Subject	Year	Month	
Mathematics	9	September	Balcarras From strength to strength

Topic:

INDICES, ROOTS, STANDARD FORM — 7 LESSONS

Content (Intent)

Prior Learning

Y7
- Powers & Roots

Y8
- Intro to standard form
- laws of indices

Future Learning

Solving indices problems involving different bases

Objectives

- Use a calculator to evaluate numerical expressions involving powers and roots
- Understanding positive indices, negative indices and roots
- Understanding fractional powers (only $\frac{1}{2}$ and $\frac{1}{3}$)
- Calculate with indices (the index laws)

- Convert between ordinary numbers and standard form
- Calculating using standard form
- Use standard form on a scientific calculator including interpreting the standard form display of a scientific calculator

For teaching purposes

Possible questions
- Kenny thinks this number is written in standard form: 23×10^7. Do you agree with Kenny? Explain your answer.
- Order a mixture of ordinary numbers and numbers in standard form (ascending and descending)

Misconceptions
- may think that any number multiplied by a power of ten qualifies as a number written in standard form
- To the power of a half does not mean dividing by 2
- Multiply the same base does not mean multiply the powers etc.

Pedagogical notes (implementation)

Liaise with the science department to establish when students first meet the use of standard form, and in what contexts they will be expected to interpret it.
NCETM: Departmental workshops: Index Numbers
NCETM: Glossary

Use *'standard form', be aware it's the same as 'scientific notation' or 'standard index form'.*

The language 'negative number' is used instead of 'minus number'.

How will understanding be assessed & recorded (Impact)

End of term Assessment in **December**
End of Year Assessment in **May**
9BAM1 Roots and indices

How can parents help at home?

MathsWatch clips (Qualification KS3)
N25, N45a, N45b

Further reading/discussion

Reading / Enrichment

KM: Maths to Infinity: Standard form

KM: Maths to Infinity: Indices

Investigate 'Narcissistic Numbers'.

NRICH: Power mad!

NRICH: A question of scale

The scale of the universe animation (external site)

Literacy

Power
Root
Index, Indices
Standard form
Ascending
Descending

Numeracy Links

Careers Links:

Scientist
Engineer