and Q have equal weight. **(27.8%)**
- D. P and Q have no weight. **(16.4%)**



(6189 class 5 students attempted the question)

If You Want Better Thinking, Change the Pause



1s

Average teacher wait time

Most teachers wait under one second before prompting or moving on.

3-5s

Recommended wait time

Even three seconds produces measurably richer student responses.

38%

Increase in response length

Longer wait time is associated with longer, more reasoned student answers.

Better silence often produces better answers.



Q Look at the image of the two doors given below.

5



Who will benefit the MOST from the symbols depicted on the doors?

- A** Polly, who can read but not speak.
- B** Asim, who hasn't learnt the English language.
- C** Meghana, who uses braille script to communicate.
- D** Harpreet, who has a broken foot and is in a wheelchair.

Alignment with the curricular vision and objectives

National Performance

Papercode	Qno	Option A	Option B	Option C	Option D	No. of Students
46123	5	45 %	31 %	13 %	10 %	5291

Appreciation of linguistic diversity: Given the wide range of languages and the richness of their cultures in India, students must be taught to understand and appreciate diversity in linguistic cultures and identities through samples of various kinds of literature from languages across the subcontinent.

NCF 2023

C-4.1 Explains and upholds the cultural diversity of India by recognizing various political ideologies, dialects, languages, traditional practices, religious ideas, trade, and commerce, Indian ayurveda, yoga, etc.

Curricular goals and competencies- Social Science NCF 2023

David has mixed up pictures that he collected for different assignments at school.

Which of the following pictures belongs to the project on diversity of India?



A



B



C



D

- A
- B
- C
- D

Option	Option	Percent Correct
<input checked="" type="radio"/> A	A	13.6%
<input type="radio"/> B	B	70.9%
<input type="radio"/> C	C	6.6%
<input type="radio"/> D	D	7.8%
Invalid		0.3%
Blank		0.8%
No. of Students Attempted		2922

Q **Which sentence uses the capital letters, full stop, and apostrophe (') correctly?**
23

- A** Lets ask Amits Uncle He will show us the correct direction.
- B** Let's ask Amit's Uncle, He will show us the correct direction.
- C** Let's ask Amit's uncle. He will show us the correct direction.
- D** Lets' ask Amits' uncle, he will show us the correct direction.

School Performance

Papercode	Qno	Option A	Option B	Option C	Option D	No. of Students
13223	23	9 %	34 %	38 %	15 %	176

National Performance

Papercode	Qno	Option A	Option B	Option C	Option D	No. of Students
13223	23	8 %	31 %	39 %	17 %	7125

What can you infer about Rohan's situation that morning?

Passage:

The Same Morning

Rohan slipped into the classroom just as the second problem was being written on the board.

He paused near the door, scanning the room, then walked quickly to his seat without looking at the teacher.

His notebook was still inside his bag.

When he finally opened it, the first page was blank, except for the date.

The student next to him leaned over and whispered, "Again?"

Rohan did not respond.

Gear 2 – Generate: The 4C Cognitive Work Ladder

Not all questions demand the same mental effort. The 4C Ladder helps teachers deliberately design questions that climb from simple retrieval towards genuine thinking. Most classrooms stop at the first rung.



Call Back – Retrieve

Ask students to recall what was taught. Essential as a foundation, but insufficient on its own. *Example: What is photosynthesis?*



Clarify – Explain Why or How

Ask students to explain mechanisms, causes, or reasoning – not just name them. *Example: Why does photosynthesis slow in dim light?*



Connect – Link Ideas

Ask students to draw relationships between concepts, lessons, or subjects. *Example: How does photosynthesis connect to the food chain?*



Challenge – Apply, Compare, Defend, Predict

Ask students to use knowledge in new situations or defend a position with evidence. *Example: Which factor most limits photosynthesis in a city?*

Many classrooms stop at Call Back. Better questioning deliberately climbs the ladder.

Separation of substances

Textbook questions

Fill in the blanks with appropriate words:

- (i) Small pieces of stone can be removed from rice by _____.
- (ii) _____ are obtained from stalks by threshing.
- (iii) Husk from wheat flour is generally removed by _____.
- (iv) The process of settling of heavier particles is called _____.
- (iv) Filtration is helpful in separating an insoluble _____ from a _____.

State whether the following statements are **true** or **false**.

- (a) A mixture of oil and water can be separated by filtration.
- (b) Water can be separated from salt by evaporation.
- (c) A mixture of wheat grains and wheat flour can be separated by sieving.
- (d) A mixture of iron filings and rice flour can be separated by magnet.
- (e) A mixture of wheat grains and rice flakes can be separated by winnowing.

7 A sieve has holes of size 1 sq mm.



Which of the following can be separated using this sieve?

A rice powder and dal

B lemon juice and water

C sugar from sugar solution

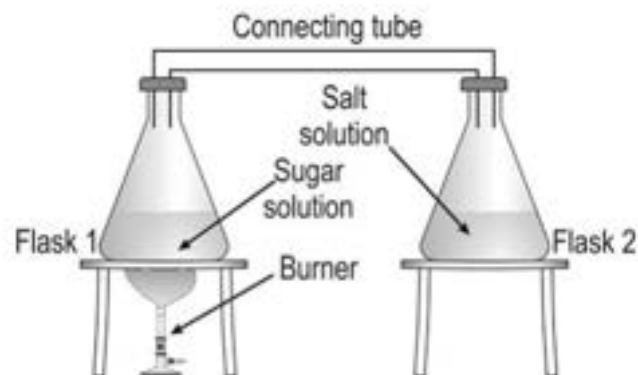
D wheat flour and turmeric powder

Mentor Feedback

I chose this answer because:

Q Keertana takes a spoonful of sugar and dissolves it in pure water in flask 1. Next she prepares a salt solution in flask 2. She tastes a spoon of the contents of flask 2.

She connects flask 1 to flask 2 by a tube and begins heating flask 1. She allows the vapours coming from flask 1 to condense into the contents of flask 2.



After several minutes she tastes a spoon of the contents of flask 2.

She will get _____.

- A** a less salty taste
- B** a less sweet taste
- C** a mix of salty and sweet taste
- D** no taste at all, like pure water

Upgrade the Textbook Question

Teachers do not always need new content. They often need a better question. The table below shows how a simple upgrade transforms what students are asked to do mentally.

Original Question	Upgrade Type	Better Question
What is evaporation?	Clarify	Why does evaporation happen faster in some conditions? What does this tell us about the particles involved?
What is the formula for area?	Connect	When would area matter more than perimeter in a real-life decision? Can you give an example from daily life?
What happened in the 1857 Revolt?	Challenge	Which cause mattered most in sparking the revolt – and why? Would you argue differently if you were a British historian?
What is the theme of the poem?	Clarify	Which word or image most clearly reveals the theme? How does your chosen word support this reading?

 Use it in your lesson planning to upgrade one question per lesson – and watch the quality of student thinking shift.

Gear 3 – Deepen: The APPPB Follow-Up Sequence

Acknowledge

Receive contribution and confirm you heard it.

Pause

Give 3–5 seconds of silence for thinking.

Probe

Ask why or how to push explanation.

Press

Request evidence; do not accept assertion alone.

Each move is deliberate. Together, they transform a single student's response into a whole-class thinking episode.

Discussion Moves Cue Card

Keep this card on your desk or in your lesson folder. These seven prompts cover the most important moves in a questioning conversation — from probing a single student to bouncing ideas across the room.

1

What makes you say that?

Pushes for reasoning behind the answer. Moves beyond assertion into evidence and logic.

2

Can you show the evidence?

Grounds the discussion in text, data, or reasoning. Prevents unsupported claims from settling as fact.

3

Who agrees — and why?

Builds consensus carefully. Forces students to evaluate rather than simply echo.

4

Who sees it differently?

Opens productive disagreement. Signals that multiple views are valid and worth examining.

5

Which answer is tempting but wrong?

Targets misconceptions directly. Trains students to identify and resist plausible errors.

6

Can you say that in another way?

Develops precision and fluency. Reveals the depth of a student's understanding through reformulation.

7

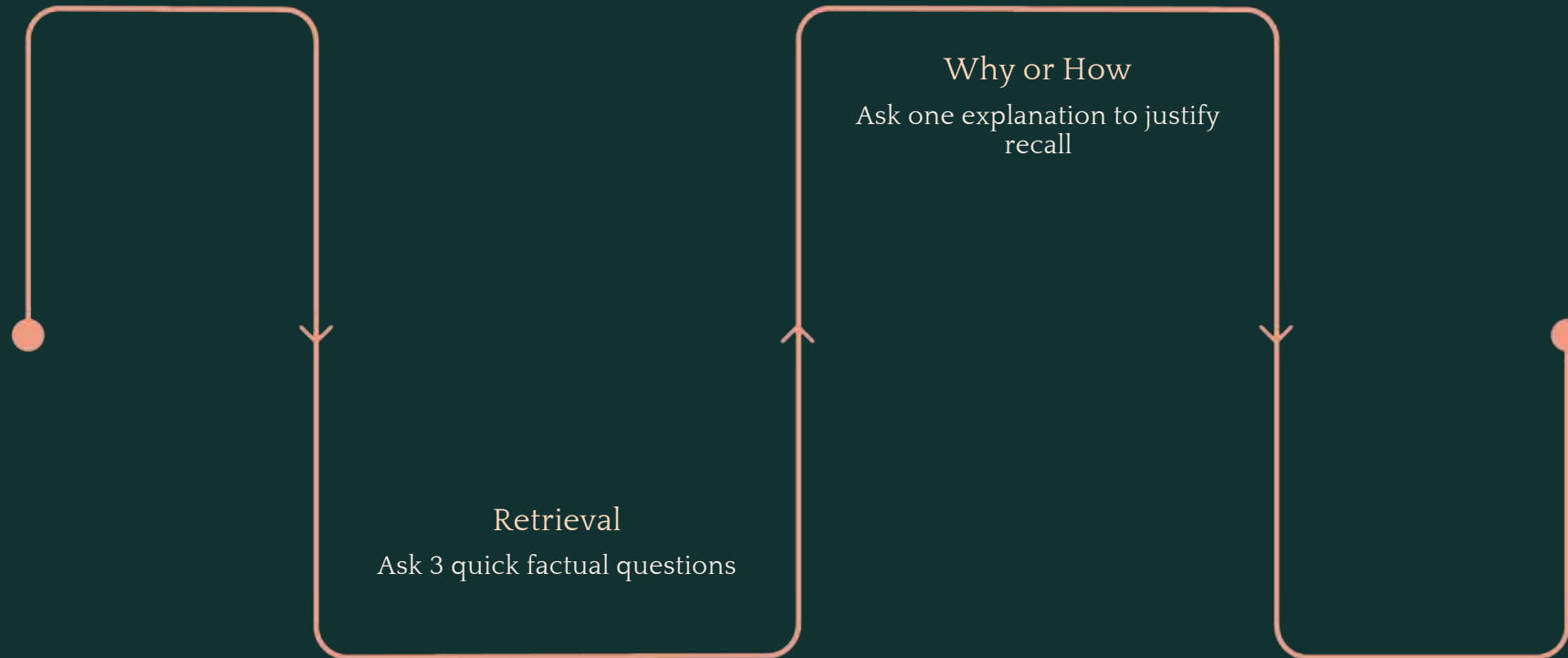
What would change if...?

Introduces a condition or constraint. Moves thinking from recall into application and flexible reasoning.

 **Screenshot this cue card.** Print it. Tape it beside your board.

Classroom Routine 1: Retrieval + Why

This routine takes under five minutes and works across every subject. It combines the memory benefit of retrieval practice with the deeper processing triggered by explanation questions.



Science Example

Retrieval: What is the role of chlorophyll? What do plants need to make food? Where does photosynthesis occur?

Why: How do you know that light is essential, rather than just helpful?

English Example

Retrieval: Who is the narrator? What is the setting? What happens in the opening paragraph?

Why: How do you know the narrator is unreliable – which word or phrase is your clue?

Retrieval checks memory. Why questions deepen meaning.

Classroom Routine 2: Same or Different?

This deceptively simple routine forces students to discriminate – not just recall. By comparing two examples, students must notice relationships, surface distinctions, and judge which differences actually matter.

How It Works

Present two examples side by side. Ask three questions in sequence:

- Are these the same or different?
- In what way are they the same or different?
- Which difference matters most – and why?

The third question is where the real thinking happens. Do not skip it.

This routine forces discrimination, not just recall.

Subject Examples

Maths: Show two different methods to solve $48 \div 4$. Ask: same or different? Which is more efficient for mental calculation? Which would you use if you had to explain it to a friend?

Language: Show two sentences using the word "cold" – one describing weather, one describing a person's manner. Ask: same word, same meaning? Which difference matters for the reader?

Classroom Routine 3: Error Analysis

Showing students a correct answer and a plausible wrong answer – and asking them to diagnose the error – produces some of the richest thinking in any classroom. Good wrong answers are often more useful than quick right ones.

How It Works

Present one correct response and one plausible wrong response side by side. Then ask:

- Which is wrong?
- Where did the thinking go wrong?
- What misconception caused this error?

This moves students from passive reception of correct answers to active analysis of why errors occur – which is precisely how understanding deepens.

Good wrong answers are often more useful than quick right answers.

Error Analysis Planning Card

Question: _____

Correct response: _____

Plausible wrong response: _____

Likely misconception: _____

Follow-up question: _____

Use this card when planning one question per lesson that targets a known error.

Classroom Routine 4: Convince Me

After a student answers, the teacher does not affirm or correct immediately. Instead, the teacher asks for evidence and reasoning. This single move transforms answering from a guessing game into a reasoning habit.

The sentence frames below are scaffolded by age group. They give students the language structure to reason out loud – which is itself a thinking skill.

Classes 3–5

"I think ___ because ___."

Simple causal framing. Builds the habit of attaching a reason to every claim.

Classes 6–8


"My answer is ___ because the clue is ___."

Adds textual or contextual evidence. Moves reasoning from opinion to observation.

Classes 9–10

"My claim is ___, my evidence is ___, therefore ___."

Full claim-evidence-warrant structure. Prepares students for examination writing and analytical thinking.

 **Key move:** Do not accept "I think it's B" without a follow-up. "Convince me" is the follow-up. Even when students are right, asking them to justify deepens understanding.

Classroom Routine 5: Predict Before Teaching

Before explaining a concept, ask students to predict. This is one of the most powerful – and most underused – moves in formative teaching. Prediction activates prior knowledge, creates a felt need to learn, and makes the explanation more memorable when it arrives.

How to Use It

Before the full explanation, ask one of the following:

- What do you think will happen – and why?
- Which answer seems most likely to you?
- What is your best guess, and what is your reasoning?

Then teach. After teaching, return to the predictions: which were close? Which were confidently wrong? Why does the correct answer make sense now?

Important Caution

Prediction works best when students have enough prior knowledge to make a reasonable guess. Without any foundation, prediction creates confusion, not curiosity.

Use with guidance. Anchor predictions to something students already know. Provide a structured prompt, not an open void.

The goal is not failure. The goal is noticing what students do not yet see – so that teaching can close the gap.

Good Questioning Is Not Unguided Discovery

A common misreading of questioning-based pedagogy is that teachers should step back and let students figure everything out. This is not supported by cognitive science – and it does not serve students well, especially novices.



Questions should stretch, not strand
A well-designed question pushes students beyond what they can do alone – but with enough scaffold to make success possible.

Novices need structured prompts
Before students can reason independently, they need worked examples, sentence frames, and guided steps. Scaffolds are not crutches – they are ramps.

Guidance enables thinking
The evidence is clear: removing guidance too early increases cognitive load and reduces learning. Guidance is often what makes thinking possible.

Guidance is often what makes thinking possible.

Better Questioning Across Subjects: Four Case Studies

Each panel below shows a weak question commonly found in textbooks or classrooms – and a richer questioning sequence that replaces it. The upgrade is not harder. It is more purposeful.



Maths

Weak: What is the answer?

Better sequence: What do you notice about this problem? What mistake might someone make here? Which method is more efficient – and how do you know?



Science

Weak: Which option is correct?

Better sequence: What is your prediction? What evidence supports it? Which option is tempting but wrong – and why?



English

Weak: What is the meaning of this word?

Better sequence: Which clue in the text helps you? Which option almost fits but does not? What tone does the writer create with this word choice?



Social Science

Weak: What happened?

Better sequence: Why did this event matter? Who was most affected – and how? What does it reveal about the forces shaping that period?

What Teachers Can Do Tomorrow

You do not need to change everything at once. Pick one move from the list below and try it in your next lesson. One deliberate change, done consistently, is worth more than five changes done once.



Write one hinge question

Use the planning card from Slide 6. Identify the concept your next lesson turns on – and design a four-option question that catches misconceptions.



Upgrade one textbook question

Take a question from tomorrow's lesson plan. Decide: is it a Call Back? Upgrade it one rung – to Connect, Clarify, or Challenge.



Use one deliberate wait-time pause

After your most important question, count to three silently before accepting a response. Notice what changes in who responds and how.



Run one Same or Different? routine

Pick two related examples from your topic. Present them side by side and ask the three-question sequence. It takes four minutes.



Use one error-analysis prompt

Find a common mistake in your subject. Show a correct answer and a plausible wrong answer. Ask students to diagnose – not just identify – the error.

 Think of one questioning move you will try tomorrow.

The point is not to ask harder questions. The point is to ask questions that cause better thinking.

Ei ASSET

SKILLBOOK

— **Class 5** —





Skill: Fractions: concepts and applications

1 Ekta and Zarina each drank $\frac{1}{2}$ a glass of milk. But Ekta said that Zarina drank less milk than her. Can this be true?

A Yes, it can be true - if Zarina's glass was smaller.

B Yes, it can be true - if Zarina's glass was bigger.

C Yes, it can be true - even if both glasses are exactly the same.

D No, both of them MUST have had the same quantity.

2 A quarter of a class of 20 students like the cartoon show 'Tom and Jerry'. How many students in the class like Tom and Jerry?

A 4

B 5

C 10

D 20

3 $\frac{4}{7} \square \frac{2}{2}$

What should come in the empty box to make the number sentence true?

A <

B >

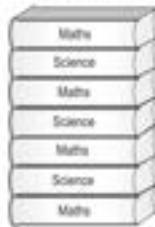
C =

D We cannot say for sure.



Skill: Fractions: concepts and applications

4 What fraction of the books shown in the pile below are MATHS books?



A $\frac{4}{3}$

B $\frac{4}{7}$

C $\frac{3}{4}$

D $\frac{7}{4}$



What fraction of the figure above is shaded?

A half

B more than half

C less than one-third

D more than a quarter



Skill: Fractions: concepts and applications

7 The piece shown below is $\frac{1}{3}$ of a watermelon.



How many MORE pieces exactly like this could you get from the same watermelon?

A 1

B 4

C 5

D 6

Mentor Feedback

I chose this answer because:

10 Rita, Madhu and their mother were eating a cake. Rita ate $\frac{1}{2}$ of the cake. Madhu ate $\frac{1}{4}$ of the cake. Their mother ate $\frac{1}{4}$ of the cake. How much of the cake is left?

A $\frac{3}{4}$

B $\frac{1}{2}$

C $\frac{1}{4}$

D None

Mentor Feedback

I chose this answer because:

Mathematics | Create a Question for Your Friend

Now it's your turn to be the teacher. Write a question on this skill for your friend!

Your Question:

How difficult is your question?



Easy

Medium

Hard

Using questions to transfer our classrooms



Creating A World Where Children Everywhere Are Learning With Understanding

Ei ASSET

