Early Career Teachers' Conference 2018

Five fun, formative frameworks

Cards/ppsticks

- Have you used cards/sticks before?
- Did you know that there is often a measurable improvement in learning when this strategy is used?
- What are the advantages of 'no hands up'?
- How can this strategy be used effectively? (discuss, then pick individuals with cards) when, why, how?
- Dylan Wiliams "The Classroom Experiment"
 - <u>https://youtu.be/J25d9aC1GZA?t=3330</u>
 - https://youtu.be/1iD6Zadhg4M?t=245
 - <u>https://www.dylanwiliamcenter.com/wp-content/uploads/2015/02/10-Feedback-Techniques.p</u> <u>df</u>
- Purchase option for blank playing cards
 - https://www.abacused.com.au/maths/blank-playing-cards-pack-of-200

Google Quiz

- Questions are from a study into the prevalence of 'neuromyths' derived from misunderstandings and misapplications of neuroscience in education
- <u>https://goo.gl/forms/LQglxs27HYmfPI5F2</u>

IF-AT

- Eric Mazur "Assessment: the silent killer of learning"
- https://youtu.be/CBzn9RAJG6Q?t=2506https://youtu.be/CBzn9RAJG6Q?t=2506
- Hard copy questions
- <u>http://www.epsteineducation.com/home/about/default.aspx</u>

Whiteboards

- Draw a diagram showing the size of the Earth compared to the size of the moon (3.5x difference)
- Write 3 scenarios (on your whiteboard) in which the whiteboards would be beneficial/enjoyable for students
- <u>https://www.teaching.com.au/catalogue/mta/mta-teachers-whiteboard-access</u>

Kahoot (ghosting)

- Boards
 - Have you used kahoot?
 - Have you used the ghost feature of Kahoot to encourage students to learn?
- <u>https://create.kahoot.it/details/how-does-climate-change-impact-the-ocean/2625812b-01a2-4202-8a</u> <u>89-b066bd82ea69?_ga=2.117050767.866590555.1539049440-1920149573.1503372940</u>

In forensic science, blood alcohol content is tested at the time of sampling and, if challenged in court, from a stored sample.

A student wanted to know how the tightness of the lid of a screw-topped container affected the loss of alcohol over time. He assumed alcohol behaved the same way in blood and water.

He partially filled three containers with equal quantities of 0.1 g L–1 alcohol solution. He then tightened the lids as follows.

- loose lid tighten until resistance is experienced then turn lid back 1 mm.
- firm lid tighten until resistance is just experienced.
- tight lid tighten until resistance is just experienced then turn a further 1 mm forward. The solutions were then stored in a storage cabinet at 30 °C for a number of weeks.

His results are shown in the graph.



By how many grams per litre has the concentration dropped after three weeks in the container with the tight lid?

- (A) 0.005 (B) 0.01
- (C) 0.09
- (D) 0.095

The key distinguishes between types of supernova according to the light they emit.

| 1. Does the spectrum contain hydrogen lines? | Yes go to 4 No go to 2 |
|---|---------------------------|
| 2. Does the spectrum contain silicon lines? | Yes Type 1a No go to 3 |
| 3. Does the spectrum contain helium lines? | Yes Type 1b No Type 1c |
| 4. Are helium lines dominant in the spectrum? | Yes Type 2b No go to 5 |
| 5. Does the light curve decay linearly after peak brightness? | Yes Type 2I No Type 2p |

A supernova shows both hydrogen and helium lines in its spectrum but the helium lines are much stronger than the hydrogen lines.

What type of supernova is it?

- (A) Type 1b
- (B) Type 2b
- (C) Type 2I
- (D) Type 2p

The two graphs below show what scientists believe were the concentrations of nitrogen and carbon dioxide in the atmosphere between 4 500 million and 2 000 million years ago.



There was a time in history when carbon dioxide and nitrogen were present in equal percentages in the atmosphere.

At what time did this occur?

- (A) 2 000 million years ago
- (C) 4 200 million years ago

- (B) 3 500 million years ago
- (D) 4 500 million years ago

The following flow chart can be used to distinguish between some elements.

Element Y is sulfur and element X is carbon.



Which feature is used in the key to distinguish between them?

- (A) Carbon is black and sulfur is yellow.
- (B) Carbon is a conductor and sulfur is an insulator.
- (C) Carbon is a gas and sulfur is not a gas.
- (D) Sulfur burns with a flame and carbon glows red hot.

Some molecules are mirror images of each other. They cannot be rotated or moved so that one molecule can be superimposed on the other.

The models of molecules shown are mirror images of each other.



Here is a model of a molecule of 1-iodoethanol.



Which model of a molecule below is a mirror image of the one above?



| Animal | The characteristics of flowers that mainly attract the animal | | | | |
|-----------|---|-----------------------|---------------|--|--|
| Animai | Size | Colour | Smell/odour | | |
| bee | small | bright blue or yellow | - | | |
| beetle | large | white | spicy or foul | | |
| butterfly | small | white | - | | |
| bird | large | red or yellow | - | | |
| bat | large | white | fruity | | |

The table shows the characteristics that some flowers have to attract animals.

The key classifies 5 flowers: I, II, III, IV and V.



Which animal would be attracted to flower I and which would be attracted to flower IV?

| | I | IV |
|-----|------|--------|
| (A) | bird | beetle |
| (B) | bee | bird |
| (C) | bird | bee |
| (D) | bee | bat |

Acceleration due to gravity is different on different planets. It depends on the mass and the radius of the planet, as shown in the formula.

$$g = G \frac{m}{r^2}$$

| | KEY |
|---|---|
| g | is the acceleration of an object due to the planet's gravity |
| G | is a constant |
| m | is the mass of the planet |
| r | is the radius of the planet |

The table below shows the mass and radius of some planets compared to Earth.

| Planet | Mass compared to Earth | Radius compared to Earth |
|---------|------------------------|--------------------------|
| Mercury | 0.055 | 0.38 |
| Venus | 0.86 | 0.95 |
| Earth | 1.0 | 1.0 |
| Mars | 0.11 | 0.53 |

Which planet has the smallest acceleration due to gravity on the surface?

| (A) | Mercury | (B) | Venus | (C) | Earth | (D) | Mars |
|-----|---------|-----|-------|-----|-------|-----|------|
|-----|---------|-----|-------|-----|-------|-----|------|

A student wrote a report containing a number of points.



8) Water was the most viscous liquid tested.

Which points are the student's results?

- (A) 4 and 5
- (B) 5 and 6
- (C) 6 and 7
- (D) 7 and 8

Was the student's conclusion correct? Why?

| | Conclusion correct? | Reason |
|-----|----------------------------|--|
| (A) | no | The marble went through the water the slowest. |
| (B) | yes | The marble went through the water the slowest. |
| (C) | yes | The marble went through the honey the slowest. |
| (D) | no | The marble went through the honey the slowest. |

Aquatic environments have a number of sources of pollutants. Pollutants from point sources come from specific places that can be easily identified and controlled. Non-point sources of pollutants are widespread, they usually cover a large area and cannot be easily measured or identified.

The following table identifies some types of pollutants and their sources.

| | Point sources | | Non-point sources | |
|--|---------------|-----------------------------|-------------------|-------------|
| Pollutant | Mines | Wastewater treatment plants | Stormwater | Agriculture |
| pathogens (bacteria and viruses) | 1 | 1 | 1 | 1 |
| toxicants (heavy metals and pesticides) | 1 | 1 | 1 | 1 |
| sediments | 1 | | 1 | 1 |
| nutrients (nitrates and phosphates) | | 1 | 1 | 1 |
| salinity | | | | 1 |
| heat | 1 | | | |

Which statement is correct according to the information in the table?

(A) Wastewater treatment plants are non-point sources of toxicant and nutrient pollution.

(B) All listed sources of pollutants release sediment and pathogens into aquatic environments.

(C) Mines and agriculture release the largest volume of pollutants into aquatic environments.

(D) While the table shows different pollution sources, the volume of each pollutant is not shown.

- 1. We use our brains 24 h a day (C).
- 2. Children must acquire their native language before a second language is learned. If they do not do so neither language will be fully acquired (I).
- 3. Boys have bigger brains than girls (C).
- 4. If pupils do not drink sufficient amounts of water (=6–8 glasses a day) their brains shrink (I).
- 5. It has been scientifically proven that fatty acid supplements (omega-3 and omega-6) have a positive effect on academic achievement (I).
- 6. When a brain region is damaged other parts of the brain can take up its function (C).
- 7. We only use 10% of our brain (I).
- 8. The left and right hemisphere of the brain always work together (C).
- 9. Differences in hemispheric dominance (left brain, right brain) can help explain individual differences amongst learners (I).
- 10. The brains of boys and girls develop at the same rate (I).
- 11. Brain development has finished by the time children reach secondary school (I).
- 12. There are critical periods in childhood after which certain things can no longer be learned (I).
- 13. Information is stored in the brain in a network of cells distributed throughout the brain.
- 14. Learning is not due to the addition of new cells to the brain (C).
- 15. Individuals learn better when they receive information in their preferred learning style (e.g., auditory, visual, kinesthetic) (I).
- 16. Learning occurs through modification of the brains' neural connections (C).
- 17. Academic achievement can be affected by skipping breakfast (C).

- Normal development of the human brain involves the birth and death of brain cells (C).
- 19. Mental capacity is hereditary and cannot be changed by the environment or experience (I).
- 20. Vigorous exercise can improve mental function (C).
- 21. Environments that are rich in stimulus improve the brains of pre-school children (I).
- 22. Children are less attentive after consuming sugary drinks and/or snacks (I).
- 23. Circadian rhythms ("body-clock") shift during adolescence, causing pupils to be tired during the first lessons of the school day (C).
- 24. Regular drinking of caffeinated drinks reduces alertness (C).
- 25. Exercises that rehearse co-ordination of motor-perception skills can improve literacy skills (I).
- 26. Extended rehearsal of some mental processes can change the shape and structure of some parts of the brain (C).
- 27. Individual learners show preferences for the mode in which they receive information (e.g., visual, auditory, kinesthetic) (C).
- 28. Learning problems associated with developmental differences in brain function cannot be remediated by education (I).
- 29. Production of new connections in the brain can continue into old age (C).
- 30. Short bouts of co-ordination exercises can improve integration of left and right hemispheric brain function (I).
- 31. There are sensitive periods in childhood when it's easier to learn things (C).
- 32. When we sleep, the brain shuts down (I).

Neuromyth assertions are presented in *italic*; C = correct; I = incorrect.