Assessment in Mathematics at Balshaw's

Numeracy Ninjas

Each Maths lesson in Year's 7 and 8 starts with a short intensive starter activity named Numeracy Ninjas.

Numeracy Ninjas is an intervention designed to fill gaps in students' basic mental calculation strategies and also to empower them with the numeracy skills and fluency required to fully access GCSE Maths concepts when they move towards Key Stage 4 study.

These are low stakes assessments that our students enjoy. They relish seeing their scores improve and they look forward to the challenge as the weeks progress and the skill level becomes gradually more demanding.

Skills Checks

In Year's 9, 10 and 11, each lesson starts with a short skills check or retrieval exercise. Again, these are low stakes tasks that students self or peer assess. Students track their progress over time and are encouraged to identify areas in which they have improved as well as areas in which they have work yet to do in their quest to master the concept in question.

Pupils find this key to their revision and find it aids in their retrieval and retention of Mathematical methods and knowledge.
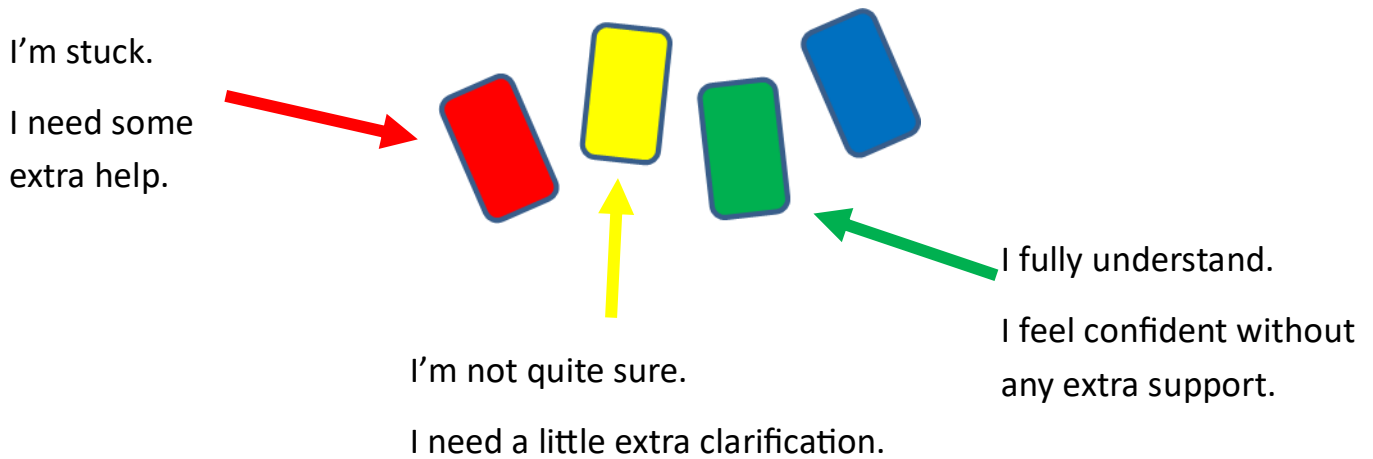

Week 1

1. Simplify $x^3 \times x^4$
2. **Expand** and **simplify** $(x-1)(x-5)$
3. **Factorise** $x^2 + 7x + 12$
4. **Solve simultaneously** $2x + y = 10$ $2x - y = 6$
5. If it takes 4 workers 6 hours to paint a fence, how long would it take 8 workers?
6. A measure is given as 200 cm rounded to the nearest cm. What is the upper bound?
7. **Work out** $\frac{2}{3} \times \frac{6}{7}$
8. Round 45639 correct to **1 significant figure**
9. Does the point (-1, 4) lie on the line $y = 5 - x$?
10. State the exact value of cos 90°

FAA

Traffic Light Cards

The use of traffic light cards in Maths lessons help to develop an improved student-teacher dialogue regarding the understanding of tasks set. All students have these and are expected to have them on their desks in a visible position to aid in the silent communication between the student and the teacher throughout the duration of the lesson.

I'm stuck.

I need some extra help.

I'm not quite sure.

I need a little extra clarification.

I fully understand.

I feel confident without any extra support.

- Aids effective circulation of room by the teacher
- Ensures that all students are on task and are thinking about their learning
- Provides a safe and discrete way of pupils asking for help without feeling embarrassed
- Builds up students confidence regarding this subject

In addition, the Mathematics Department at Balshaw's use this system to develop students thinking skills, and understanding of subject matter through active participation.

AFL QUIZ

Look at the probability scale.
Which letter points to an unlikely event?

2
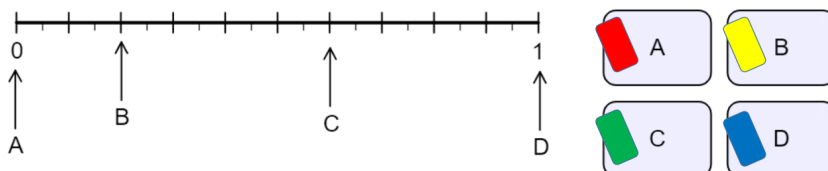
- Progress checks through diagnostic questioning
- Gaps in learning/ misconceptions quickly and easily identified

Key Words:
certain, even chance, extremely likely, extremely unlikely, fifty-fifty chance, good chance, impossible, likely, no, chance, poor chance, possible, unlikely, scale, uncertain, unlikely, very good chance, very likely, very poor chance, very unlikely

Lastly, we often use this strategy to introduce new concepts which in turn enables teachers to minimise the risk of going over old ground needlessly.

Progress Checks

Progress checks are built into Mathematics lessons in order to help both students and teachers to confirm progress within a particular mathematical concept so that the momentum in our students learning is optimal. This is done by posing questions that encourage students to consider their experiences of their individual learning journey so far.

Solely about that particular lesson.

What have we been learning about today?

Write 3 bullet points to summarise todays lesson.

Which one of these is the most important? Why?

End of topic, other aspects of Maths.

When will you use this again?

What other topics could this link to in the future?

Where will you use this next year?

Start of topic, what do they already know that will help.

What do you think you will need to know?

Can you use any knowledge from the last topic?

Can you use any knowledge from this term?

Can you use anything from last year?

End of topic, cross-curricula and real-life.

Why have we been learning about this?

Where could you use learning from this topic in other subjects?

How could you use this topic in a job in the future?

Declarative, Procedural and Conceptual aspects of the lesson.

What are the key things that you need to remember and understand from todays lesson?

Are there any facts or formulae you need to remember?

Are there any methods or skills you need to practice?

Are there any skills you will use in other topics?

How a series of lessons link.

Why have we been learning about this?

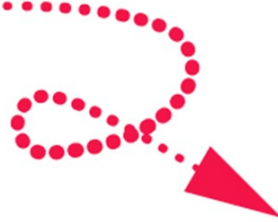What have you used from previous lessons today?

What do you think we will be doing next lesson?

How do you think this will be used in the future?

The Century Tech Digital Learning Platform

With Century our students can....

With Century our students....
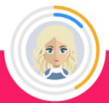
Century instantly identifies gaps in learning and remedies misconception, supporting and stretching our students at a pace that is right for them. This digital learning platform provides a system that is much more individually directed offering a more bespoke experience.

Century generates a recommended learning pathway for the user. This constantly adapting personal pathway is ideal for independent study. All students are expected to spend a minimum of 30 minutes per week working through their recommended learning pathway.
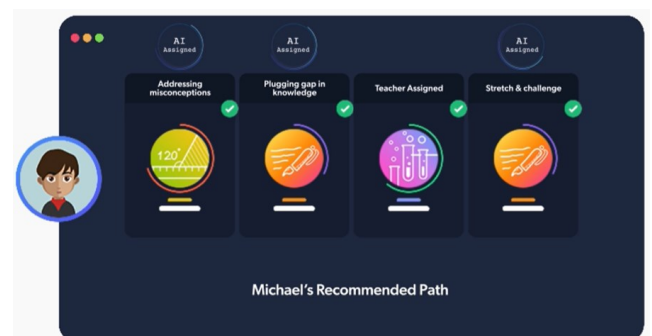
In the Mathematics Department at Balshaw's Century Tech is regularly used to

- assess prior knowledge that form the prerequisites in readiness for the commencement a new unit of work
- assist with **M**ake **A D**ifference Time
- provide a more bespoke digital home learning experience
- provide revision materials in readiness for summative assessments

All students are provide with a home learning book for which they are encouraged to use to

- make notes from the video(s) and/or flashcard(s) that they have explored
- practise writing the full written methods of working
- act as a log/journal in which they can record their achievements and areas for development

Below shows an example of student feedback that is typical via this platform. The feedback is specific to the user as an individual and will update as the student works through their recommended learning pathway. As well as highlighting areas for improvement, this platform recommends areas for 'stretch', meaning that all of our students have plentiful opportunities to progress, exceed and excel in this subject no matter their starting point.

Strengths

◯ Forming Algebraic Expressions: Two Step [MF17.02]

◯ Multiplying Fractions 2 [MF4.24]

◯ Expanding Double Brackets 1: $(x \pm a)(x \pm b)$ [MF18.10]

◯ Combination of Indices [MF13.07]

◯ Multiplying Fractions 1 [MF4.23]

Areas for Improvement

○ Tree Diagrams 13: Solving Equations [MH46.28]

○ Completing the Square 2: $(x + q/2)^2 + r$ [MH53.02]

○ Completing the Square 3: $p(x + q)^2 + r$ [MH53.03]

○ Completing the Square 1: $(x + q)^2 + r$ [MH53.01]

○ Algebraic Fractions 9: Multiply [MH54.09]

Stretch With

● Algebraic Terminology [MF17.03]

● Collecting Like Terms 1: Add and Subtract [MF17.04]

● Collecting Like Terms 2: Add and Subtract (Including Squared/Cubed Variables) [MF17.05]

● Collecting Like Terms 3: In Context (Perimeter) [MF17.06]

● Simplifying Expressions 2: Multiplication (In Context) [MF17.08]

Focus On To Improve

● Tree Diagrams 12: Algebraic Expressions [MH46.27]

● Completing the Square 1: $(x + q)^2 + r$ [MH53.01]

● Completing the Square 2: $(x + q/2)^2 + r$ [MH53.02]

● Quadratic Simultaneous Equations [MH20.14]

● Algebraic Fractions 8: Multiply [MH54.08]

Marking and Feedback

Each half-term the students at Balshaw's are provided with a feedback sticker as shown here.

These are concise for students to follow and provide them with actionable targets for further improvement in addition to highlighting areas in which their performance in the work that they are producing is pleasing.

Students attempt a short summative assessment for each unit of work that they study. These assessment questions are often posed following a short break after the unit to be assessed has been thoroughly covered in class so that we can evaluate what learning has been retained. These assessments are designed primarily to assess the curriculum covered within the unit. Students self or peer assess these tasks using a green pen.

Each year group complete a minimum of one set of assessment questions per term that involve working for a more sustained period of time. Students are informed in advance as to what the content of these assessments include. Relevant nuggets are set on the Century Tech digital learning platform to aid revision. These papers require a whole lesson to complete and are teacher assessed. Where and when possible, the department work together to collaboratively mark these scripts. The outcomes of these assessments are recorded on the departmental database so that comparisons can be made. This data serves to help to inform the schools termly tracking exercises too.

Students are expected to evaluate their performance on individual questions by completing the assessments corresponding cover sheet for which an example is shown below. On completion of this cover sheet, our students are aware of their individual strengths as well as their areas for improvement.

Assessment 2

Part a

Calculator Allowed

Question	Topic	Total	My mark	R	A	G
1	Term-to-term Rule	1				
2	Solving Equations	2				
3	Co-ordinates	2				
4	Percentages and Fractions	4				
5	Function Machines	3				
6	BIDMAS	2				
7	Equivalent Expressions	4				
8	Money Calculation	3				
9	Money Calculation	3				
10	Transformations	2				
11	Scale Drawing	3				
12	3 Way Ratio	4				
13	Time Series Graph	3				
14	Highest Common Factor	2				
15	Ratio	2				
	Total	40				

WWW:	EBI:

Make A Difference time

At the completion of a unit of work students are given a sticker that draws attention to the learning objectives explored throughout that particular unit. Areas of success (**W**hat **W**ent **W**ell) and areas for improvement (**E**ven **B**etter **I**f) are highlighted accordingly.

WWW (you can ...)
- Find factors and multiples
- Find HCF and LCM
- Use HCF and LCM in practical examples
- Understand powers and roots
- Find prime factors and express as product of primes

EBI (you need to....)
- Complete the tasks on finding factors/multiples
- Complete the tasks on HCF and LCM
- Complete the tasks on powers and roots
- Complete the tasks on product of primes
- Complete the tasks on problem solving

WWW (you can ...)
- Identify shapes
- Identify symmetry and rotational symmetry
- Construct triangles using a protractor
- Construct triangles using compass
- Bisect lines and angles using compass

EBI (you need to....)
Using Century Tech, search for:
- Rotational symmetry
- Constructing triangles
- Perpendicular bisector
- Angle bisector

Expectations may in involve students attempting to address concerns highlighted by focussing on specific questions, from a series of questions, that they are exposed to.

Students are also encouraged to make optimal use of the digital technology available to them. This encourages individuals to take ownership of their own learning, and become more resilient in their attitudes towards making progress. For example, they can attempt to address areas for development by accessing the Century Tech digital learning platform that we at Balshaw's are subscribed to.

MAD Time

a) $\sqrt{9} = 3$ ✓ b) $\sqrt{25} = 5$ ✓ c) $\sqrt{100} = 10$.

a) $\sqrt{20} \approx 4.5$ b) $\sqrt{97}$ lies between 9 and 10 ✓
it lies between 8 and 9^5

c) $\sqrt{6}$ lies between 2 and 3 ✓

5. i 2:10pm ✓

Challenge

a) 7×2^3 ✓

2D Shapes
Rotational Symmetry [MF29.01]

Construction and Loci
Angle Bisector [MF42.04]

Here is an example of a different style of MAD Time task designed to support our students with the correction of their work on an assessment question on the topic of rearranging formulae.

I DO

Rearrange $c = \dfrac{d \div 5}{8}$ to make d the subject.

Rearrange $c = \dfrac{d-4}{7}$ to make d the subject.

WE DO

This task is split up into three key stages.

- The first part of the exercise is solely for the class teacher to model the required response and draw students attention to key points on the accompanying mark scheme.

- The second part, although still teacher led, provides an opportunity for students to be more involved in helping to achieve the desired response. This in turn assists the teacher in assessing how the students are progressing before being tasked to work more independently.

- The third part ensures that students have the opportunity to practise and ascertain as to whether or not they have now increased their likelihood of experiencing more success with similar questions in the future.

Make x the subject

$$y = ax$$

Make x the subject

$$y = x + a$$

Make x the subject

$$y = ax + b$$

Make x the subject

$$y = x^2 + b$$

Make x the subject

YOU DO

a) $y = x + a$

b) $y = x - a$

c) $y = a - x$

d) $y = \dfrac{x}{a}$

e) $y = \dfrac{a}{x}$

f) $y = ax$

g) $y = ax + b$

h) $y = \dfrac{x+b}{a}$

i) $y = \dfrac{x}{a} + b$

j) $y = \dfrac{a}{x} + b$

Challenge:
Make x the subject

$ax = bx + c$

$ax - c = bx + c$