30 Practical Ways *You* Can Use These Evidence-Based Strategies in the Classroom

Helping You to Help Your Kids

Great teaching starts with a desire to have a genuine impact on those you teach. Your job is to have as much of an effect on their learning as you possibly can. You also have the honour of touching their hearts and helping them grow as people.

The good news is that research shows that teachers can have a real and lasting impact on how well their students do at school. However, research also shows that some teaching strategies have far more impact than others. I explained these findings in my article on Evidence Based Teaching Strategies. Here is a brief summary.

The article went viral and is our most popular article to date. However, a lot of members asked for more details on how they should go about implementing these strategies.

While some of this advice can be found in other articles, I wanted to put it all together for you in one place – this eBook.

Here you will find a brief explanation of each strategy, followed by 3 practical ideas for how you could apply it in your classroom. The order and wording of the strategies have changed slightly since I first published the original article. But the essence remains the same.

Enjoy!

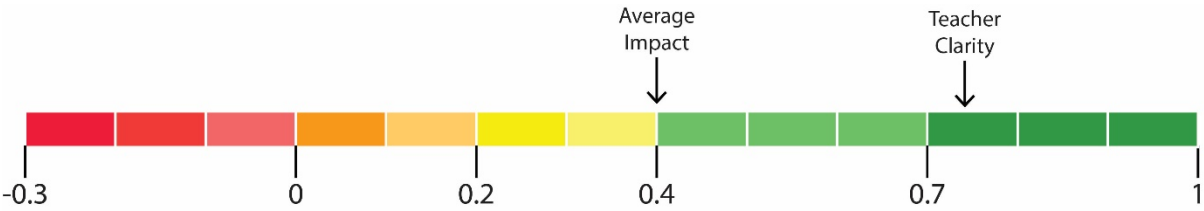
Shaun Killian (MLead, MEd)

TABLE OF CONTENTS

Strategy 1: Clear Learning Goals

Most teachers spend time thinking about the topic they are about to teach and the activities they will get their students to do. However, many teachers don't take the time to clarify **what it is that they want their students to *know* and *be able to do* by the end of a unit or lesson**.

You can **increase the impact you have on your students' results by taking the time to set clear learning goals**. Learning goals are the first step in achieving teacher clarity. In turn, teacher clarity has a large impact on your students' results.



Learning goals are not merely a description of **the topic** (e.g. *the Crusades*) or **what your students will be doing** in a lesson (*discussing the Crusades*). Instead, they describe what students must *learn*. In this case, a specific goal may be that:

- My students will be able to explain the reasons for the first crusade

Here are some examples of attempted goals that miss the mark:

- My students will do silent reading
- Equivalent fractions
- Read a story to the class
- Do Math's Mentals

Here are some better alternatives:

- My students will be able to create an inferential question from a page in their novel
- My students will be able to change a common fraction into an equivalent fraction.
- My students will be able to connect the events in a story to their own lives

Practical Idea 1: Write Goal-Based Day Plans

We all write day plans of some description.

Many primary school teachers jot down the times they plan to be teaching different subjects that day. Typically, they then make a note of the topic to be covered during each lesson or activity. Sometimes they also describe the activities in the lesson, and the resources that they will use.

Secondary teachers do a similar thing, although the time for different subjects is set.

Yet, it is far better to write a goal-based day plan. You can view a sample, goal-based day plan here.

Practical Idea 2: Combine & Extend Goals as Needed

While every lesson needs a goal, you can also plan lessons with more than one goal. This is particularly the case when the goals are simple. For example, a Year 4 teacher may want her students to be able to:

1. **Label** the continents on a map of the world
2. **List** 3 famous European explorers
3. **Plot** the main areas these explorers went to

This could all be done within a single lesson.

Other goals may take your students a few lessons to achieve. For example, it may take your students a few lessons to be able to *list 3 famous European explorers*, if you were going to cover one explorer per lesson. In this case, your single lesson goals may be for your students to:

1. **Describe** Christopher Columbus's exploration of North America
2. **Describe** Francisco Pizarro's exploration of South America
3. **Describe** James Cook's exploration of Australia

Practical Idea 3: Matching Goals to Student Needs

You need to set different goals depending on how familiar your students are with the material.

For example, you may be teaching the scientific concept of mixtures to a Year 7 class. If the topic is relatively new, you must provide them with some foundational knowledge. Your goal would be for your students to demonstrate their understanding of what you teach them. You can do this by using words such as *describing, defining, labelling, drawing, listing, giving examples* and *giving non-examples*. For instance, you may want your Year 7 students to be able to:

1. **Define** and **give examples/non-examples** of a mixture, and
2. Correctly **label diagrams** as a mixture or a pure substance

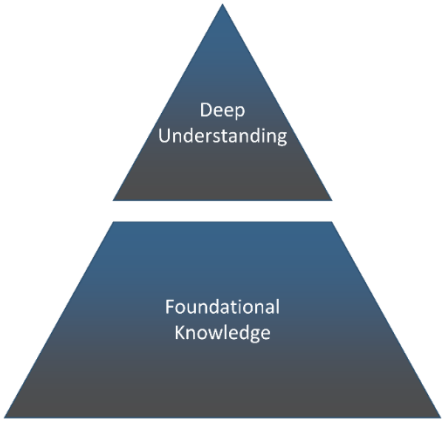
Your goals should be different when you are working with students who are already familiar with the basic material. In this case, you need to **deepen their understanding**. One powerful way to do this is to help your students connect various bits of knowledge in a meaningful way. Meaningful connections include: *sequencing, classifying, comparing, explaining, justifying, analysing* and *generalising.*

Suitable goals could include, the students must be able to:

1. **Compare and contrast** solutions and suspensions
2. **Classify** diagrams of mixtures as either a solution, suspension, colloid or emulsion
3. **Analyse** the properties of different mixtures
4. **Predict** which type of mixture could be separated using a sieve or filter
5. **Justify** the teacher's conclusions about the classification of different things (e.g. Why is black coffee a solution?)

Strategy 2: Show & Tell

There is a common misconception that explaining things to students inhibits deep understanding. It is true that helping your students to learn involves far more than imparting information. However, it is not true that providing students with instruction is a bad idea. Expanding students' knowledge does not impede deep understanding.



Students cannot develop deep understandings without having a foundational bank of facts. Their knowledge base gives them something 'to think about'. And, it provides the foundation upon which deeper understanding depends on. The more facts a student knows, the more capacity they have to glean deeper understandings.

Consider this example shared by Dan Willingham.

A Year 4 class was starting to learn about rain forests. Their teacher asked them if they would like to live in a rain forest. And she also asked them to justify why. Students without enough background knowledge gave shallow responses, such as:

- ✗ No, because it would be wet
- ✗ Yes, because it would be fun

In this case, asking students to apply a higher-order thinking skill (justifying) without providing them with a foundational knowledge base did nothing to deepen their understanding. Sadly, we do this a lot in modern classrooms.

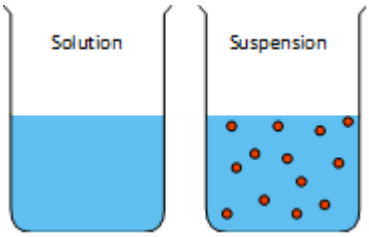
When asked the same question, students with a larger bank of interconnected knowledge gave answers such as:

- ✓ No, because the poor soil and constant shade would mean she may have to include meat in her diet, and she was a vegetarian.

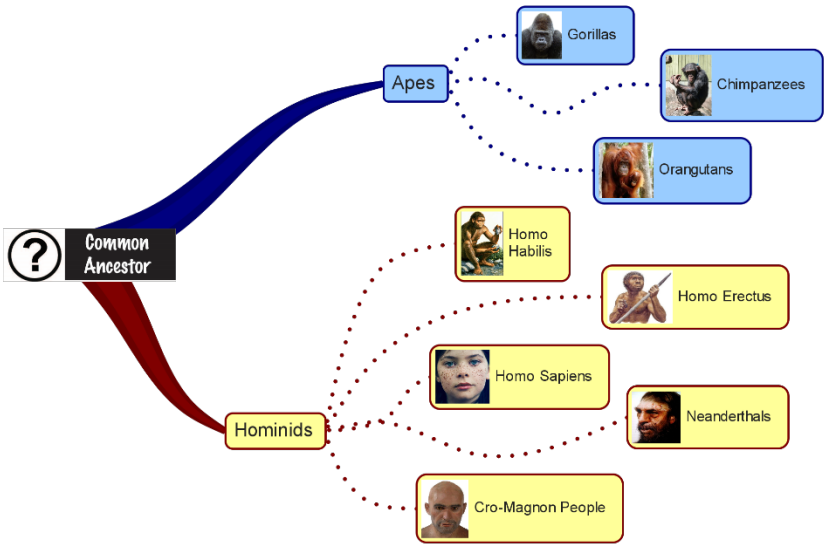
This is an excellent example of how knowledge provides the foundation that enables deeper understandings to grow.

Practical Idea 4: Visual & Auditory Explanations

Despite a popular myth to the contrary, catering to a student's preferred learning style doesn't work. However, psychologists agree that we take in and store information in at least two ways – words and images. Students are more likely to learn information when you present it using both *words* and *supporting visuals*.



A visual is simply some form of diagram or image that helps you to explain what it is that you want your students to understand. Visuals can include text, but they are never 'text-based'. Students can listen to your words and look at visuals simultaneously. Many visuals help students to 'see' connections between isolated bits of information. The above visual connects information through *comparison*. The visual below connects information through organising it into a *hierarchy.* However, these are just two examples. Connections come in many forms, including *sequences, cause-effect* and more.



The key is to use words and visuals at the same time. You can use dedicated drawing software, SmartArt in PowerPoint, interactive whiteboards, or even simple chalk diagrams on a blackboard. It is not about your drawing or technical skills, but about the well-thought-out connections, you want your students to understand.

For more see: How to Use Visuals to Improve Student Learning

Practical Idea 5: Examples & Non-Examples

Students are more likely to understand a concept when you give them examples of what it means. For instance, you may have explained the idea of *physical change* in a science lesson. You could then illustrate the concept with **examples** such as *melted ice, cut hair* or *breaking a glass*.

It also helps to provide non-examples. For instance, when teaching *prime numbers* children often equate them to *odd numbers*. Including **examples** such as *2*, as well as **non-examples** such as *9* and *15*, helps to eliminate this misconception. In relation to the idea of *physical change* mentioned above, non-examples could include *toasting bread, frying an egg* and *baking a cake*.

Sometimes you need to teach a process or set of steps, not just a concept. For instance, you may want to teach your students how to add fractions with unlike denominators. In this case, you should provide what is known as a **worked example**.

Worked examples show each step involved in carrying out the task. They are even more effective when they include think-alouds (think thought bubbles) that show the thinking behind the steps. Of course, you can and should *model* how to do such tasks (e.g. on the board). However, **worked examples** go further. They provide an ongoing reference for students to refer to when needed.

Practical Idea 6: Exemplar Assignments

Assignments are common, especially as students get older. However, students are rarely shown examples of great assignments. Nor are they shown the steps used to produce such an assignment. For example, *in Science*, how does a student show that their hypothesis is not a wild guess, but a *plausible possibility* given what they already know? *In History*, what does an analysis of continuity and change over time look like? And, *in English,* what does it mean to make an effective pitch of your movie idea to a board of directors?

You need to provide **sample responses** to a task that is like the actual assignment. This includes a finished sample with thoughts explained (think-alouds), as well as **modelling** completing elements of the task yourself.

Strategy 3: Checking for Understanding

While it is critical to offer students explicit instruction, it needs to be short and sharp. You don't want to spend most of your time droning on at the front of the room. However, it is equally important for you **not to push forward until students have understood what you have taught them**. Therefore, it is essential that you know some quick and easy ways to gauge your students' understanding.

On its own, **checking for understanding** only has a moderate impact on students' results. However, *it adds significant value when used in conjunction with other strategies in this list*.

First, you tell students what they need to know and show them what they need to do. Then, you should check that they understand before proceeding any further. You can do this by asking suitable questions.

In the middle of a lesson, it is not always feasible nor desirable to have every student answer every question. However, there are practical things that you can do, including these 3 ideas.

Practical Idea 7: Unison Responses

When you seek **unison responses**, you ask a question of the class and then have them answer together at the same time.

You can have your students respond verbally provided you are only seeking one- or two-word responses. However, there are other simple ways to have students respond at the same time.

A common technique used by primary teachers is to have students write their responses on a small, *personal whiteboard.* Students then hold them up for you to see when told to do so. Some teachers use *'Yes' and 'No' cards* in s similar way. If you are teaching older students, you could replicate this idea using *post-it notes*. If you are comfortable with technology, you can also use *response clickers* and your *interactive whiteboard.*

For more see: Checking for Understanding Without Creating Mountains of Marking.

Practical Idea 8: Partner Responses

Unison responses work well when you are looking for a basic response. You can then use *partner responses* when asking more challenging questions. Put simply, **partner responses** involve having each of your students share their answer with a partner. However, in order to get the most from this technique, you need to provide some structure.

First, ask the question to the whole class and then insist that each student answers it on their own (e.g. on a piece of notepaper). You need to monitor this closely as it helps to reduce social loafing where one student relies on the other to do the work.

Then ask one student in each pair to be *A*, and the other to be *B*. After enough individual working time, ask the *A*s to share with their *B* partner. Soon after, ask the *B*s to share with their *A* partner. This helps keep the task brisk while keeping the students on track.

Practical Idea 9: Random Sampling

Random sampling involves selecting a small number of genuinely random students to answer questions and using their answers to draw conclusions about the class.

First, you ask the class a question and leave enough time for them to think of an answer. Then you select a random student (or 2-3 students) to share their answer. It is the visible randomness of your selection that encourages every student to have thought of an answer.

You can achieve this by putting your students' names on counters or paddle pop sticks and picking one out each time you ask a question. Make sure you put it back each time, to ensure that every student knows they could be asked next – even if they have answered before. If you like using technology, you could use an online random name picker and project it onto your whiteboard.

Strategy 4: Making Graphical Connections

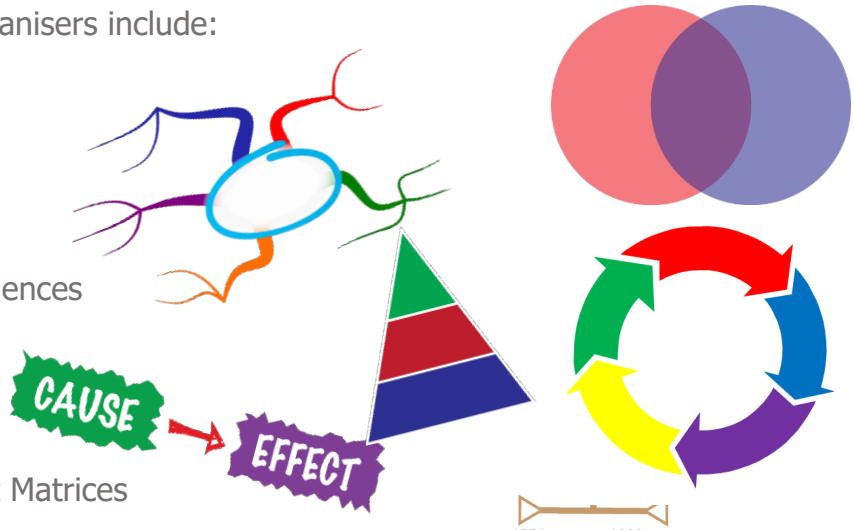
When students are unfamiliar with a topic, you need to teach them some foundational knowledge. However, you must also actively help them to move beyond factual recall to develop a deeper understanding of the topic at hand.

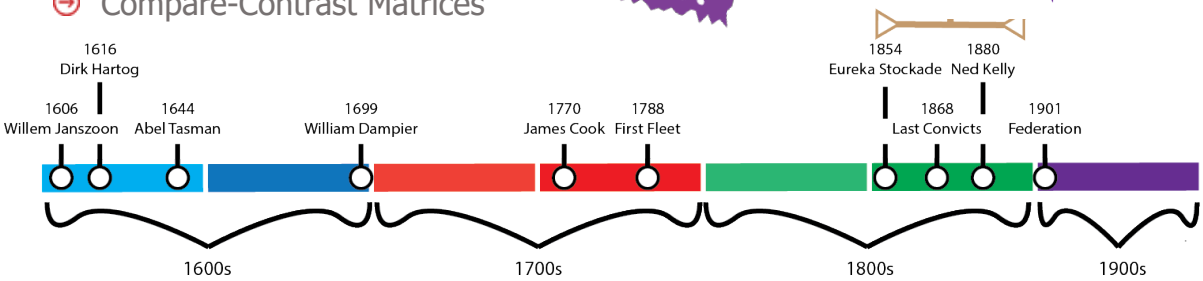
One powerful way to do this is to help your students connect various bits of knowledge in a meaningful way. According to Robert Marzano's research, such connections include:

- Grouped lists
- Time sequences
- Cause-effect sequences
- Comparisons

Diagrams, charts, and other *graphic organisers* can help your students to form such connections. Graphic organisers include:

- Mind Maps
- Timelines
- Venn Diagrams
- Grouped Lists
- Cause-Effect Sequences
- Concept Maps
- Cycles
- Pyramids
- Compare-Contrast Matrices





You can use such *graphics* to:

- Explain new concepts and how they differ from similar concepts
- Engage students in finding connections of their own
- Track and record progressive connections throughout a unit

Practical Idea 10: Explaining Using the Frayer Model

The Frayer model is designed to help you explain a new concept. There are slightly different versions of the model around, yet my favourite one involves:

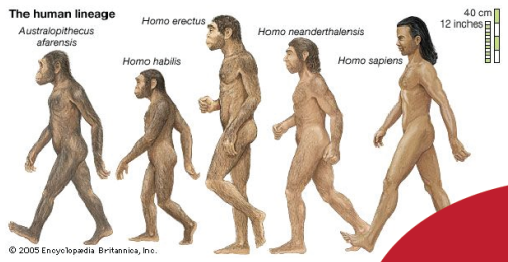
- Verbally explaining the concept
- Supporting that explanation with visual examples, non-examples, essential features and non-essential features

The Frayer model is particularly useful when a new concept shares a similarity with a previous concept. For example, *prime numbers* share some similarities with *odd numbers.* When explaining *prime numbers,* you could list *'odd'* as a non-essential feature. This helps students to use their *prior knowledge* without forming *misconceptions*. The inclusions of 2 as an *example* of a *prime number*, and 9 as a *non-example*, further clarifies the idea that *prime* is not the same as *odd*.

The following example shows how the Frayer model can be used in a similar way to introduce ***hominids.***

Hominids

Examples



Essential Features

Primate

Walks upright on 2 legs

Legs longer than arms

No tail

Toes that aren't multi-directional like thumbs

Non-Examples

Chimpanzee

Gorilla

Monkey

Orangutan

Non-Essential Features

Large brain

Less hair than apes

Played music

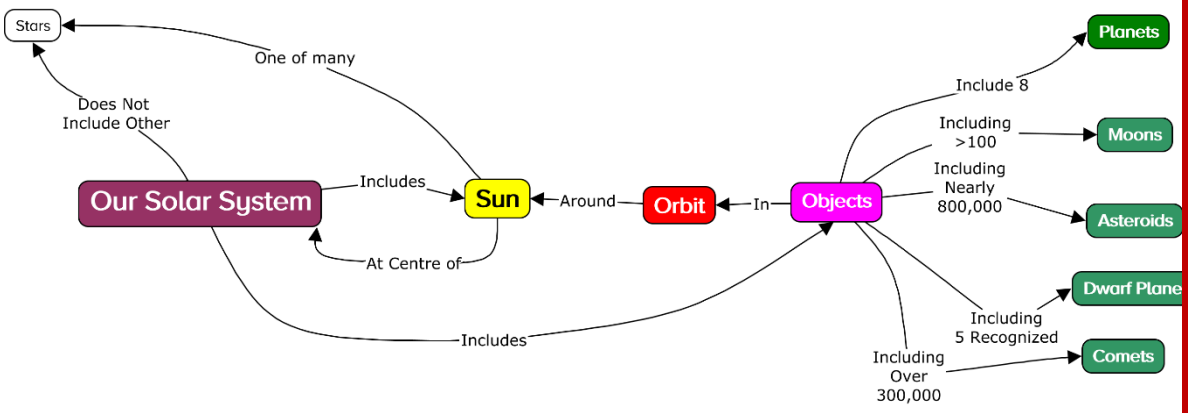
Made fire

Used tools

Had burial rites

Practical Idea 11: Finding Connections with Concept Maps

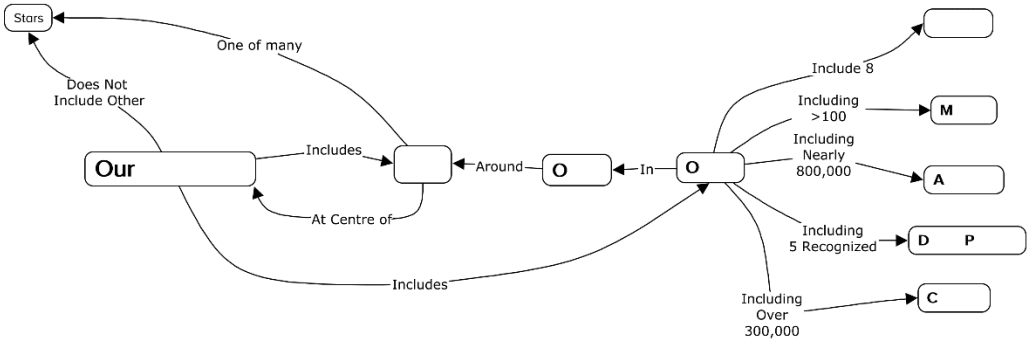
A concept map is simply a group of related concepts, joined by labelled arrows that describe the nature of the connection. Here is an example:



The use of labelled arrows allows students to show a wide range of relationships.

As students grasp the foundational idea of a topic or concept, you can deepen their understanding by having them create their own concept maps. There are several ways to do this.

1. After introducing the above example, ask your students to complete a fill in the blanks type concept map.

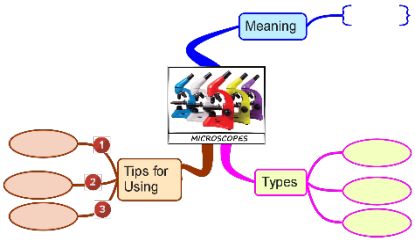


2. Together with your students, come up with a list of related concepts and ask them to create their own maps with those concepts.

3. Ask them to create a concept map of their own on a topic you have taught them.

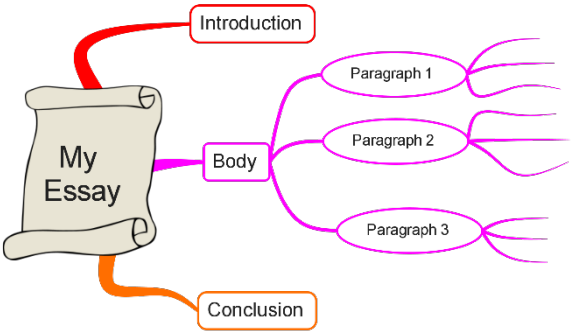
Practical Idea 12: *Progressive* Mind Maps

A mind map is a visual way of recording information related to a central idea. In this example, the central idea is *microscopes* with related ideas radiating out on different coloured branches. You then use sub-branches to expand your ideas further.



Mind maps can be used in a variety of different ways. They can be used to:

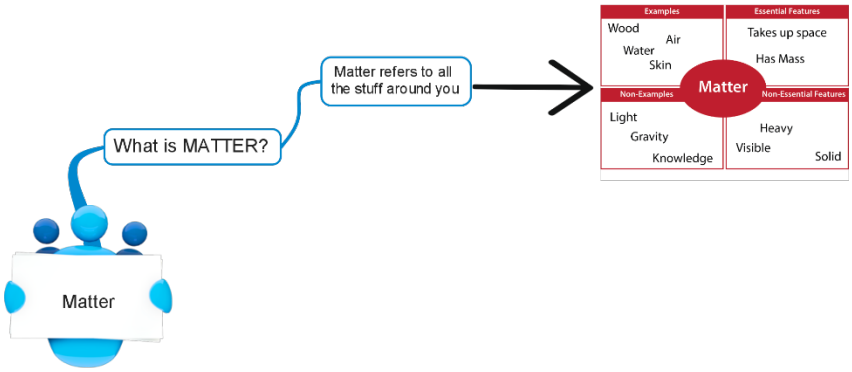
- Show hierarchical connections
- Explore a topic
- Plan a persuasive essay (or any other piece of writing)



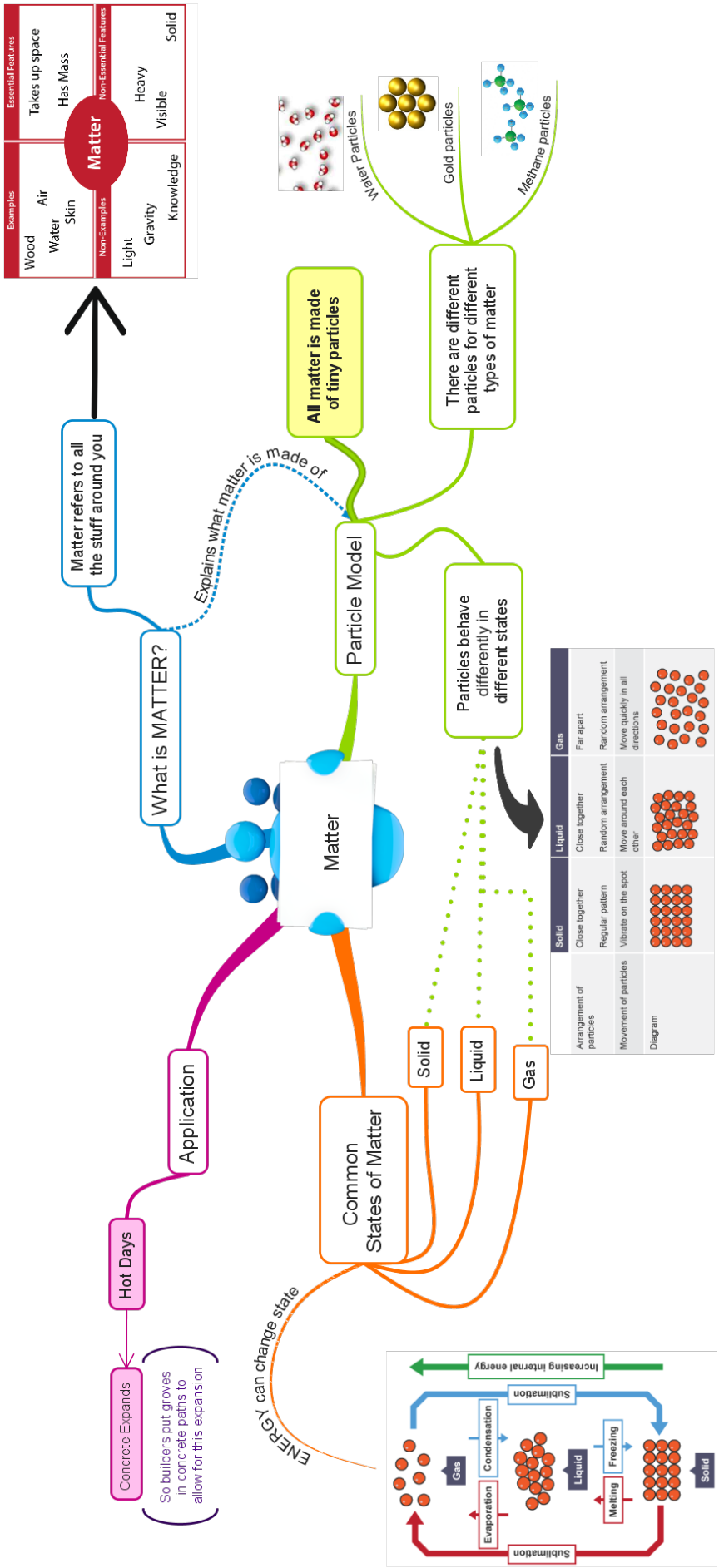
However, in this example, I want to show you how to use ***progressive mind maps***. In most ways, they look like a typical mind map, with **3 distinct differences**. You:

1. Create them as a class
2. Build them over time, adding a new piece of information with each new sub-topic you teach.
3. Include other forms of graphic organisers used in individual lessons.

For instance, after starting a science unit on *matter,* you could end your lesson by beginning a class mind map such as this one.



You then add to it at the end of subsequent lessons, *progressively* building a map such as the one on the next page.


Matter
What is MATTER?
Matter refers to all the stuff around you
Examples
Wood
Air
Water
Skin
Non-Examples
Light
Gravity
Knowledge
Essential Features
Takes up space
Has Mass
Non-Essential Features
Heavy
Visible
Solid
Explains what matter is made of
Particle Model
All matter is made of tiny particles
There are different particles for different types of matter
Water Particles
Gold particles
Methane particles
Particles behave differently in different states
Solid
Liquid
Gas
Arrangement of particles
Movement of particles
Diagram
Close together
Regular pattern
Vibrate on the spot
Close together
Random arrangement
Move around each other
Far apart
Random arrangement
Move quickly in all directions
Common States of Matter
ENERGY can change state
Sublimation
Increasing internal energy
Condensation
Evaporation
Freezing
Melting
Application
Hot Days
Concrete Expands
So builders put groves in concrete paths to allow for this expansion

Strategy 5: Plenty of Practice

There is a saying that dates back to Roman times. Yet, it was US President John Adams who made it famous. That saying is – *practice makes perfect*. When you are repetitively exposed to the same material, you *understand it better,* and you are more likely to *retain it*. In a similar vein, when you repetitively do something, you are more likely to *master* and *internalise the skill*.

Your students need plenty of practice and not just within a single lesson. Research shows that practice has far more impact when it is spread out over time.

Furthermore, **practice has more impact when it**:

- Peppers a smattering of past material amongst more recent material
- Includes giving students feedback on their attempts (see feedback section)

Here are three practical ways you can get your students practising what they have learned.

Practical Idea 13: Daily Reviews

Daily reviews involve spending a short amount of time at the start of each lesson reviewing previously covered content. Appropriate activities could include:

- Unison rehearsal (e.g. of times table) before learning a different set
- Rereading a section of a textbook before starting a new topic
- Completing a set of practice questions covering past material

Note

Reviews should include recently covered content and samplings of older content

Practice questions can involve basic surface knowledge. But, they can also include the application of deeper knowledge (or complex skills).

You should include a mixture of repeated:

- Exposure (e.g. rehearsal, rereading)
- Retrieval (e.g. practice questions, practice tests)

Practical Idea 14: Relevant Homework

Homework is always a hot topic in schools. Students hate it. Many parents and teachers agree with them. But what does the research say?

In short, research shows that homework has a:

- Significant impact on the results that high-school students achieve
- Marginal impact on the results of their primary school counterparts

One common interpretation of this research is that homework helps older students, but not younger students. However, it is equally plausible that the type of homework set in high schools (e.g. practice questions or notes from the day's lesson) has a large effect on students' learning, while the type of homework set in primary schools does not.

Given this, primary teachers should ensure that any homework they set involves practising things they have already taught at school. Furthermore, all teachers should include a mix of recently taught content and past content in their homework.

Practical Idea 15: Practice Assignments

We often give students time to practice basic skills and rehearse basic information they need to know. However, it is rare for students to be given a chance to:

- Practice using complex skills
- Demonstrate deep understandings

Yet, this is what we ask them to do in their formal assignments.

Rather than just commenting on drafts, you could set practice assignments. This includes giving your students opportunities to practice the sorts of things you want them to do when completing their formal assignment.

Then, give your students personal feedback on their practice attempts. This small step provides differentiated instruction, specifically suited to what each student is ready to learn.

Strategy 6: Feedback

Giving your students *feedback* is one of the most potent ways you can help them to improve. But what is feedback?

Comments About Students Work

Feedback refers to comments you make about a student's work. These comments can be verbal or written. They can also be positive or negative. Therefore, there is a wide variety of ways that you can give feedback.

However, all feedback focuses on what the student has done, not on the student themselves. It is about the work, not the person.

Comments With 2 Elements

Effective feedback must include two different things – a comment about *how your student did* and a comment that *helps them to do even better*.

A Small Number of Comments

It is easy to overwhelm students with too much feedback. Therefore, you must **focus your feedback on just a few key points**. You can do this when you have a clear goal in mind, be it a task goal, a lesson goal or a personal goal for that student.

A Specific Strategy That Is Part of a Process

Feedback only works when it is part of a broader process. Before you give feedback, you need to teach the students what they must know and show them how to do the things they must be able to do. Then you allow students to practice it themselves. After this, you give them feedback before requiring them to do a similar task for assessment.

Practical Idea 16: Marking+

Marking students' work is essential. However, **marking on its own is not feedback**.

When you mark students work, you tell them whether their attempts at a task were right or wrong. In order to give feedback, you must also tell them how to improve. Put another way, **feedback equals marking *plus* more**.

What more can you do? Here are some examples.

- Your answer is wrong … and this is why
- Your answer is wrong … the correct answer is x … and this is why
- Your answer is wrong … here is how you do it *(remodel doing the task)*
- Your answer is wrong … here is how you do it *(provide a worked example)*

You can also combine some of the above ideas. When helping a student who is struggling to complete a certain type of math's task, you could ❶ show them how to do it (remodelling), ❷ give them a worked example to follow for next time, and ❸ have them complete a similar problem with you watching.

Practical Idea 17: Commend & Recommend

Marking more complex tasks (e.g. a piece of writing) is not as simple as sorting right from wrong. A Year 2 student's written story should not be as good as a Year 9 student's story; however, the Year 2 student's story is not 'wrong'.

In these cases, you can use the ***commend and recommend*** form of feedback. This involves telling your student:

- ✓ What they did that you liked
- ✗ What additional things they could do to make it better

When you commend aspects of their work, you must comment on 1-3 specific things they have done. In a similar vein, you should only make a small number of recommendations. And you must recommend things that would take their writing one level higher.

Practical Idea 18: Coaching

Coaching feedback prompts students to think of ways to improve their work without explicitly telling them what to do. It is **the art of using hints and questions to help students help themselves**.

Coaching is something you should only **use with more advanced students**. This doesn't refer to those who are inherently bright, but rather students who have mastered the basics of the material – whether 'the material' be writing a PEEL paragraph, finding the surface area of a prism or performing a song.

Some generic coaching questions include:

1. What do you know about how to do this well?
2. How does this compare to what you actually did?
3. What do you need to do in order to improve?

For example, you may have already taught your students about PEEL paragraphs.

Point:	Make a statement
Evidence:	Back up your point with evidence
Explanation:	Explain why this is so
Link:	Link back to the question addressed by the text as a whole

Yet, when writing about whether Australia or New Zealand is the better place to live, a sample student (John) may not have used this structure correctly.

Australia has fewer earthquakes than New Zealand. Therefore, I would feel safer living in Australia.

To coach John, you could ask:

1. What are the 4 parts of a PEEL paragraph?
2. Which 2 parts have you used? Which ones have you not included?
3. What will you do to improve this paragraph?

Strategy 7: Learning with Peers

Human beings are social creatures, and therefore, **kids like working with each other**. Research also shows that group work can lead to learning above and beyond what students master through other teaching strategies.

However, learning can be hampered by:

- Some group members doing nothing
- Other group members taking control
- Interpersonal clashes between certain students

To be effective, you must structure your group work well.

Furthermore, group work has more impact when it is **used in conjunction** with (rather than as a replacement for) *whole-class instruction* and *individual work*.

Simply placing students in groups and asking them to work together is not enough. Instead, you need to:

- Design your group work carefully
- Integrate your group work with a range of other teaching strategies

You can help students to get the most out of group work by:

- Explicitly teaching the new material to your class before using group work
- Letting students think and practice on their own before asking them to contribute to a group's efforts
- Clearly explaining what you want each group to do and how you expect them to do it
- Keeping the size of groups as small as possible
- Not letting students choose who they will work with

Practical Idea 19: Turn-Taking Practice

Many short tasks involve a series of steps – tasks such as multiplying 2-digit numbers, writing a complex sentence or using a particular scientific theory to explain a real-world observation.

Whenever you teach a series of steps to complete a task, you should model doing the steps yourself and then allow your students time for *individual practice*.

Once they have reached a basic level of proficiency, you can then help them to master the material with *turn-taking practice.* This involves placing the students in small groups, with the number of group members corresponding to the number of steps in the task.

For example, *multiplying 2-digit numbers* involves three steps:

1. Multiply by the *ones*
2. Multiply by the *tens*
3. Add the two answers together

In this situation, you would place students into *groups of three*. The group is responsible for getting the correct answer; however, each child is responsible for completing one step of the task.

You could also use groups of three for writing a complex sentence:

1. Write a simple sentence, e.g. *Sonia is a teacher*
2. Add a conjunction, e.g. *who*
3. Add a joining clause, e.g. works with preschool students.

Each group completes the same (or same type of) task several times, *taking turns* with who performs each step. All students must have at least one turn at every step. With many tasks, they could have several goes at each step.

However, groups seldom work out evenly. But, if for example, you had 2 students left over, the first could do steps 1 & 3, and the second student could do step 2. They would then swap for the next question.

Practical Idea 20: Reciprocal Teaching

Reciprocal teaching is a way of helping students hone their comprehension skills. This can be valuable in its own right. And, it can also be used to help students understand written information about a relevant topic in any subject.

Reciprocal teaching maximises the benefits and minimises the problems of group work. It does this by assigning clear roles to each group member. Note, these are **genuine roles.** They **are not** peripheral roles, such as *collecting the necessary equipment*.

Groups normally include 4 students who each adopts one of the following roles:

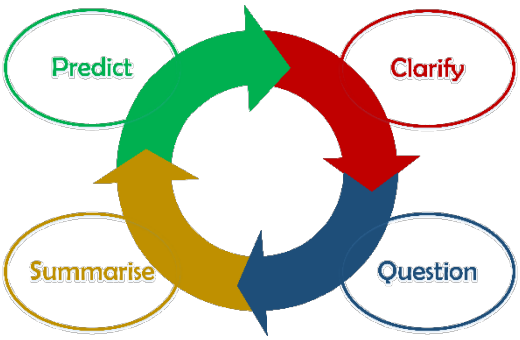
① **Predictor:** Who uses prior knowledge and logic to predict what they will find out when they read the next section of the text.

② **Clarifier:** Whenever any student realises they have not understood something in the text, they ask the group to stop reading and ask the *clarifier* to help them work it out.

③ **Questioner:** The questioner asks each student a question about what they have read. As students get better at this role, this can include inferential and evaluative questions.

④ **Summarizer:** The summarizer sums up the main points or events in a few sentences.

Students read a section of text before swapping roles, reading the next section and continuing from there.



You can use the structure of *reciprocal teaching* but use other roles. You can also adjust the number of roles when you cannot make even groups of four.

You can read more about *reciprocal teaching* here.

Practical Idea 21: Peer Tutoring

Peer tutoring involves one student helping another student to learn and master some aspect of the curriculum.

Typically, peer tutoring involves students working in pairs – a tutor and a tutee. However, there may be cases where it involves students working in small groups. The smaller the group, the more learning that occurs.

Peer tutoring allows students to receive:

- Individual instruction matched to their specific needs
- Guided practice, with prompting as needed
- Immediate feedback, so they can refine their understanding as needed

Research shows that peer tutoring is quite effective. However, it also reveals that some approaches to peer tutoring are more than twice as effective as other approaches.

Simply by including 3 or more of the following, you will have a much larger impact on your students' results.

1. *Teacher-formed pairings.* This allows you to ensure that tutors have adequate levels of mastery and that the two students are likely to work well together.
2. *Structured interventions,* where students are clear about what you expect them to do and how you expect them to do it.
3. *Personalized curricula* matched to students current levels of mastery and understanding.
4. *Assessment* of the tutee's new level of mastery, as opposed to no assessment or normative assessment
5. *Earned Rewards,* where both students earn some form of reward if the tutee demonstrates they have mastered the material.

STRATEGY 8: TIME FOR MASTERY

Mastery learning stems from a belief that **any student is capable of learning anything** ***if given enough time*** **and instruction**. The idea was first championed by Greek philosophers such as Aristotle. Later it was popularised by pioneering psychologists such as Benjamin Bloom, and prominent educational experts such as Robert Slavin.

The mastery approach recognises that learning is often sequential. Put another way, students must master prerequisite knowledge and skills before they can be expected to master the next level. You must *learn to crawl* before you can *walk,* and you must *learn to walk* before you can *run.* Therefore, **all students are expected to master the core material before they move on to the next level**.

The theory lies behind several common educational practices, some of which have:

- ⊗ Little or even a negative impact on later learning
  (e.g. repeating students, streaming)
- ✓ Substantial impact on later learning
  (e.g. formative assessment, corrective interventions)

The key differences between successful and unsuccessful practices seem to be:

- A **genuine expectation** that every student must master the material associated with the level they are at
- A **clear understanding** (by both the teacher and the student) of what mastery of that level entails
- **Temporary grouping**, where students can move out of lower levels as soon as they are ready
- **Structured and tailored activities** to help students achieve the next level

Note: Failure is quite okay. We all fail sometimes. However, ongoing, successive failure must not become an option. Mastery learning requires you to help your students move through initial failures while pressing them to succeed soon.

Practical Idea 22: Differentiated Instruction

You can divide many curriculum areas into a graded and sequential set of learnings. We can then teach students 'where they are at'. This is the core of differentiated instruction.

Within the broader community, we do this when teaching *swimming*, *karate* and *dancing*. In these activities, it doesn't matter how old you are or how long you have been attending lessons. Instead, lessons are tailored, so they teach you precisely what you are ready to learn.

There are many situations where you can differentiate in the classroom. Think levelled *reading groups* in the early years, levelled *sight-word lists*, and *Direct Instruction* programs such as Spelling Mastery.

Just remember, such groupings are temporary, and you must expect all students to progress through to higher levels.

Practical Idea 23: Teacher-Led Corrective Sessions

Following the principles of Mastery Learning, you could organise a Year 8 Math's program into 20-30 × 1-2 week units. One such unit on percentages may consist of ❶ 6 × normal lessons, ❷ 1 × formative assessment, ❸ 2 × corrective and enrichment sessions, and ❹ 1 × follow-up assessment.

After delivering the normal series of lessons, you assess your students' level of mastery. Then, during the next two lessons, those who:

- Mastered the material complete 2 *enrichment* sessions
- Failed to master the material complete 2 teacher-led ***corrective*** sessions

You design corrective sessions based on common difficulties your students had with the material. Possible corrective activities include *reteaching*, providing additional *worked examples*, individual *practice* (with feedback), cooperative *group work* and even *peer tutoring.*

NB: It is important that you lead these corrective sessions (i.e. not a teacher's aide or parent)

Practical Idea 24: Independent Work

Sadly, it will not always be possible to provide your students with teacher-led correctives. There will simply be too much to do, with too many students, in too little time.

However, you can still help any of your students who have failed to master the targeted material.

This can be as simple as:

- Providing those students with a complementary textbook
- Having them actively reread relevant information
- Giving them some practice questions to complete

This could be done at home, or whenever they have free time in class.

NB: Active rereading could include note-taking, summarising and copying down worked examples.

However, technological advances now provide additional alternatives. Two such alternatives that I have used include:

- Hotmaths by Cambridge University Press
- Improve by Education Services Australia

Hotmaths includes online lessons with worked examples and practice questions. You set up a class account with each student having their own login. You can then quickly assign individual lessons and activities to students. Their progress and success are reported back to you.

Improve is primarily an online assessment tool. As such, it is a quick and easy way to conduct formative assessments. **It is different to most online assessment tools in one important way.** You preload independent review activities for each question. Then, after taking their formative test, each student receives a report that includes independent corrective activities they need to do.

One alternative I haven't used but would like to try is the Khan Academy. It is a free site that offers hundreds of short 'explainer videos' about a wide range of topics (e.g. *how to find a certain percentage of a number*, *states of matter* and *abstract nouns*).

STRATEGY 9: TEACHING *STRATEGIES*

Taking notes helps students to understand and remember what they have read. However, some students don't know how to take notes. Teaching your students *how to take notes* would be an example of *teaching them a strategy.* In this case, a strategy that helps them comprehend and retain information.

In the broadest sense, strategies are things that students can do to help them complete a set task. There are many kinds of strategies. These include:

- **Practical strategies**, such as finding a quiet place to work when studying
- **Problem-solving strategies**, such as *drawing a picture or diagram*
- **Comprehension strategies**, such as monitoring for when meaning is lost
- **Retention strategies**, such as *mnemonics*
- **Connecting strategies**, such as identifying similarities and differences

Explicit Teaching

Many students implicitly learn several useful strategies as they progress through school. Often, this is the students who are doing well. However, other students do not. Therefore you should explicitly teach strategies to your students.

However, you should not teach strategies 'just for the sake of it'. Instead, you must identify strategies that will help your students with the sorts of tasks they will be doing.

The type of strategies you teach will vary from subject-to-subject, and with the age of the students you teach. However, the practical ways you use to teach strategies remain the same.

You need to explicitly teach your students how to use strategies that are relevant to them. This involves:

- **Explaining** *how* and *when* your students should use the strategy
- **Modelling** using the strategy
- **Verbalising** the thought process going on in your head

It is also useful to teach your students *prompts* (sometimes called *cues* or *scaffolds*) related to the strategy. Prompts can come in many forms, including:

- Questions, e.g. How does X relate to Y?
- A sequence of steps, e.g. Plan ➔ Draft ➔ Edit ➔ Proofread➔ Publish
- Essential elements, e.g. PEEL paragraphs, and BOLTSS in mapping

Prompts can also be checklists, visual cues or simple statements.

Once you have taught your students a strategy and armed them with suitable prompts, it is important to let them practice having a go themselves. As with teaching in general, you:

- Start by working together (e.g. having students help you use a strategy)
- Guiding them as they practice
- Letting them practice alone
- Offer students feedback on their independent attempts

Ongoing Reminders

Explicitly teaching a strategy as a once-off event is necessary, but it is not enough. It is also important that you regularly remind students to use the strategy. You can do this by:

- Modelling the strategy whenever possible
- While sharing your thinking out loud

Furthermore, you can prompt students to use a certain strategy when giving them a suitable task.

Teach Sets of Multiple Strategies

Many strategies are made up of sets of smaller, more specific strategies. For example, ***inferential reasoning*** is a combination of smaller strategies:

- *Bringing forth background knowledge*
- *Identifying clues* within the text

In a similar vein, ***note-taking*** involves *scanning* and *paraphrasing*.

When needed, you should teach each component strategy. However, you should quickly move on to using the strategies as a coordinated set. Research shows that you have more impact on your students learning when you teach **a small number of related strategies** rather than:

- A single strategy in isolation
- An overwhelming number of strategies

Practical Idea 25: 2-Step Knowledge Building

We know that students learn better when they connect new information to what they already understand. The idea of **activating prior knowledge** is not new, but it is neither well understood nor taught. Here's why:

1. It is not as simple as asking yourself what you already know about the topic. Rather it is about actively *connecting* **what you know to the new information before you**.
2. When a student thinks they know stuff already, they tend to ignore or dismiss contrary information. Sadly, many students hold misconceptions about things they have learnt in the past. Therefore, **you should encourage students to think about what they currently** *'understand'* **rather than what they** *'know'*.
3. As Piaget noted, there are different kinds of connections. Sometimes newly encountered information *confirms* what we already understand. At other times it *adds to* that understanding. These are both forms of *assimilation*. At other times new information can *challenge or change our understanding*. Piaget refers to this as *accommodation*. **You should teach your students to connect new information to old in both ways – *assimilation* and *accommodation***.

With this in mind, you can teach your students the 2-step strategy for connecting new information to old. The strategy involves two simple questions:

1. **How does this confirm or add to what I already understood?**
2. **How does this change what I thought I knew?**

Practical Idea 26: Wise Words

One of the most useful strategies to teach your students is a simple set of *wise words*. These words remind students to act in a way that helps them to succeed in any subject, and even outside of school.

What are these wise words? Here is one example (there are lots)

Work first, pleasure later

Students who are naturally conscientious follow this maxim automatically; however, many of us don't. Research shows that students who follow it achieve an average of 17 percentile points higher than those who do not.

This simple strategy can be used in many ways. When students are preparing an assignment, they often delve straight into the enjoyable but peripheral parts of the task. For example, finding photos, fancy designs, making models. But, it would be better for them to get stuck into the work itself. Similar problems arise when putting off homework, doing chores and working in groups.

Introducing the strategy is easy, but habitualizing the use of the strategy is what really makes the difference.

Practical Idea 27: Checking Reasonableness

Over the years, I've helped students of all ages with their maths. I found that there is one strategy that cuts across all this content.

The strategy involves teaching students to:

1. Estimate an approximate answer, and
2. Use the estimate to check the reasonableness of their actual answer

If the student's estimate is not close to their estimate, they redo both to discern where they went wrong.

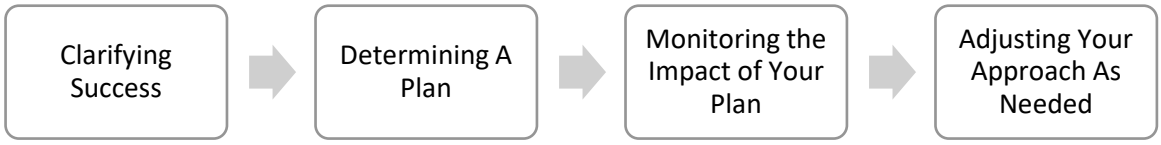
For example, when converting $\frac{3}{8}$ to a percentage, a student can quickly work out that it is a bit less than half (aka a bit less than 50%). If their answer was 73%, then they know something isn't right and it needs to be fixed.

Strategy 10: Nurturing Meta-Cognition

Many teachers think they are nurturing meta-cognition when they are just teaching students' strategies – strategies such as those I outlined in the previous section. **Meta-cognition is** not a set of strategies students should use to solve a task, but rather **a set of techniques for:**

- Selecting the best strategies to use
- Adjusting those strategies if they are not working

Typically, metacognition involves four steps.



For example, a Year 7 student called Adele was told that Barney bought a guitar. The guitar normally cost $145, but there was a 20% discount today. The teacher asked Adele to find out how much the guitar cost.

1. To get this question correct, Adele clarifies the problem in her own mind. She must **find the reduced price of the guitar** – not the dollar value of the discount.
2. Adele remembers there are two ways to work this out. She could **find 20% of $145 and then subtract the answer from the original price**, or she could find 80% of the original price. She decides to use the first of these methods. Adele also knows that estimating is a good way to check the reasonableness of your answer. She knew that the reduced price would be greater than 50% ($72.50) and even more than 75% (a bit over $100).
3. Adele worked out the answer was $29. **She saw this was not even close to her estimate.**
4. Therefore, **Adele chose to redo the question using the second method** (i.e. finding 80% of $145). Her new answer was $116. She was satisfied with this answer and moved on to the next question.

If Adele was not yet confident at calculating discounts, she could apply these same four steps to each part of the problem. For example, her plan for working out the percentage discount may have been to:

- Convert 20% to a decimal by moving the decimal point two places to the left (yes, I know – purists say you don't move the decimal point, but it is a strategy)
- Multiply $145 by that decimal by ❶ pretending it was a whole number, ❷ counting how many digits are after the decimal point, and ❸ making sure there is the same number of digits after the decimal point in her answer.

You can use these same four meta-cognitive steps in all subject areas. For example, as part of a history unit on Ancient Egypt, Declan was asked to research the *Rosetta Stone*.

Clarify: Declan knew he had to understand what the *Rosetta Stone* was and why it was important.

Plan: He decided to *Google* it. He then found and read an article about it on *Wikipedia*.

Monitor: He found the text of *Wikipedia* hard to understand.

Adjust: He remembered his teacher telling him to put the word *simple* or *kids* into your search when looking up something that is totally new to you. He did this, finding an article on the *History for Kids* website, and another article on *Simple English Wikipedia*.

Plan: Declan decided to deepen his understanding by taking notes, with the first note starting with the words, *the Rosetta Stone is …* and the second note starting with the words, *it is important because …*

Monitor: He found it easy to describe what the Rosetta Stone was but couldn't find a clear answer to why it was important.

Adjust: Declan remembered that sometimes you had to *infer* meaning from clues in the text … and so on

Practical Idea 28: Explicitly Teach the Core Steps

You should teach your students the basic steps in the meta-cognitive process, and how they can apply it to different tasks they would encounter at their age.

Remember, the four basic steps are:

1. **Clarify** success
2. Determine a **plan**
3. **Monitor** your progress
4. **Adjust** your approach when needed

Show them the steps, explain what they mean and give relevant examples of the steps in action. I often use a metaphor (borrowed from Tony Robbins) that *a problem is like a sea voyage. You need to know where you want to end up, and you need to plan a way to get there. Along the way, you need to monitor where you are and adjust your course if necessary*.

Check your students' understanding, before moving on. At this stage, I often find it useful to jointly construct a class poster with a simple diagram illustrating the steps.

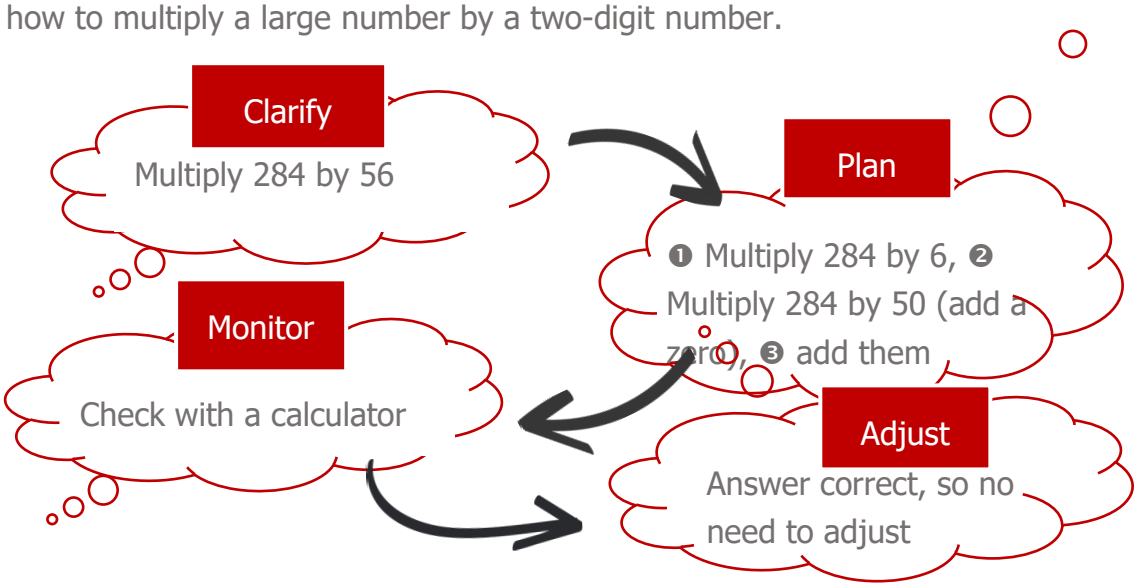
Students can make their own version of the diagram and glue it into their book.

Finally, give your students some guided and then independent practice at following the four steps to complete relevant tasks.

Practical Idea 29: Meta-Cognitive Think Alouds

Think Alouds started as a way to model what goes on inside a good reader's head as they try to read challenging material. However, they are also an effective way to model the thinking that goes on when completing any form of challenging task – including meta-cognitive thinking.

You can use *meta-cognitive think alouds* whenever you show students how to complete a new task. For example, you could use *think alouds* when modelling how to multiply a large number by a two-digit number.



Practical Idea 30: Prompt Practice

There will be many times when you ask your students to practice different tasks. Each of these is an opportunity for them to also practice the basic meta-cognitive process.

The simple act of prompting such practice can have a potent impact. Remind students before they start and ask them about their efforts as you wander around and help them.

BIBLIOGRAPHY

Beesley, A. D., & Apthorp, H. S. (2010). *Classroom Instruction That Works, 2nd Ed.: Research Report.* Denver: McRel.

Benassi, V. A., Overson, C. E., & Hakala, C. M. (Eds.). (2014). *Applying Science of Learning in Education.* New York: American Psychological Association.

Benseman, J., Sutton, A., & Lander, A. (2005). *Working In the Light of Evidence, As Well As Aspiration.* Wellington: Ministry of Education Auckland UniServices Ltd.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How People Learn: Brain, Mind, Experience, and School.* Washington, DC: National Academies Press.

Bruning, R. H., Schraw, G. J., & Norby, M. N. (2011). *Cognitive psychology and instruction.* Boston: Pearson.

Cooper, H. (2007). *The Battle Over Homework.* Thousand Oaks: Corwin Press.

Engelmann, S., & Carnine, D. (1982). *Theory of instruction: principles and applications.* Irvington Publishers.

Hattie, J. (2013). Visible Learning: A Synthesis of 800 Meta-Analyses Relating to Achievement. Routledge.

Hattie, J., & Anderman, E. (2013). International Guide to Student Achievement: Educational Psychology Handbook. Routledge.

Hattie, J., & Yates, G. C. (2014). *Visible Learning & the Science of How We Learn.* New York: Routledge.

Hattie, J., Masters, D., & Birch, K. (2015). Visible Learning Into Action: International Case Studies of Impact. Routledge.

Hollingsworth, J., & Ybarra, S. (2009). *Explicit Direct Instruction.* Thousand Oaks: Corwin Press.

Marzano, R. J. (1998). *A Theory-Based Meta-Analysis of Research On Instruction.* Aurora, Colorado: Mid-Continent Regional Education Lab.

Rosenshine, B. (2012). Principles of Instruction: Research: Based Strategies That All Teachers Should Know. *American Educator, Spring*, 12-20.