Top Ten Challenges to get students thinking

Challenge in the classroom fulfils a plethora of different important functions. First challenge pitched at the right level is a motivational trigger which leads to higher levels of engagement and student-led learning. Secondly it provides a fantastic basis for questioning and discussion that helps students develop a better understanding of the key concepts they are exploring as part of the topic. Finally, most importantly, it creates an environment where AfL can powerfully inform planning. Without challenge it is difficult to establish the extent to which students fully understand the new knowledge presented and therefore the effectiveness of teaching and learning taking place.

Here are a range of generic tools that can bring more challenge into the classroom. All have been seen to work effectively to get students thinking more deeply about their learning. They are tools that have been seen to work in all year groups both at primary and secondary and in a range of different subjects.

1. Mysteries

Getting students to use newly acquired skills or knowledge to solve a murder or crime baffling detectives. Mystery games help students to learn through the discovery process. Information is distributed to each of the students in a series of clues. The process of pooling of information is required for solving the mystery or mysteries.

A mystery game can be a broken information exercise which engages students and develops skills of analysis, empathy, oral communication and listening. Students are given pieces of information from which they have to solve a mystery. Alternatively the students could use newly acquired skills/knowledge to solve a mystery.

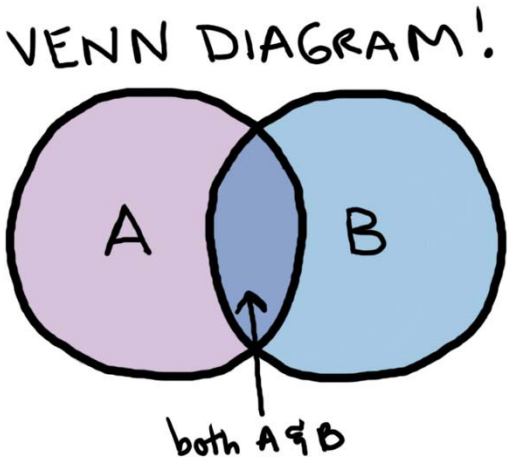
Students of all ages tend to enjoy mysteries especially when they are a bit gruesome! George Orwell commented that a typically British trait is to enjoy reading about a "juicy murder". These mysteries can be thought-provoking, challenge stereotypes and fun.

Examples

- Which country is the murderer hiding? – geography mystery.
- Why is the maori boy crying? – again a geography mystery to explore racism and inequality in New Zealand.
- Who killed our plant? – biology mystery exploring what plants need to grow.
- Leaving the outcome ambiguous enables students to come up with different theories that lead to the truth.
- What's happening in the photo/video clip that links with your learning?

2. Venn Diagrams

You may think of this as a maths specific resource, how wrong could you be. Venn diagrams are a great tool to get students to explore the differences and similarities between concepts and think more deeply about the properties of the concept. This can be applied with Early Years children up to Yr13. For extra complexity additional circles can be added.



They can be used in two different ways. Either give the students cards containing key words or evidence that the students have to correctly place OR get the students to come up with examples to fit into the different categories. Remember the area outside both circles represents those things that do not share any of the properties of either circle.

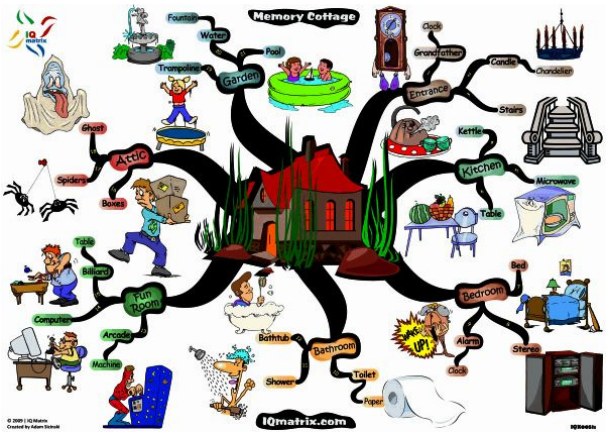
Examples of Venn diagrams in action

- English to compare/contrast genres, characters, or themes
- history to compare/contrast events, individuals or countries
- business studies to compare/contrast cash flow and profit in business studies
- Early Years to allocate items to different people e.g. boys and girls possessions or items to characters in a story
- Any classification topic in science

The activity could be given additional complexity by providing more evidence that may mean students need to re-appraise their answers.

3. Map from Memory

This activity works as an excellent activity to recap prior learning either to start a lesson or as a revision activity. The activity does exactly what it says. Students are put into groups of 3-5. Each student in the group is given a number. Then the teacher calls up all the students with number one. These students have got 30secs to study a mind map/diagram or map of a topic. They have to memorise as much of what they see before

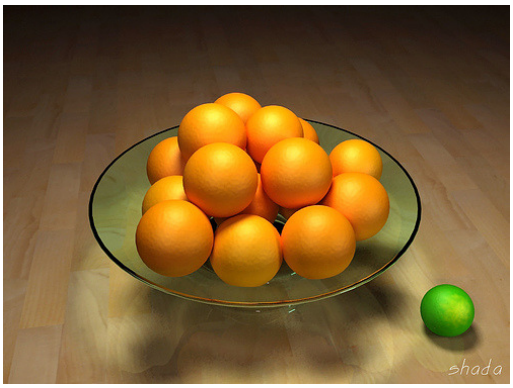


they return to their group to explain what they can remember to the rest of their group. Another member of the group then reproduces this on the team's large piece of paper.

The process is then repeated with the number 2's going up and so on.

This activity promotes talking and listening amongst students as they try to plug the gaps in terms of content on their own map.

4. Odd one Out



The process of identifying the properties of things and classification lies at the heart of odd one out. This can be as a class, individual or paired activity. The strength of the activity is that it promotes discussion and exploration of the properties of things. It could work well as part of a starter or plenary activity

Additional complexity can be built in by including multiple possible answers to create uncertainty and tension in the minds of students.

For young children; actual objects from home or school could be used. Alternatively they could come from a story they are familiar with. Alternatively it could be as simple as duck – frog – cat!

5. Sequencing / Ranking / Sorting / Classifying

This is a great way to get students discussing, analysing, and evaluating. Giving them a list of items and getting them to rank / sequence / classify or sort them into the 'correct' order. Actually building in ambiguity can ensure that different groups get different orders and actually appreciating that there may be more than one acceptable answer.

The information on each card could be a key word or an idea. Alternatively with younger children perhaps pictures would be used instead.

Examples include:

Sequencing

- the stages in processes in science / geography / business studies
- stages in events in history / novels in English

Ranking

- relative importance of different factors /events / individuals

Sorting / Classifying

- items into groups with similar characteristics

6. Explaining Exemplars (Carroll 1994) – For skills teaching

An exemplar is a model of good practice or worked example. This strategy can be used in almost any subject from mathematics to craft catering. Try it with calculations, written work, exam question answers, case studies, assignments, essays, craft artefacts etc.

1. Give pairs or small groups of students examples of good practice, and perhaps some examples of bad practice or examples containing a few common errors. They may have the same, or different exemplars.
2. After examining and discussing it, each group critically appraises the exemplar to the rest of the class. This might focus on the methods used to create the exemplar as well as its quality. They could 'mark' the work, either informally or against agreed criteria.
3. Get the students to summarise general statements of good practice.

Exemplars in pairs:

This strategy will be explained by example. It could be used with any subject:

1. Each pair of mathematics students is given the same four worked examples. The examples solve slightly different problems or use slightly different methods, and are correct in each case.
2. Each individual student takes two of the four worked examples. They study these, and prepare to explain and justify the method to their partner.
3. Students explain and justify their examples to their partners
4. Together the pairs agree 'How to do it' advice.
5. Class discussion to agree 'how to do it'.
6. Students do some similar questions themselves.

You can of course give students worked examples including common errors, and ask them to find these. This works well as a follow up activity.

Carroll's Research into teaching algebra suggests that showing students a large number of varied worked examples can work better than the more common strategy of 'showing them a couple on the board and then getting them to do lots themselves'. This is true even if the amount of time spent doing examples is reduced to make time to look at the worked examples. Low achievers make particularly good achievements.

Examples of work with common errors are instructive and good fun.

Asking students to examine exemplar essays or assignments immediately after completing one of their own with the same tasks is also very instructive.

This strategy is underused, and is particularly helpful for right brain students because it gives students a holistic 'feel' for the characteristics of good work.

Examples of Exemplars in action

- Grammar / verb rules in English / MFL
- Many applications in Maths

7. Concept Mapping

This tool aims to get students to examine the relationships between different concepts in a topic or subject area. This aims to get students to develop better synthesis. The students should be encouraged to explore cause/effect relationships, two way relationships and label the links between concepts. Students should be encouraged to talk either to peers or teacher about the reasons for their choices.

To use concept mapping, give small groups of students a list of key terms or concepts and get them to map them out on a large piece of paper drawing arrows to identify relationships between them.

This has such wide application in all subject areas as either a plenary activity or at the start of a topic to identify prior learning.

8. Compare and Contrast

Comparing and contrasting has been found to improve students understanding of the topics compared by much more than one grade. It is a preferred method for helping students to clarify concepts that are often confused, or poorly understood.

Students are put in pairs or small groups, and are given a grid like the one below (only much bigger!) on flip chart or A3 paper. They work in groups to make a bullet pointed list of important similarities and differences between the two concepts. They can work from previously unseen, or from other notes to do this. Clearly this could be used in any subject to help teach almost any pair of similar concepts. For example:

Fractions and Percentages

Charles I and Charles II relations with Parliament

Osmosis and diffusion

Shares and Bonds

Commas and semicolons

Characters in a novel

<table>
<tr><td></td><td colspan="2">Similarities</td></tr>
<tr><td rowspan="3">Comparing Kinetic Energy and Momentum</td><td colspan="2">They both:</td></tr>
<tr><td colspan="2">Differences</td></tr>
<tr><td>Kinetic energy… But Momentum…</td><td>Momentum… But Kinetic energy…</td></tr>
</table>

9. PMI - An Edward De Bono created method of decision making.

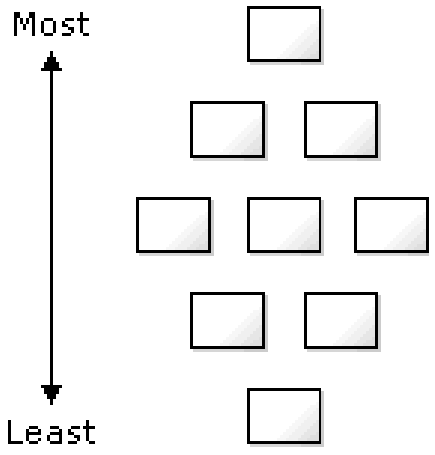
Plus	Minus	Interesting

The benefit of this approach to thinking is that it forces students to consider both sides of an idea not just the one they initially favour. Setting the class a challenge of working in groups to come up with 3-5 positive and negative (minus) points along with 2-3 interesting points provides a framework to force them to think more deeply about the issue. Some of the groups can be given the task of only considering one or other side of the argument. This tool can prove to be very productive in preparing students for writing essays.

It would be a good idea to model the process first with a practice examples such as "Social networking sites should be banned for everyone under the age of 18."

10. Diamond Ranking

Understanding how to set priorities by asking "how important is this?" is an important skill. Diamond ranking challenges students to work together to discuss and make judgements about the relative importance of different items. Set a question and have nine ideas for students to prioritise. Write each idea on a post-it note and ask each group to arrange their nine ideas in a diamond shape with their top priority (or best solution) at the top, two in second place, three in third place, two in fourth place and the lowest priority (or worst solution) at the bottom. They need to get consensus as a group and can move the ideas around until they reach an order with which they all agree.



Examples in action

- Different foods in order of healthiness (Food Tech)
- Activities a person might do (literacy)
- Factors influencing a character in a novel (English)
- Factors affecting a business location for a firm (geography. Business studies)