

Section 2:

Mathematics and Science

(This section is for subject areas Maths and Science only)

Issue Date	16 th January 2017
Review Date	16th January 2018

N.B Demonstrate refers to the independent learning section of the learning cycle in maths.

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The purpose of assessment

- 1) To monitor student progress on specific skills to inform future planning.
- 2) To inform students what areas they need to develop to improve.
- 3) To motivate, reward and encourage improvement.
- 4) To award a mark/comment to track progress.
- 5) To award a grade to monitor progress locally and nationally.

Assessment process to address each of the purposes

- 1) Assessment will be completed after every/every other lesson. Demonstrate parts of the lesson will be assessed using the codes detailed in appendix A. This may be initially assessed by the student/peer using green pen and then re-visited by the teacher. Other parts of the lesson will be self or peer assessed using green pen with effort commented on by the teacher using written comments. This ensures that the frequency of assessment can be high and is thus timely. It will inform teaching in the subsequent lesson as students will respond to the feedback by answering appropriately differentiated questions in the review to address their requirements. An example of how this assessment will look is demonstrated in appendix B.
- 2) Within every lesson students will be encouraged to write key points and facts in green pen. Examples could include key formulae, new vocabulary and definitions and explanations of corrections.
- 3) For each lesson the 'where can I improve' (progress grid) sheet (Appendix C) will be completed. This will apply at both Key Stage 3 and 4 other than Year 11. All those where the student has demonstrated a good understanding will be highlighted green, if the student is almost there, orange and if the student has not understood the objective; pink. Some will be left blank if it is not deemed an area of immediate high importance for the specific student. Students can demonstrate they have worked on their weaknesses by completing the corresponding review question.
- 4) Personalised teacher stampers or written comments will be used at the individual teacher's discretion.
- 5) In Maths, each unit in Year 8/9 will begin with a baseline assessment on the topics about to be taught. This will be teacher assessed and returned within a week. The students' scores will be recorded on the student's personal progress tracking card (Appendix D).
- 6) Students will complete a final assessment at the end of each Learning Unit. This will either be peer or teacher assessed. The percentage will be recorded on their flight tracker.
- 7) All results will be recorded on the progress tracking card.
- 8) SPA stickers will be used once every half term. This will be completed based on students' assessments and the 'closing the gap' exercise can be given using a review slide with different highlight colours.

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- 9) At the end of each year a formal assessment based on GCSE specifications will be sat. For Year 7, 8, 9 and 10 this will be based on the new GCSE (first exam June 2017) specifications. A GCSE working grade (number format) will be generated. Year 11 will sit GCSE exam papers.
- 10) Year 11 will begin revision in April. The assessment and feedback policy will then remain in place, but may be less frequent as teachers begin to assess and feedback on past papers. Year 11 will complete mock exams throughout the year which will be QLA'd. Students will receive personalised QLA's detailing their strengths and weaknesses (Appendix E).
- 11) In Maths Year 7 will be following the mastery SOW as produced by DELTA.

Summary

Demonstrate highlighted each lesson. Specific questions targeted at students to review.

Fortnightly areas for development and strengths given through highlighting the where can I improve (building blocks) sheet.

Summative assessment approx. every half term; strengths and areas for development highlighted on the QLA sheet.

End of year exam based on GCSE specifications.

NB: The assessment for Year 11s preparing for final exams will alter to provide increased focus on exam technique. Books will be used for student revision and may be assessed on a less frequent basis. Past papers will be assessed regularly and feedback given on these in the form of strengths and areas for development.

Appendices

Appendix A: Mathematics and Science codes

Appendix B: Annotated assessment exemplar - Maths

Appendix C: Where can I improve (building blocks) sheet and associated questions

Appendix D: Tracking your Maths progress card

Appendix E: Mathematics QLA feedback sheet

Appendix F: Tracking your Science progress card

Appendix G: Assessment exemplar - Science

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Appendix A: Mathematics and Science Department Marking Codes

Green Highlighter	Meeting expectations. You can complete this task to the level expected, well done! If you keep up this good work you are on track to meet your target grade.
Orange Highlighter	Developing. You have made a few mistakes. Correct your work with the help of your table and ask for some help if you need it. Work on this topic to stay on track to achieve your target grade.
Pink Highlighter	Not meeting expectations. You need to complete some more work on this topic. Come to maths booster on Tuesday after school. Make sure you work on this topic to ensure you reach your target grade.
Sp	Spelling mistake of a key word. Please correct by looking in the dictionary or asking a table member.

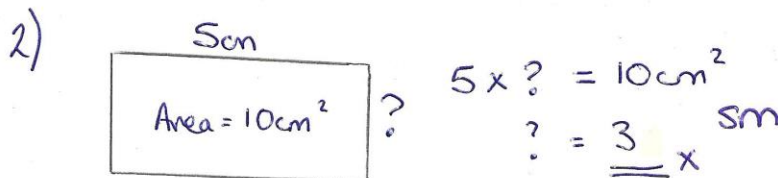
Appendix B: Marking exemplar

Area of rectangles

2/9/14

Challenge work, after group work, card sorts etc.
Effort and progress noted but not formally marked.

Demonstrate

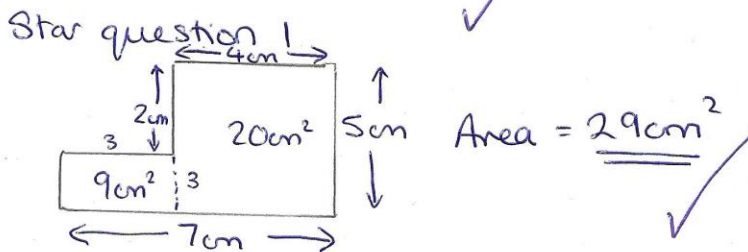


3) Area of garden: $10m \times 4m = 40m^2$
Grass covers half so $20m^2$
Cost of grass seed 50p per m^2
 $20 \times 0.5 = \underline{\underline{10}}$ ✓

PM by TG (G)

Review 3/9/14

2) 5m Must remember units.
Answer 2cm ✓



At the start of the next lesson the work is reviewed by the student working on the appropriate question. (Pink, orange, green) In this example they had to correct their silly mistake for the green task and then attempt the yellow star question. This section of the lesson will be completed in green pen

Area of triangles

3/9/14

Work is ruled off and ready to start the next topic. If lots of students received pink or orange a second lesson on the topic will be seen.

Appendix C: Where can I improve (building blocks) sheet (Sections shown as an exemplar)





Learning Unit 1 Year 7

Where am I at and how can I improve?

I can do this well

I am almost there with this

I need to work on this to improve

KEY BUILDING BLOCKS			
			
Recall times table facts.	Calculate multiplications of integers by 10 and 100.	Use a written method to accurately multiply 2 digit by 2 digit integers.	Explain why different multiplication methods work.
Explain what the area is and calculate it by counting squares.	Calculate the area of rectangles and triangles.	Use correct units for area.	Explain the formula for calculating area of rectangles, triangles, trapezia and parallelograms.

Appendix D: Tracking your maths progress card, Year 8 example with level 4 at KS2

Tracking your maths progress

I can improve in maths by:

- 1) Making sure I know how to do the key skills.
- 2) Using doddle to work on my areas of development (pink highlighter).

Name:
 Class: 8
 End of previous years: ____
 End of year target:

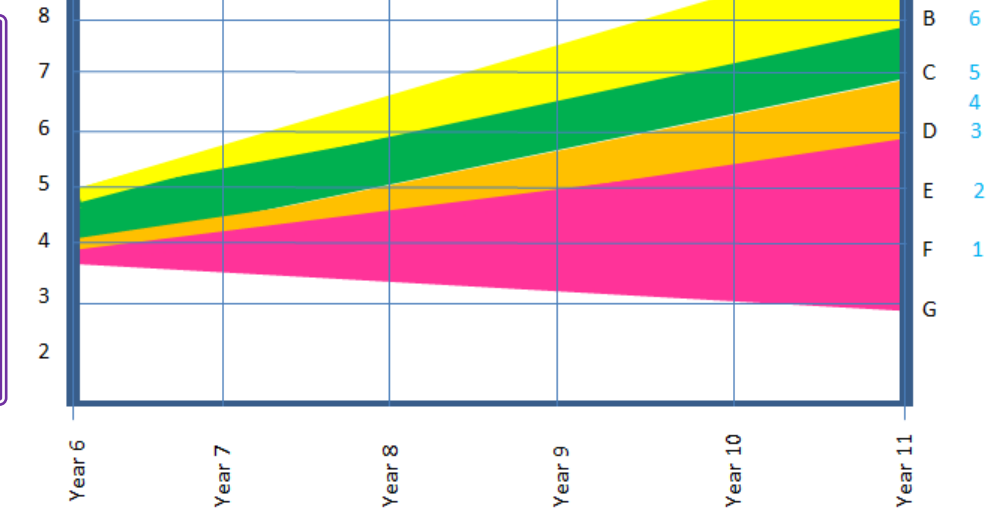
Exceeding – brilliant, keep up the hard work.

Meeting – well done, you are working well.

Developing – keep going, attend booster to work on your areas for development.

Not making expected progress – speak to your teacher about how you can work on your areas for development.

KS2



Key skills

- Times tables
- 4 rules (+, -, X, ÷) with integers, decimals and negatives
- Multiply and divide by 10,100
- Square and cube numbers
- Converting between FDP
- Fractions and percentages of amounts
- Rounding to decimal places (dp)
- Simplifying algebra

Learning Unit and topics covered		Initial test %	End of unit test%
1	Multiplying, dividing, adding and subtracting integers and decimals. Area and perimeter of rectangles, triangles, compound shapes, trapeziums, parallelograms, circles. Volume of prisms. Surface area. Rounding to significant figures and dp. Error intervals (upper/lower bounds). Simplifying algebra. Expanding double brackets. Creating formula. Real life money and time problems.		
2	Tally charts. Frequency tables. Stem and leaf. Writing and analysing questionnaires. Averages – mean, median, mode and range from raw data. Averages from a table. Averages from grouped data. Bar charts, dual and composite bars. Drawing and interpreting scatter graphs. Percentages of amounts and increase and decrease. Reverse percentages.		
3	Rotational and line symmetry. Rotation. Enlargement, fractional enlargement. Reflection. Translation using vectors. Co-ordinates. Horizontal/vertical lines. Nth term. Straight line graphs. Scatter graphs. Angle facts and angles on parallel lines. Solving equations. Substitution.		
4	Equivalent fractions, mixed numbers. Adding, subtracting, multiplying and dividing fractions. Fractions of amounts.		

	<p>Pictograms. Drawing and measuring angles. Drawing and interpreting pie charts. Probability scale. Sample space diagrams. Theoretical probability. Relative frequency.</p>		
5	<p>Ratio of amounts. Proportion. Conversion graphs. Interpret real life graphs. Similar shapes. Applying ratio to money problems. Multiples, factors, prime numbers. LCM, HCF and product of prime factors. Factorising into a single bracket. Venn diagrams. Cube numbers, powers.</p>		
Exam			

Highlight green as an area of strength

Learning Unit 5

STUDENT NAME

Target: C

Properties of 2D shapes

- Naming 2D shapes (Grade G) 100%
- Identifying parallel lines (Grade F) 100%
- Types of angles (Grade F) 100%
- Angles in a triangle (Grade E) 100%
- Area (Grade E) 0%
- Bearings (Grade D) 100%
- Angles on parallel lines (Grade D) 33%
- Interior and exterior angles (Grade C) 0%
- Similar and congruent shapes (Grade B) 50%
- Circle theorems (Grade B) 0%

Highlight pink as an area for development

Equations, inequalities, sequences and graphs

- Solving equations (Grade E/F) 100%
- Linear sequences (Grade D) 50%
- Drawing straight line graphs (Grade D) 0%
- Inequalities (Grade C) 50%
- Equation of a straight line (Grade C) 0%

- Drawing quadratic graphs (Grade C) 0%
- Factorising and solving quadratics (Grade B) 0%
- Factorising using the difference of two squares (Grade B) 0%
- Simultaneous equations (Grade B) 0%
- 3D coordinates (Grade A) 0%
- Quadratic formula (Grade A) 0%
- Quadratic sequences (Grade A/A*) 0%
- Quadratic simultaneous equations (Grade A*) 0%

Transformations and symmetry

- Line and rotational symmetry (Grade G) 33%
- Reflection (Grade F) 50%
- Simple enlargement (Grade D) 100%
- Describing transformations (Grade D) 33%
- Translation (Grade D) 50%
- Enlarging with negative and fractional scale factors (Grade B) 0%
- Transforming graphs (Grade A) 0%

LU5 percentage 29%

Percentage progress from initial assessment 29%

Unit 1: Energy Changes

GCSE Target grade: 6

Outcomes	Understanding in lesson	Understanding in assessment
State energy types and show how energy is transferred from one form to another		
Calculate the gravitational potential energy within an object		
Calculate the kinetic energy within a moving object		
Calculate the elastic potential energy within a stretched spring		
Calculate the change in thermal energy when an object is heated		
Required practical: Specific Heat Capacity	BKen	
Describe what is meant by work done and calculate the work done in moving an object		
Calculate the efficiency of an energy transfer		
Draw accurate Sankey diagrams to show energy transfers		
Renewable vs non-renewable fuels		
Required practical: Thermal Insulation	BKen	
End of unit assessment	Lx6	32

Wednesday 28th September 2016

Elastic Potential Energy

$$\begin{array}{ccccc} \text{Joules} & & \text{N/m} & \text{m} & \\ \uparrow & & \uparrow & \uparrow & \\ \text{EPE} = \frac{1}{2} \times k \times e^2 & & & & \searrow \text{(Extension}^2\text{)} \\ & & \downarrow & & \\ & & \text{(constant)} & & \end{array}$$

Demonstrate =

① $\text{EPE} = \frac{1}{2} \times k \times e^2$

Constant = 0.75 N/m

Extension = 0.25 m

$$0.25^2 \times 0.5 \times 0.75$$

= 0.023 ✓ units J

② $\text{EPE} = \frac{1}{2} \times k \times e^2$

constant = 0.9 N/m

? $\frac{1}{2} \times 0.9 \times 0.5^2$
X = 0.1125 J ✓

~~_____~~

$$\frac{1}{2} \times 26 \times 0.8^2$$

= 8.32 J ✓

Blue Question

↙