Hampshire Services
HIAS SCHOOL IMPROVEMENT

HIAS MOODLE+ RESOURCE

Year 9 Unit Plan 9.1

Autumn Term

HIAS Maths Team
May 2019
Final Version

Hampshire County Council

www.hants.gov.uk

Overview

In this document

Year 9 Unit Plans linked to Medium Term Overview

Points to consider when using this resource

These unit plans provide an example of how medium term planning could be developed into units of work. These unit plans will need to be adapted to meet the needs of students. The unit plan provides an outline of a possible learning journey with suggestions of types of tasks that could be used. They also identify key prior learning; some common misconceptions and an indication of key skills students need to develop towards competency. It is assumed that teachers will make use of appropriate mathematical representations (manipulatives, visuals and symbolic) to support conceptual understanding for students alongside procedural fluency.

Year 9 Unit Plans – Number: standard form, roots, powers and reciprocals, percentage change and compound measures

This unit is about representing number in different ways. Students will extend their understanding of the number system to include powers and roots and represent magnitude using standard form; and make connections between number relationships through multiplicative or proportional reasoning.

<table>
<tr><th>Session</th><th>Unit Objectives</th><th>Types of task</th></tr>
<tr><td rowspan="2">1-5</td><td rowspan="2">Standard Form
Interpret and compare numbers in standard form A x 10n 1≤A<10, where n is a positive or negative integer or zero
Apply appropriate calculation strategies and degrees of accuracy to increasingly complex problems</td><td>Build on what was taught in year 8.

Use ‘the size of the solar system/world’ type activity to explore using standard form (multiplying, dividing, converting from ordinary numbers)

Show in full x10 x100 x1000 etc to show where the index number comes from.
Link with science department including use of prefixes e.g. kilo, mega, giga, terra, milli, micro, nano

Use Gattegno charts to support multiplying and dividing by powers of ten.</td></tr>
<tr><td>Key facts focus:
Develop a sense of the ‘size’, or magnitude of number and how to write and compare numbers in standard form</td></tr>
<tr><td rowspan="2">6-10</td><td rowspan="2">Roots, powers and reciprocals
Interpret when the structure of a numerical problem requires multiplicative or proportional reasoning
Use conventional notation for powers, roots and reciprocals
Use integer powers and associated real roots when solving problems
Appreciate the infinite nature of the sets for integers, real and rational numbers</td><td>Types of task
Evaluate powers and roots of numbers using calculators for squared, cubed, higher powers, square root, cube root, higher roots. Write in full initially e.g. 5^2 = 5 x 5 5^3 = 5 x 5 x 5
Show square and cube root in a similar way.
Explore reciprocals (and as power of -1) using a spreadsheet:
5 0.2 1/5
-5 -0.2 -1/5
½ 2 2</td></tr>
<tr><td>Key facts focus:
Powers and roots
Conventional notation</td></tr>
</table>

11-15	**Percentage change and compound measures** • **Interpret when the structure of a numerical problem requires multiplicative or proportional reasoning** • **Solve problems involving percentage change** • **Use compound units such as speed and unit pricing to solve problems**	**Types of task** Use examples that involve proportional reasoning, e.g. comparing quantities and prices: If 5 chocolates cost £3.50, how much do 12 cost? Model a table or four corners approach showing multipliers along the way: x 0.7 → 5 3.50 12 ? → x 0.7 *Include a unitary step if necessary* Give examples that involve percentage increase and decrease using a multiplier: Jamie's salary is £22,000 and he is due to get an increase of 4%. How much will his salary be after his pay rise? (22000 x 1.04) A new phone is priced at £340. In a sale it is reduced by 35%. Calculate the sale price. (340 x 0.65) Use bar modelling to find fraction and percentages of quantities. *Work with formula such as speed and unit pricing to consider percentage change.* **Key facts focus:** Make connections between number relationships through multiplicative or proportional reasoning. Understanding percentage change

Check and refresh	**Watch out for ……**	**Building fluency**
Multiplying and dividing decimal numbers by 10 and 100. Know metric conversions. Bar modelling to find simple fractional and percentages of an amount	When multiplying and dividing by powers of ten students may use the language of "adding / taking away zeros". This needs to be addressed to ensure standard form is understood. Be careful using a calculator with squaring a negative number etc.	Multiplying and dividing decimal numbers by 1000 Convert between fractions and decimals Express numbers as a product of its factors

HIAS Maths Team

Jo Lees – Area Inspector - Mathematics
Email: jo.lees@hants.gov.uk
Tel: 02380 816139

Jacqui Clifft – Area Inspector - Mathematics
Email: jacqui.clifft@hants.gov.uk
Tel: 02380 816139

Jenny Burn – Inspector/Adviser – Mathematics
Email: jenny.burn@hants.gov.uk
Tel: 01962 876207

Tessa Ingrey – Teaching & Learning Adviser – Mathematics (P/T)
Email: tessa.ingrey@hants.gov.uk
Tel: 01962 876207

Natalie Ivey – Inspector/Adviser – Mathematics (P/T)
Email: natalie.ivey@hants.gov.uk
Tel: 01962 876207

Dave Parnell – Teaching & Learning Adviser – Mathematics
Email: dave.parnell@hants.gov.uk
Tel: 01962 876207

Rebecca Vickers – Teaching & Learning Adviser – Mathematics
Email: rebecca.vickers@hants.gov.uk
Tel: 01962 876207

Brenda Robertson – Inspector/Adviser – Mathematics
Email: brenda.robertson2@hants.gov.uk
Tel: 01962 876207

Kate Spencer – Teaching & Learning Adviser – Mathematics
Email: kathryn.spencer@hants.gov.uk
Tel: 01962 876207

For further details on the full range of services available please contact us using the following details:

Tel: 01962 874820 or email: hias.enquiries@hants.gov.uk

HTLC Professional Learning Moodle

- Searchable course catalogue linked to the Learning Zone.
- Course updates.
- In-house training opportunities.
- Online calendar of events.
- Publications and online resources.
- Bespoke consultancy services.

Link: https://hias-totara.mylearningapp.com/

Terms and conditions

Terms of licence

Moodle+ subscribers are licenced to access and use this resource and have agreed to pay the annual subscription fee. This authority starts when the fee is paid and ends when the subscription period expired unless it is renewed. This file is for personal or classroom use only. By using it, you agree that you will not copy or reproduce this file except for your own personal, non-commercial use. HIAS have the right to modify the terms of this agreement at any time; the modification will be effective immediately and shall replace all prior agreements.

You are welcome to:

- download this resource
- save this resource on your computer
- print as many copies as you would like to use in your school
- amend this electronic resource so long as you acknowledge its source and do not share as your own work.

You may not:

- claim this resource as your own
- sell or in any way profit from this resource
- store or distribute this resource on any other website or another location where others are able to electronically retrieve it
- email this resource to anyone outside your school or transmit it in any other fashion.