AfL HPQs
AfL Fourth Run

@AFL_SUPPORT  FEB 24, 2017 01:56PM

JOSHUA O. OKE  MAR 30, 2017 02:59PM
MATHEMATICS
14/15 year olds
To be used at the middle of the lesson.
As some students still find Trigonometric ratios confusing, my response to the wrong questions is expected to clear this confusion.
Taking the students who are still confused through the rudiments of the lesson again in group.

HPQ: How many square centimetres in 1.2 square metres?
1. 120
2. 1200
3. 12000
4. 120000

The most common misconception is answer A. This evidences a lack of understanding of relationship between scale for length and resultant scale for area.

Response: Diagrammatic representation of problem to show misconceptions.

Development: Move into conversion of units for volume.

@AFL_SUPPORT  MAR 30, 2017 02:33PM

MATHEMATICS
KS3
Converting metric units including area and volume.

The HPQ could be used as an introduction to the topic to assess the level of teaching required.

From here:
https://padlet.com/mariamunawwar07/s8d
COMPUTER SCIENCE

Q: Virtual memory becomes very useful when

1. Saving large amount of data
2. Physical memory not working properly
3. Multiple applications are being used.
4. Accessing the saved data from physical memory

Correct answer is 3

Topic: Virtual Memory
Level: 9th Grade
HPQ

Which of these is a triangular pyramid?

Grade 2 Mathematics
3D shapes

From here:
https://drive.google.com/file/d/0B8jHHQvLUmb3Rkh3WVBWR2tobDQ/view

Science. Grade 2

Sort out the characteristics of a mammal from the given list:
1. It has scaly skin.
2. It has hair on its skin.
3. It eats with its beak.
4. It feeds its young ones by its milk.
5. Dolphin is a mammal.
To check understanding about mass, weight and gravity.

What is the weight of an astronaut (with all his gears) in the Moon and in the Earth? Show the right answer.

If the astronaut weights 90 kg-900 N how much he will weight on the Moon:
A. 90 kg and 15 N
B. 15 kg and 15 N
C. 90 kg and 90 N
I would ask the students with correct answers to explain why A. is the correct answer if needed after a short discussion. The idea is to come to some clear rule/explanation. (i.e. The mass of an object stays the same wherever it is, but its weight can change depends on the gravitational field...).

@AFL_SUPPORT  MAR 30, 2017 01:13PM
From here: https://padlet.com/lilialang21/y0hmh3c5iu!
Submitted by Lilia Lang

KS3 Science – PHYSICS
Astronomy and Space
Topic: SEASONS
To check for common misconception.
Perform (again) some experiment with model showing that sun shines longer in the northern hemisphere and point out that in winter the Earth is not further from the Sun.

Why it is warmer in summer than in the winter? Show (on a mini-white boards) the write answers.

A. The Sun is brighter/emits more energy in summer than it is in winter.
B. The Earth is closer to the Sun in summer than it is in winter.
C. The Earth’s axis is tilted.
D. The days in the summer are longer than in the winter.
E. The prevailing winds in summer come from the Equator and in the winters from the Poles.

The next step depends on the type of responses. If there are answers B, we will look at some simulations- globe, thermochoeric paper and source of light. (http://www.bing.com/videos/search?q=Changing+of+Seasons+Explained&view=detail&mid=5237DEDB672945AB4F752337DEDB672945AB4F78rvs=mid=B3DE96E48BEABDB34F92B3DE96E48BEABDB34F92&fsscr=0&FORM=VDFSRV), for other wrong answer will question for quick explanation. If B and C are not together again will ask for short clarification.

@AFL_SUPPORT  MAR 30, 2017 12:50PM
From here: https://padlet.com/rabia_mul_pk/gzg9cswc

Rabia Kanwal
Mar 30, 2017 9:50am

TRANSPORTATION
What mode of transport is an airplane?
A) Water, it flies over water
B) Air, flies in the air
C) Land, it moves on land during landing/takeoff

@AFL_SUPPORT  MAR 30, 2017 12:55PM
TRANSPORTATION
Pre-K (Age: 3 years)

Which of the following is a polygon?
BIOLOGY. HPQ: Intended context:
Subject- Biology. Level- Stage 9. Topic- Variation and Inheritance. Point of using- After teaching the topic of Inheritance and emphasising characteristics that are caused by genes (inheritance) only and those caused by inheritance and environment. The HPQ should elicit the response of a clear understanding that some characteristics are inherited entirely from parents, with no affect from the environment, while other characteristics are inherited but also affected by the environment. In response to the evidence elicited from the HPQ I would: 1) If the evidence indicates a lack of understanding of the concept involved, I would re-teach to clarify the principles involved. 2) If the evidence indicates that students have a clear grasp of the concept, then I would move on teach on how such knowledge can be used in selective breeding and how it works out in Natural Selection. My HPQ: A set of identical twins both have blue eyes and their mother also has blue eyes. One of the twins, who works in an office in London, is very light skinned and fairly overweight. The other twin, who works as a game ranger at a game park in Southern Africa, has darker skin and is of a slim build. Which of the following responses best explains the characteristics shown by the twins? A) Eye colour is caused by the environment while skin colour and mass are caused by inheritance and environment. B) Eye colour is caused by environment and inheritance while skin colour and mass are caused by environment only. C) Eye colour is caused by inheritance while skin colour and mass are caused by environment only. D) Eye colour is caused by inheritance while skin colour and mass are caused by inheritance and environment.
Whilst it is possible for students to read this question and respond quickly (and also for the teacher to see the responses quickly), many students will get the correct answer just by guessing. Three is a longer answer, and has the most written by way of a science explanation. Students could easily guess correctly, without really thinking about it, just by the length of the answer. Balancing out the wording across all three answers, so that they are of a similar length, would be a good improvement. Additionally, it would be worth referring to other known misconceptions to balance out the wording. E.g. some students may believe that the production of gas will actually increase the weight of the bottle. — YEASMIN MORTUZA

His wife must have written him the speech.

A) The speech must have been written for him by his wife.

B) She must have been written the speech by her.

C) The speech must has been written by him for her.

D) He must have been written the speech by her wife.

Hi Widjan. Thanks for this thoughtful HPQ. I wonder whether students will guess that those answers in which the 'muscle stimulated' option is NOT at the beginning nor end of the chain are probably no good, just by guessing. You might get a better assessment of the more difficult misconceptions if you modified options A) and D), so that they are more focussed on the other (more likely) misconceptions. Such as, thinking that the muscle moves first, or confusing the order of the other events. — YEASMIN MORTUZA


This question is on knee reflex arc. The correct answer for this question is option B. The receptor has to get stimulated once the knee is tapped followed by the activation of sensory neurone. Next, the motor neurone will be activated which leads to the stimulation of the muscles to respond.

This question will be posted to High School Biology students and this question will be posted to the whole class to test their understanding based on the topic learned during their lessons in class.
This question will be posted to my students at the end of the lesson. Since they will be exposed to the theory on reflex arc earlier in their lessons, they should be able to answer this question easily.

Science- Reversible and Irreversible Reactions

This topic was done in year five
The student were asked to indicate reversible or irreversible reactions with two coloured cards.
Hi Mary. I like the inclusion of the ice-cream example, and the salt dissolving example, which Year 5's may have more difficulties in recognising as reversible changes. The word 'reaction' may introduce a new misconception though (which your secondary school colleagues would be stuck with having to undo in later years!). Perhaps the word 'changes' instead of reactions would be better. Thanks for sharing!

— YEASMIN MORTUZA

This question was used with my Year 9 Business Studies Class to check their understanding at the end of the topic. This is an A-Level based question so needed them to have read recent newspaper reports and think carefully about it.

BEV SEALE   MAR 27, 2017 10:08PM

BMW i8 engines to be built in Birmingham

I was reading today that BMW i8 engines are to be built in Birmingham. Why would the German-based car maker want to produce engines in the UK? What's brought them here?

A. Cheaper labour
B. Cheaper manufacturing costs
C. Ready supplies of raw materials
D. Strong marketing and buying presence

@ZAINABFAYYAZ_54523   MAR 27, 2017 03:49PM

Subject: Science Level: Grade 1 Topic: Living things and non living things

I'll portray this hinge point question after the students have learn and understood the characteristics of living things.

Q. What is true for plants?

A. Plants are living things because they can grow.
B. Plants are non-living things because they cannot move.
C. Plants are non living things because they cannot see.
D. Plants are living things because they need water.

This will help me to elicit student's learning and understanding of characteristics of living things.

In response to the evidence I'll lead my discussion to the next level i.e. Life processes in plants.

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@NABIHAHIBRAHIM23   MAR 29, 2017 10:02AM

BIOLOGY

TOPIC : CELL STRUCTURE

teacher gives students two clues which are:

-Permeable to all fluids
-Rigid and not elastic

teacher asks students to show which structure has these characteristics by showing them a picture of a cell with answer choices. then student need to identify the name of the structure.

@NABIHAHIBRAHIM23   MAR 29, 2017 10:02AM

Hi Nabiha, I like the way that these questions are presented. I have a question. Might the students think that D) (Cytoplasm) is permeable? and would you accept it as a correct response? Thanks for sharing! — YEASMIN MORTUZA

@DIYANAATIQAHWHD   MAR 27, 2017 03:14PM

Subject : Biology Level : Form 4 student (16 years ) Topic : Malnutrition

Using White board for each of student to show their answer Hinge Point Question
Carbohydrates is the most important nutrient that can provide high energy for human. Dental carries is one the effect due to excessive intake of carbohydrates which are produced by bacteria from carbohydrates. What will happen if you don’t get enough carbohydrates in your diet?

a) Stomach bloated, growth of body and brain retarded, no appetite for food, weak body.

b) The level of sugar in blood may drop to below the normal range (70–99 mg/dL), causing hypoglycemia. Body then starts to burn fat for energy, leading to ketosis.

c) Dermatitis (Skin becomes red and inflamed), diarrhea and mental disorder.

d) Bleeding gums, bruised skin, painful and swollen joints, weakness.

Write your answer on mini whiteboard given without seeing your friend answer.

Hi Mary, Thanks for your entry. Your question seems to be a straight-forward one that (on the face of it) is checking for factual knowledge. If you added the characteristics of each soil type somewhere, it might support you in flushing out any misconceptions associated with knowledge of soil types. This could be introduced as a second multiple-choice question, for example, in which you ask students why they chose a particular answer in the first question. — Yeasmin Mortuza

Hi Dyanaatiqahwd. Thanks for your entry. Answer C) is the only one that describes a reduction in something (the other answers describe symptoms only). Answer C) also explains how the reduction that leads to the condition. For this reason, students could easily guess that this was the correct answer, without being sure. You might try removing the explanation, so that all answers describes symptoms only OR adding other explanations that fish for misconceptions. — Yeasmin Mortuza

Hi Alistair, You are correct that a major cause of global warming is the release into the atmosphere of carbon dioxide. Students are learning to understand that a major cause of global warming is thought to be the release into the atmosphere of carbon dioxide. Responses are collected using ABCD cards. The lesson continues either with most students working in small groups to design an experiment to measure the effects on temperature of the build-up of CO2, or with those students who understand the connection between increased atmospheric CO2 and global warming (C) pairing up with those who answered something else to read and discuss information on global warming on the internet. Scientists believe that a major cause of global warming is: (A) decreasing average distance of the Earth from the Sun due to a slowing down of the Earth in its revolution around the Sun (B) decreasing concentration of stratospheric ozone due to so many CFCs being emitted into the air (C) increasing concentration of atmospheric CO2 due to all the emissions from automobiles and factories (D) increasing concentration of atmospheric water vapour due to all the water being evaporated from the oceans, rivers, and lakes.

— Yeasmin Mortuza

Hi Mary, Thanks for your entry. Your question seems to be a straight-forward one that (on the face of it) is checking for factual knowledge. If you added the characteristics of each soil type somewhere, it might support you in flushing out any misconceptions associated with knowledge of soil types. This could be introduced as a second multiple-choice question, for example, in which you ask students why they chose a particular answer in the first question. — Yeasmin Mortuza
Which of the following statements about halogenoalkanes are correct?
A. Fluoroalkanes are extremely reactive compared to other halogenoalkanes.
B. 2-bromoethane is more reactive than 1-bromoethane.
C. Halogens act as electron withdrawing groups in halogenoalkane compounds.
D. 3-iodopentane has a higher boiling point than 3-chloropentane.

Which water treatment best reduces the risk of infection by killing pathogens in drinking water?
(A) Chlorination
(B) Ultraviolet
(C) Filtration
(D) Precipitation

Which of the following prevent entry of pathogens into the human body?
(A) The skin and phagocytosis
(B) The skin and chemical barriers
(C) Inflammation response and phagocytosis
(D) Inflammation response and chemical barriers

What is the difference between the plant cell and animal cell?
A. Plant cell has cell membrane but animal cell does not
B. Plant cell has cell wall but animal cell does not
C. Plant cell has no fixed shape but animal cell has fixed shape
D. Plant cell has no chloroplast but animal cell has chloroplast

This shape has one line of symmetry because:
a) It is exactly dividing the letter in to half.
b) If we fold the letter from the line of symmetry it will be half.
c) Letter A can have a horizontal line of symmetry as well.

Subject: CHEMISTRY Level: 7 Topic: Particle model of matter
Hinge Point Question: After giving the concept of particles in an atom. In an atom the sub-atomic particles which revolve around the nucleus are called A Electrons B Protons C Neutrons D Positively charged particles — SALMA FAISAL

AMNA SAMI — AAMNA SAMI
Assigning variables

What will happen after click on green flag?

a) The figure will say: Variable A is greater than Variable B
b) The figure will say: Variable B is greater than Variable B
c) The figure will say both sentences
d) Nothing will happen.

This is a good hinge point question. It tests the student's understanding of the commands and the choice of possible responses makes the students think through the process.

— SUE CONNERY
**DAMIAN HOWISON**  MAR 25, 2017 10:05PM

**Mathematics**

Year 9  
Number  
Standard Form

This is my improvement based on feedback received. My HPQ was perhaps too difficult. Maybe it still is?! And maybe it is more of a challenging discussion question than a HPQ. Now that I've said that out loud I'm more inclined to think that.

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**MICHAEL**  MAR 25, 2017 08:49PM

**Fahrenheit 451**

At what temperature does paper ignite and burn?  
What is the difference between firemen now and in Ray Bradbury’s future?

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**KARIN KURRY**  MAR 25, 2017 08:37PM

**Chemistry**

CHEMISTRY  
9th grade (14-15 yr. olds)  
Balancing equations and identifying reaction types  
I would use this question at the end of discussing reaction types before starting a precipitate lab.

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**AAMNA SAMI**  MAR 25, 2017 02:59PM

**MATHEMATICS PRIMARY**

Which of the following statements is/are false – you may pick more than one:

1) Sound can travel through gasses, liquids and solids.  
2) Sound travels as vibrations.  
3) Sound travels at the same speed in all materials.  
4) We hear sounds when vibrating air hits our eardrums.

Context: Primary Science, Year 6 revision on the topic of sound.

As this is a Year 4 topic, I would actually use it at the beginning of my Year 6 revision lesson, to gauge an...
understanding of what their current level of understanding is.
• I would expect them all to know that sound can travel through gasses, liquids and solids, as they encounter this on a day-to-day basis. (1)
• I would expect most to recall that sound travels as a vibration. (2)
• I expect only a few would know that sound does not travel at the same speed in all materials. (3)
• I expect most would recall that we hear sounds when vibrating air hits our eardrums. (4)

My response to evidence:
1) Students who are correct – then use statement 3 to stimulate constructive dialogue. Using pair talk they can discuss examples of this to show their understanding. (This can be done independently whilst teacher works with other group). Later this can be fed back to the class at large.

2) Students with misconceptions to work with the teacher to clarify their understanding on all of the points.

**KS 3 / 4 Biology**

Breathing and Respiration topic.

There are two main misconceptions I have experienced in this topic. Students get the two processes confused and secondly they think we breathe in oxygen and give out carbon dioxide. So I though of this HPQ to try and establish understanding of the latter.

Which of the following statements if any about the gases involved in breathing are true.

A. We breathe in oxygen and breathe out carbon dioxide.
B. We breathe in air and breathe out carbon dioxide.
C. We breathe out water vapour.
D. The Air we breathe out has less oxygen and more carbon dioxide than we breathe in.

**Mathematics**

Year 9
Number
Standard Form (Scientific Notation)

The evidence I am trying to elicit is what learners understand about the different parts of a number written in standard form: the coefficient and the order of magnitude. Do they know how to work with the numbers when required to add them? And do they understand how the answer would be written in standard form?
**HPQ Chemistry**

Which part of the diagram can be used to measure the amount of the reactant used in a titration.

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**Hira kashif**  
**March 24, 2017, 10:33 AM**

**Hira Kashif**

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**NIKHAT BUNJUN**  
**March 23, 2017, 6:35 PM**

**BIOLOGY A Level**

Varsha Bunjun

**HPQ on Photosynthesis**

I plan to use this question after teaching the light dependent stage, to confirm if the class can proceed to the light independent stage. The HPQ will check if students know the 3 end-products of this stage. Students are to select the two best answers.

**Question:** The end-products of light dependent stage are:

A. Reduced NADP and oxygen  
B. ATP and water  
C. ATP and oxygen  
D. Reduced NADP and water

The right answers are A and C.

This will indicate that students have a clear understanding of:

(i) the light dependent stage,  
(ii) the importance of water as one of the raw materials needed for photosynthesis  
(iii) reduction of NADP and evolution of oxygen, from water by photolysis  
(iv) how the light energy has been transformed into ATP and

Students selecting **B or D** as part of their answer are missing out on the fact that water splits to provide (i) the hydrogen used to reduce NADP, and (ii) the oxygen which is given off, so water cannot still be one of the products.

This misconception occurs when students mix up respiration and photosynthesis, especially when they are not looking at the complete equation of each process.

With the group that gave wrong answers, I’d review photolysis and connect it to the Z scheme, (using the flow chart on smart board/OHP transparency) this by guided discussion. I’d follow this up with written task -to account for the formation of each of the end-product. Students will be grouped in pairs for this activity.
Victoria Parson My Hinge Point Question:Key Stage 3 Science - This question could be used in a lesson about particles, and the way particles behave when they are cooled. It could also be used as part of a lesson about pressure in gases. The aim of answers A, B, and D to tease out the following misconceptions:

A- That the particles themselves get smaller when materials contract as they cool
B- That there is air in between particles in gases, rather than the air being made of particles itself
The answer D is there to check that pupils know that in gases the particles move less when the gas is cooled

Here is the question:
If I put an inflated balloon in a freezer it will:
A Get smaller because the cold makes the air particles get smaller
B Stay the same size because the air in between the particles will keep the balloon inflated
C Get smaller because the particles have less energy and move around less, so they push on the surface of the balloon less
D Get larger because cooling particles down makes them move further apart

Depending on the pupil responses I’d consider carrying out the following activities:
Do the balloon experiment as a demo – it’s not too difficult to carry out
Ask the pupils to draw particle diagrams of how the particles are behaving in the frozen balloon on white boards, pair them up and then discuss in groups
Use interactive resources to investigate how particles behave in solids, liquids, and gases with temperature changes (there are lots on BBC, for example)

I expect the hinge-point question to elicit a common misconception that students have when locating fractions on a number line; counting interval hash marks and/or points instead of locating benchmark hash marks or points to help place the fraction on the number line.

Some things I might try if students respond indicating they have this common misconception might be to have students work outside on a number line drawn on the ground with interval hash marks. We could talk about the interval hash marks, identifying what they represent and why. Students would next be given fractions and asked to figure out in pairs where that number would be placed on the number line with the interval hash marks. Each pair would be asked to explain the placement of their fraction.

I could also have students use some interactive tools such as some GeoGebra Applets where they can move fractions on a number with preset interval hash marks to see how understanding the intervals of the hash marks helps identify where the fractions should go. This could be done independently and I would walk around and ask students to share what they are discovering or it could be done in pairs and student record what they are doing using an app like Explain Everything. The pairs could share their learning with the rest of the class.

LISA HOGAN  MAR 23, 2017 01:08AM
Mathematics
Fractions - Grade 3
I envisage using this HPQ once students have had practice working with number lines, fractions, and placing fractions on number lines with interval hash marks and/or points.

ANONYMOUS  MAR 22, 2017 11:10PM
GCSE Mathematics
Probability
Physics (18-19 age)

Topic: electromagnetic induction

Primary: grade 1 MATHEMATICS

PROPERTIES OF SHAPES
I will use this question to check on my students understanding about the properties of cuboids before continuing the lesson. Which of the following shapes are cuboid? I, II or III
I) 12 edges, 6 faces and 8 vertices
II) 8 edges, 5 faces and 5 vertices
III) 1 curved face, 0 edges and 0 vertices

Which circuit will give me the brighter bulb

Physics - Year 8 - Light

Which of the following is true about a ray of light hitting a glass block?
A. The entire light ray is reflected
B. The light ray is absorbed
C. The entire light ray is refracted
D. The light ray is both refracted and reflected

Adverbs (English Primary)

The lesson is about the characteristics of adverbs with students learning to identify the adverb in a sentence. Responses are collected with ABCDE cards. The lesson continues either with students working in small groups.
writing simple sentences and underlining the adverbs, or with those students who chose the correct answers doing this, while the teacher works with those who answered incorrectly. Identify the adverbs in this sentence: The boy ran across the street quickly.

A: Boy
B: Quickly
C: Across
D: Ran

Points to Remember: Hinge-point questions can't be asked in a traditional way...hands up...doesn't engage students. Rather all students must be participating.

Some alternative ideas: □ 1: ABCD cards (everyone must participate) □ 2: Mini-whiteboard (everyone must have an answer...you hear everyone) □ 3: Poll Everywhere (less risk, everyone answers)

What makes a good hinge point question:
I: Careful planning and time □ 2: Multiple Choice ability

**Secondary Maths - translations**

True/False session at end of lesson. Students to vote independently then class discussion to elicit an explanation. Sally Valentine

**True or False?**

I am at the point (8,3) and want to collect another star of the same colour.

I need to travel by the blue.

**Translation hinge point questions**

ODP document

PADLET DRIVE

**Primary Math**

**MATHEMATICS**

**Topic**: Conditions for parallelism and perpendicularity of non-vertical lines in terms of their slopes (10th graders)

Point in the course I intend to use it: after the students have learnt what the slope of a line is & which are the conditions for parallelism and perpendicularity of lines in terms of their slopes.

The evidence I would expect the hinge-point question to elicit:

Answer C – will point out that a wrong procedure: checking only the condition related to slopes (without checking if the intercepts with Oy are different)

Answer D - will point out the misconception m1m2=1 (condition for perpendicularity of 2 lines is m1m2=-1) or

Answers A, B, D are correct.

Any combination of right and wrong answers should demonstrate limited understanding of the link between the slope and the form of the equation of a straight line (The student reads the number in front of x as if it were the slope in all equations).

**In response to the evidence**, I will organize group work:

• students who chose D – will do some more practice for checking condition for perpendicularity of 2 lines and will explain how we obtained the condition;

• students who chose C – will do some practice for representing lines which have the same slope (m) and cut the same intercept n on y-axis; they will argue why this type of pair of lines are not parallel

• students who chose different combinations of right and wrong answers - will do some more practice for identifying the slope of a line when the equation of the line is given in different ways
• students who chose A, B, D - will solve some challenging problems related to conditions for parallelism and perpendicularity of non-vertical lines in terms of their slopes
(Ariana-Stanca Vacaretu)

NANCY BURTCH  MAR 21, 2017 08:50PM

MATHEMATICS --Normal Curves

Which is true of the following curves?

a) The curves have different standard deviations and means.
b) The curves have the same standard deviation, but different means.
c) The curves have the same mean, but different standard deviations.
d) The curves have the same standard deviation and mean.

(Image from https://commons.wikimedia.org/wiki/File:Sss_gause.gif)

CHRISTOPHER JOHN BUTTIGIEG  MAR 21, 2017 11:36AM

Primary Science
Year 4

Topic: Measuring the Weather.

Which one of the following instruments is used to measure humidity?

A. anemometer
B. ammeter
C. hygrometer
D. barometer

What is the name of the device that measures wind speed?

A. anemometer
B. ammeter
C. hygrometer
D. barometer

What does a barometer measure?

A. wind speed
B. wind direction
C. air pressure
D. temperature

Which device measures air temperature?

A. anemometer
B. thermometer
C. barometer
D. wind vane

After introducing the topic weather and discussing I will be asking a set of questions to determine if the pupils understood how to use and for what purpose each instrument is used. By using all the instruments available and testing each and everyone (after the Hpq's) we will determine if the pupils understood what these instruments are used for.

p.s. These are just a few questions not the whole sequence either.

ANONYMOUS  MAR 21, 2017 09:18AM

Electrochemical cells

CHEMISTRY
A-level chemistry Year 13 topic: electrochemical cells

This topic requires learners to be confident in identifying oxidation and reduction in a given equation as well as using electrode potential data. Often students confuse the direction of equilibrium when provided with this data (all half equations are presented as reduction) and lack the ability to decide which half-cell would be the positive/negative terminal linking this to
Questions:
If a copper half-cell is connected to a an iron(II)/iron(III) half-cell, which statement(s) are true?
(SEP copper half-cell: +0.34; SEP iron half-cell: +0.77)

a) the iron half-cell is the positive terminal where reduction takes place
b) copper ions will be reduced as they have the less positive standard electrode potential
c) electrons will flow from the copper half-cell to the iron half-cell
d) the positive terminal always has a positive electrode potential

The intention is to a) link oxidation/reduction to terminals, b) use electrode potentials to decide if oxidation or reduction take place, c) establish that electrons flow from the negative to the positive terminal, d) get over the common misconception that positive numbers mean positive terminal and vice versa.

Depending on answers, students who choose correct answers would move on to feasibility questions, students who can't link terminals to oxidation/reduction or electron flow would look at diagrams and discuss what happens when half cells are combined and those linking positive to positive would work with cell potentials where both standard electrode potentials are either positive or negative (can be reinforced by practical).

PHYSICS 1. KS 3 and 4 electrostatics.
Having introduced the topic and revised atomic structure using model atoms, students would use balloons and identify the charge type (+ or -) achieved by friction, using a coulomb meter. 2. Students often forget that only electrons can move. 3. Those students giving the answer a) would go back to the atomic model and look at what happens when electrons are added or removed. The nature of the nucleus would be stressed. Students giving answer c) would have extra help looking at the action of friction and the possible removal of electrons from the model atom. Students who got the right answer would then investigate other materials before the whole class moves on to attraction and repulsion. HPQ: When you rub your hair with a balloon, the balloon becomes negatively charged and your hair becomes positively charged. This is because: a) Protons move from the balloon onto your hair. b) Electrons move from your hair onto the balloon. c) The balloon gains electrons from the air and your hair gains protons from the air.
ESOL (ENGLISH AS A SECOND LANGUAGE)
ADULT
LEARNERS
INTERMEDIATE LEVEL
TOPIC: Stative and Dynamic verbs after a previous lesson on present continuous tenses and their usage. The hinge-questions would be asked in the middle of learning to assess learners learning and understanding. The evidence I would expect the questions to extract from the learners to analyze and assess their responses sensibly are: • answering in less than one minute • Incorrect answer choices that match most common mistakes as a result of wrong thinking and understanding • Inability to explain correctly as a result of wrong reasoning or idea
These hinge-point questions are necessary • To challenge students’ knowledge of present progressive tense and assess their understanding of stative and dynamic verbs • To clear any incorrect view or opinion based on faulty thinking or understanding about stative verb and present progressive tense. • To stimulate critical thinking and constructive dialogue among groups • To check on learning when I feel most students have understood the general idea of present progressive and stative/dynamic verbs and use that evidence to decide whether to continue with the lesson plan or reteach the topic to improve learners’ knowledge. • To enable me use the feedback at every stage to evaluate myself for better development.

QUESTIONS

(1) Few verbs have stative meanings and they can describe all except one.
   A. emotional state
   B. mental state
   C. possession
   D. action
   E. ownership
   Answer is D

(2) Which of these statements is false.
   A. You cannot use stative verbs with continuous forms.
   B. State verbs do not describe the things we do
   C. You can never use a state verb to answer the question what are you doing?
   D. State verbs do not describe actions
   E. You can use stative verbs to answer the question ‘what are you doing’?
   Answer is E

(3) Which of these sentences is correct?
   A. He’s loving his brother
   B. The cake is tasting delicious.
   C. The wine is smelling really nice.
   D. I’m liking this movie.
   E. None of the above
   Answer is C

(4) You can use dynamic verbs in
   A. Both present continuous or present simple form.
   B. Only present continuous form
   C. Only present simple form.
   D. Neither present continuous nor present simple form.
   E. None of the above
   Answer is A

(5) Which of these sentences is incorrect?
   A. He is needing an umbrella
   B. He is knowing about you
   C. He is wanting some food.
   D. He is understanding the problem.
   E. None of the above
   Answer is E

(6) Which of these is an informal way of using a specific stative verb.
   A. I prefer water to coffee
   B. The bag belongs to my mother.
   C. She knows you.
   D. She is loving her baby.
   E. None of the above
   Answer is D
I don’t usually teach grammar so explicitly but I think the questions look good and would work. Ideally, I think I would use the questions in a classroom response system or an app like plickers and use the answer data to organise some differentiated group and/or individual work and/or possibly teacher presentation. Sometimes I use these kinds of question with something like plickers asking for individual answers without showing the correct answers and then form groups of 3 or so students (combining some who have right with some who have wrong answers) and re-present the questions but get them to discuss and answer as a group the second time around. — JOSHUA UNDERWOOD

BIOLOGY Ventilation

What’s the best answer?

Breathing occurs

A. so all the oxygen goes in and the carbon dioxide comes out.

B. because of contraction and relaxation of muscles.

C. when the lungs expand and contract.

D. because our mouth is open to the air.

I constructed this hinge point question because I had just done a lesson on ventilation with my year 9. It would have been interesting to see what response I got before the lesson – but I literally just done it when we were given this assignment. Anyway, I gave it as a starter to the next lesson – when I meant to start with a back-to-back on alveoli. Only to discover that a significant number of pupils were answering “C”. So I gave them some structured questions to do (they’d filled in a table the lesson before). They moaned about not being given the answer straight away (particularly one kid who had answered “B” and clearly wanted the rest of the class to know he was right). After the structured questions, they all got it right.

CHEMISTRY

Level: Secondary 3 (UK Year 10), Topic: Atomic structure, Course: GCE ‘O’ Level

An element X has two isotopes, which may be represented as X-238 and X-235. How does an atom of X-238 differ from an atom of X-235?

(A) It has 3 more protons and 3 more electrons.

(B) It has 3 more protons but the same number of electrons.

(C) It has 3 more neutrons and 3 more electrons.

(D) It has 3 more neutrons but the same number of electrons.

I intend to use this question to check my students’ understanding of the scientific term “isotope” wrt. the three sub-atomic particles: electrons, protons, and neutrons.

The students’ responses will inform me as to whether my students really understood the definition of an isotope and that the number of protons, not the number of neutrons, determine the identity of an element.

I like this! Shame it didn’t come up in any of my reviews!

— ANONYMOUS

CHEMISTRY KS3

Year group: Y9 (mixed ability class)

Topic: Ionic bonding and balancing equations

Mid-topic just before we move onto balancing equations

I would expect to see most of the class choose the correct answer based on the work we have been doing on writing formula for ionic compounds. If there was confusion at all with the number of atoms of each ion, then I would not move on to writing and balancing equations because correct answers would be unlikely based on the inability to write correct formulae. I would spend time ascertaining who uses the cross-over method and who uses the simple maths balancing method, and ensure everyone found a method that worked. I may ask those who do show a good understanding based on this question to work out how to balance the number of atoms...

HPQ

Select the answer below that you think shows the correct chemical formulae for the following compounds:

Copper sulphate + sodium hydroxide > copper hydroxide + sodium sulphate

1. CuSO₄ + NaOH > CuOH + NaSO₄
2. CuSO₄ + NaOH > CuOH + Na₂SO₄
3. CuSO₄ + NaOH > Cu(OH)₂ + Na₂SO₄
4. \[ \text{CUSO}_4 + NaOH \rightarrow \text{Cu(OH)}_2 + \text{NaSO}_4 \]

**ANONYMOUS**  MAR 20, 2017 11:14AM

**Primary Science (KS2) Emma Cresswell**

Why does day become night?

A. The sun moves around the Earth; the side it shines on experiences day.
B. The Earth spins on its axis once every 24 hours; the side facing the sun experiences daytime until it spins away from the sun.
C. The sun and moon swap places to cause day and night.
D. The moon blocks the sun which turns day into night.

The question would elicit misconceptions about how children view the relationship between Earth, the sun and the moon. Answer A would indicate the misconception based upon the geocentric model of the relationship, answer B is the correct explanation and C and D are both very common misconceptions that children build up through their own observations prior to formal learning of this concept.

Corrections could occur with the group or groups that struggle with this concept via role-play with the children representing the Earth, sun and moon to demonstrate the heliocentric model, and/or practical representations involving torches and models of the Earth, moon and sun to demonstrate how the light source comes from one point (the sun) and it is the rotation of the Earth that alters the location that the light hits during the 24 hr rotation.

**CHRI$$ S$$ MAR 19, 2017 07:58PM

**HPQ for electric current**

I want to find out if students understand the conservation of current

There are 2 lamps in connected in series in a circuit. One of the lamps is brighter than the others. Which of these reasons could explain why?

A) The current is getting weaker as it moves around the circuit.
B) Some electrons have been used up as they have been through one lamp already.
C) The lamps are not the same make.
D) Resistance has slowed the current down.

If I get A/B/D responses:

I will have a circuit ready with 2 different lamps (eg 1.5v 3.5v) so that one is brighter. I will get a student to swap the lamps around and predict which is brightest, is it about the position in the circuit or the lamp itself?

I may need to recap the experiment:

I will show/get them to set up the circuit and measure the current at different places (or use a sim on a computer).

**AMINA ALI**  MAR 19, 2017 03:50PM

**An image to support my topic : fraction HPQ (Amina Ali)**

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**KYLIE THORPE**  MAR 20, 2017 09:57AM

**Year 1 maths**

![Fraction Image]

**Context**

We have been learning about different strategies to solve addition problems. This question is a check for understanding of the most difficult of these concepts the near double.

**Question:** which of the following equations is a near double?

A. 4 + 1
B. 4 + 4
C. 4 + 5
D. 4 + 0

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**@ROSEMARY_CAMPBELL**  MAR 20, 2017 06:41AM

**Primary Maths - Year 2/3**

A HPQ to assess if students understand how to add fractions where the answer is greater than one.
a) The clouds move and cover the sun
b) The Earth rotates, spinning on its axis, away from the sun
c) The moon blocks the sunlight and it can no longer shine on the Earth
d) The sun faces the opposite side of the Earth and it will be daytime there.

Hi Sarah. Thanks for sharing. I can see what the misconceptions are that you are getting at - one of them caught me out too! I initially thought that B) was correct, until I thought about it properly! — yeasmin mortuza

**MATHEMATICS**

**RIGHT ANGLE CALCULATION DIAGRAM**

Hi anonymous. In order to make this a HPQ, a range of answers should be shown to students to choose from.

— yeasmin mortuza
Which of these shapes belong to the following group?

A. <image>
B. <image>
C. <image>
D. <image>

You are welcome! — MARTHA M GAV

Thanks! — JILL P

I use card sorts and the Concept Attainment Model in my teaching -- but it never occurred to me to use this kind of visual structure for an HPQ. Great idea! — JILL P

MATHEMATICS
Primary school – Year 1
Which of these sequences is/are geometric?
A. 1, 2, 4, 8, 16, 32, ...
B. 3, 6, 9, 12, 15, 18, ...
C. 2, 1, .5, .25, .125, -.0625, ...
D. 1, 4, 9, 16, 25

Intended Context: Algebra I/II course structured around functions during unit on linear and exponential functions, particularly when studying sequences as functions with a positive integer domain - or possibly as a launch to the course.

Evidence I would expect the hinge-point question to elicit: understanding that each term (beyond the first) in a geometric sequence is generated by multiplying the previous terms by the same constant [common ratio].

What I would do in response to the evidence, either with the whole class or with particular groups of students:

Students who do not choose A do not appear to have a basic understanding of geometric sequences and will need more time with situations that are geometric (i.e., that include exponential growth). Activities that cue them into the feature of the common ratio (like picture pattern sequences and contextual problems) and help them to learn to question a sequence by asking, "Is there a common ratio?"

Students who choose B are likely to be confusing that the common difference and common ratio. Sometimes students see multiples of a number as powers of a number. I’d provide these students with rich tasks that include situations that help students delineate between arithmetic and geometric sequences (e.g., King's Chessboard-type problem, card sorts - probably on teacher.desmos.com and with physical cards, and student-generated examples of sequences that are arithmetic, geometric, and neither).

Students who do not choose C are likely to have the misconception that the common ratio has to be greater than 1 -- that the sequence has to "grow." More work with contextual exponential decay problems alongside exponential growth -- and asking questions that cue students into common features of the sequences and their graphs -- especially on problems where the common ratios are reciprocals.

Students choosing D likely hold the misconception that the \( x^2 \) relationship is exponential. This is a common misconception. I’d provide more situations where students distinguish between sequences that are arithmetic, geometric, and neither - again, card sorts and contextual problems with a focus on key features. The sequence is not geometric - nor is it arithmetic. [hmmm... also possible: Because it does not have a constant first difference, students might default to thinking it is geometric. Maybe this isn't a good option to include - but the quadratic/exponential misconception is worth ferreting out.]

BUKHARI TANIA MAR 18, 2017 11:35AM
The lesson is about magnetic forces with students learning to recognise the characteristics of objects attracted by magnets. Responses are collected using ABCD cards. The lesson will continue either with most students working in small groups to design an experiment to classify objects attracted to magnets or with those students who understand the characteristics of magnetic objects paired up with those who do not.

Which object can be picked up with a magnet?
(A) An iron nail. (B) A copper wire. (C) A piece of wood. (D) A piece of glass.

Hi Bukhari Tania. This is a nice straight-forward HPQ testing for subject knowledge around magnets. If it were me, I would have also thrown in one more metal item perhaps, since most students will have quickly learned that metals are a factor. That way, you can test them to find out if they know which ones may be attracted to a magnet. Thanks for sharing!

— YEASMIN MORTUZA

Anonymous Mar 17, 2017 12:32PM

Right Angles

Which shapes have a right angle?

Hi Ayesha. Although I am not a maths teacher - I can see what sorts of misconceptions this question would flush out. Thanks for sharing!

— YEASMIN MORTUZA

Anonymous Mar 16, 2017 12:00PM

Primary Maths

Which of these is a triangular pyramid?

@AYESHA_ABBAS Mar 15, 2017 03:37PM

Primary Maths

Question: 1

Hi Ayesha. Although I am not a maths teacher - I can see what sorts of misconceptions this question would flush out. Thanks for sharing!

— YEASMIN MORTUZA

Anonymous Mar 15, 2017 08:37AM

Electrical circuits

What is incorrect about this diagram...
1. Cell symbol
2. Position of Ammeter
3. Position of Voltmeter
4. Symbol for a resistor
My students loved it — BUSHRA KHAN

It was a different way to ask questions, I love it — EDGAR GARCIA

@AFL_SUPPORT  MAR 20, 2017 06:50AM
My Maths HPQ

MATHEMATICS
KS2
Number
Question
In which of the following diagrams is one-fourth of the total area shaded?
Answer
A, B and D

Using this question as a hinge-point question would provide a quick way to ascertain the depth of students' understanding of fractions.

It would not be easy to guess the three correct responses (A, B and D), and different combinations of answers would point to students having different kinds of misconceptions about fractions, for example that if one out of four regions in a diagram is shaded, the four regions have to have the same area for the shaded area to represent one fourth.

It would thus be possible to pre-plan differentiated follow up work which students could do depending on their responses to the question.

@AFL_SUPPORT  FEB 24, 2017 02:45PM
A diagram to support my Chemistry HPQ

ANONYMOUS  MAR 14, 2017 10:45AM
BIOLOGY - True for mitosis but not meiosis...

@AFL_SUPPORT  MAR 20, 2017 06:50AM
My Maths HPQ

MATHEMATICS
KS2
Number
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@AFL_SUPPORT  FEB 24, 2017 02:45PM
A diagram to support my Chemistry HPQ

ANONYMOUS  MAR 13, 2017 05:32AM
hb

ANONYMOUS  MAR 13, 2017 05:32AM
hb
A diagram to support my Maths HPQ