Mathematics workshop 5

Session 1: From number to algebra

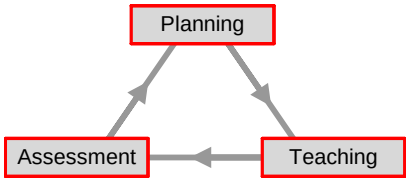
Objectives

By the end of this session you will:

- know how algebra is developed through the mathematics standards
- have considered how diagnostic and formative assessment can be used effectively to inform planning
- have discussed ways of teaching algebra

1.1

Planning, teaching and assessment



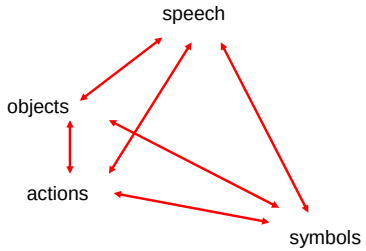
1.2

A model of learning

Capacity begins	Capacity develops	Capacity developed	Capacity declines
help given by more capable others, e.g. parents teachers peers coaches experts	help provided by self	internalised automatic fossilised	return to earlier stages

1.3

A model of learning mathematics



1.4

Recommendations

- Introduce letters as generalised arithmetic
- Whenever possible, link algebra to arithmetic
- Frequent use of letters will help students feel comfortable with symbols
- Introduce the idea of ‘terms’ with numerical examples
- Link factors of numerical ‘terms’ with factors of algebraic ‘terms’

1.5

Review

- Are you clear on the requirements for teaching algebra in the grades that you teach?
- Can you see the links between number and algebra?
- Can you see ways in which you can help students make the links and connections between number work and algebra?
- Do you understand why diagnostic assessment is an important feature of planning for teaching?
- Do you have some ideas for assessment activities?

1.6

Mathematics workshop 5

Session 2: The distributive law

Objectives

By the end of this session you will:

- have looked at the links between number and algebra
- have considered strategies for teaching algebra
- have seen how topics in algebra develop through the grades

2.1

The laws of arithmetic

- Commutative law
  $a * b = b * a$
- Distributive law
  $k * (a + b) = k * a + k * b$
- Associative law
  $a * (b * c) = (a * b) * c$

2.2

Pedagogical issues

- Teachers can develop students' understanding of algebra by using consistent methods through the grades
- Teachers often fail to make links between factors of numbers and algebraic factors
- Multiplication grids can improve students' understanding of the distributive law
- Factorising quadratic expressions should be seen as the reverse of multiplying out brackets
- When students are taught algebra as sets of rules they have a lot to memorise

2.3

Multiples and factors

- Students are introduced to multiples, factors and primes in Grade 4 and again in Grade 5
- In Grade 6 students meet HCF and LCM
- By Grade 8 students should be confident in factorisation by removing common factors in algebraic expressions
- By Grade 9 students need to be confident and flexible in factorising quadratic expressions

2.4

The distributive law

- Students are first introduced to the distributive law in Grade 3 and this is developed in Grades 4, 5, 6 and 7
- Students are expected to understand the principles of the commutative, associative and distributive laws and their use in mental and written calculations in Grade 8
- Students are introduced to simplification of algebraic expressions in Grade 6 and to the collection of like terms and removal of brackets in Grade 7
- By Grade 9 students should be confident in multiplying out two brackets and factorising quadratic expressions

2.5

Review

- Do you have a better understanding of what students should be taught regarding the distributive law across the grades?
- Do you have some new ideas to help you teach your students?
- Do you understand the need to work closely with your colleagues to ensure that you are using consistent teaching methods?

2.6

Mathematics workshop 5

Session 3: Mathematical modelling

Objectives

By the end of this session you will:

- have looked at some exercises to help students turn word problems into mathematical statements
- have considered some strategies for teaching sequences
- have studied some investigations that lead to generalisations

3.1

The modelling cycle

- Interpret the problem
- Write the problem in mathematical language
- Solve the mathematical problem
- Interpret the solution in relation to the problem
- Consider whether the problem has been solved
- If necessary repeat the cycle

3.2

Pedagogical issues

- Teachers report that they do not have sufficient time to complete the requirements for each year
- Mathematical modelling provides opportunities to revise many subjects while practising algebra topics
- Word problems can be created in number, geometry and data handling
- Begin with simple examples in the early grades

3.3

Word problems

- Word problems are introduced in Grade 1 and continue throughout the grades
- Students begin by solving problems intuitively
- Teachers need to help students to interpret word problems and model them in simple mathematical statements
- Word problems can be used to revise the technical language of mathematics:
  sum, difference, product, quotient, consecutive, …
- Encourage students to begin any problem by defining the unknown variables:
  'Let … be … and … be …'

3.4

What is the number?

- I am thinking of a number
  Multiply by 3. Add 5. The answer is 32.
  What is the number?
- I am thinking of a number
  Multiply by 5. Take away 8. The answer is 62.
  What is the number?
- I am thinking of a number
  Divide by 3. Add 17. The answer is 34.
  What is the number?

3.5

Sequences

- This is a list of numbers:
  5 1.7 2 0.5 3 217
- This is a sequence of numbers:
  3 7 11 15 19 23
- The word ‘sequence’ implies that there is a rule for calculating the next number
- I could give you a term-to-term rule such as ‘add 4’
- I could give you a position-to-term rule such as:
  the nth term is $4n - 1$

3.6

Puzzles and investigations

- Interpret the problem
- Write the problem in mathematical language
- Look for patterns
- Make a conjecture
- Make a generalisation
- Test it
- Explain and give reasons (proof)

3.7

Review

- How are you going to integrate word problems into your teaching?
- How are you going to plan to get students to investigate?
- Have you worked with your colleagues to ensure that investigations are used in the appropriate grade?
- Planning for all algebra topics is essential. You will need to plan the teaching with your colleagues to ensure consistency and to capitalise on what students already know

3.8

Mathematics workshop 5

Session 2: Report from School 1

Objectives

By the end of this session you will:

- have heard how other colleagues have implemented the standards
- have discussed progress made by students
- have considered how diagnostic and formative assessment can be used to inform planning

4.1

Purposes of assessment

- Diagnostic
- Formative
- Summative
- Evaluative

4.2

Evidence from research

Improving learning depends on five key factors:

- giving students effective feedback
- involving students actively in their own learning
- adjusting teaching to take account of results of assessment
- recognising the profound influence assessment has on students' motivation and self-esteem
- ensuring that students are able to assess themselves and understand how to improve

4.3

Points to consider

- How will you measure achievement?
- How will you record achievement?
- How will you involve your students in self-assessment?
- How will you use assessment records to help set individual students or classes targets for learning?

4.4

Recording assessment

- **Green**
  understands and can do the work without help
- **Amber**
  understands and can do the work with some help
- **Red**
  has poor understanding and needs a lot of help

4.5

Planning for teaching

- Use the standards to decide what students should already know
- Consider how the starter activity could be used to assess prior knowledge
- Consider how teachers can assess as they teach the main activity
- Look at how the consolidation section could be used to check whether the objectives have been met

4.6

Review

- Are you working together as a team to plan the teaching and assessment within your school?
- How are you recording progress made by your students?
- Are you sharing the outcomes of assessment with the students?
- Are you involving the students in self-assessment?
- Are you setting targets for the students?

4.7

Mathematics workshop 5

Session 5: Dynamic geometry 1

Objectives

By the end of this session you will:

- have practised using dynamic geometry software
- have considered some strategies for teaching transformation geometry
- have planned some activities for use in the classroom

5.1

Progression through the standards

- In Grades 3 to 7, students study the symmetry of 2-D and 3-D shapes
- In Grade 8, students do:
  - reflections and rotations using paper and ICT
  - reflections, rotations, translations and enlargements on a coordinate system, using paper and ICT
- In Grade 9, students are expected to identify lines of reflection, the angle and centre of rotation, and the scale factor of enlargements

5.2

Advantages of using DGS

- Visual
- Accurate
- Fast
- Intuitive

5.3

Disadvantages of using DGS

- Record of work can easily be lost
- When students work at their own computers they have to know how to use the software
- Unless students are familiar with the software they can waste time with trivial problems that detract from learning
- Students also need to know how to do the work on paper

5.4

Review

- Do you have the necessary hardware to use ICT in the classroom?
- Do you have the necessary software?
- Are you planning together to ensure consistency?
- Can you share ideas across schools?
- How can you assess students when you use ICT?

5.5

Mathematics workshop 5

Session 6: Dynamic geometry 2

Objectives

By the end of this session you will:

- have practised using dynamic geometry software
- have considered some strategies for teaching geometrical constructions and theorems
- have planned some activities for use in the classroom

6.1

Progression through the Standards

- In Grades 7 and 8, students should use ICT to explore constructions
- In Grade 9, students should be able to deduce properties in a given plane figure using known properties of angles and shapes
- In higher grades, students should use dynamic geometry systems to explore pattern, similarity, congruence and constructions, and to conjecture geometric properties and theorems

6.2

Advantages of using DGS

- Visual
- Accurate
- Fast
- Intuitive
- Helps to overcome misconceptions

6.3

Disadvantages of using DGS

- A lack of any record of work
- Difficult to assess
- Working vertically on a computer screen gives a different perspective to working horizontally on paper
- Students still need practice in using geometrical instruments, such as compasses
- Students experience difficulties turning intuitive solutions into formal proof

6.4

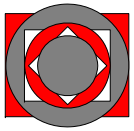
Review

- Teaching using DGS cannot replace paper methods
- Prepare your own files in advance
- Plan to incorporate lessons using ICT
- Share ideas with colleagues within and across schools
- Consider how you will assess students while they are using ICT

6.5

Mathematics workshop 5

Session 7: Report from School 2



Objectives

By the end of this session you will:

- have heard how other colleagues have implemented the standards
- have shared your own reflections with the other teachers
- have used ICT to draw a wide range of graphs

7.1

Mathematics workshop 5

Session 8: Interpreting graphs and diagrams 1

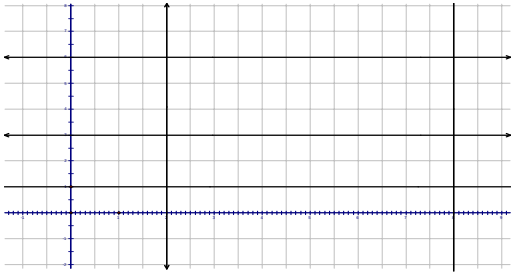
Objectives

By the end of this session you will:

- have considered some strategies for teaching students to interpret graphs
- have designed some questions to ask students
- have looked at some exercises to help students interpret graphs

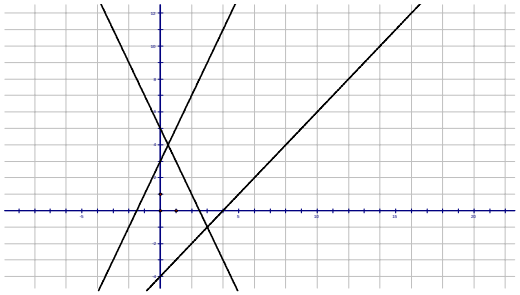
8.1

Give the equations of the graphs



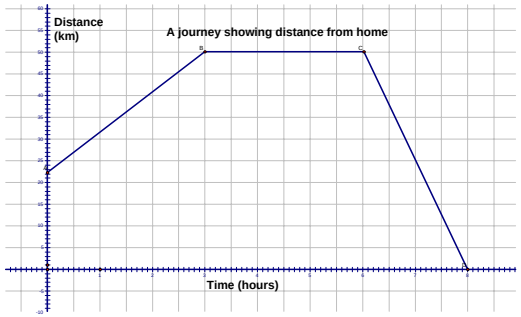
8.2

Give the equations of the graphs



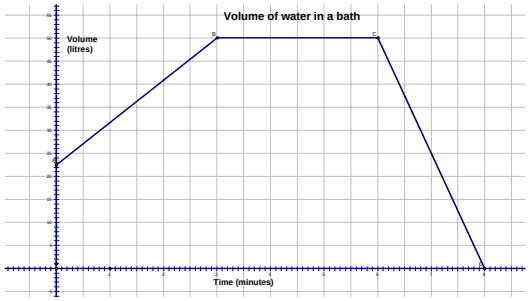
8.3

Tell the story



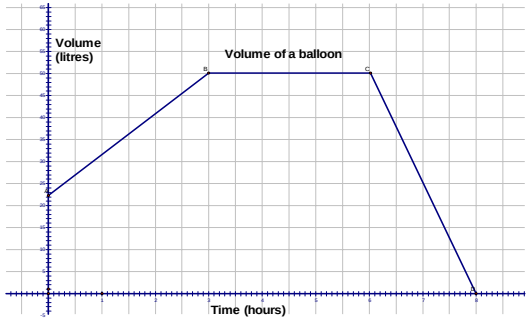
8.4

Tell the story



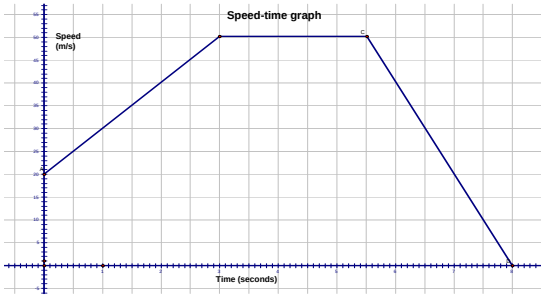
8.5

Tell the story



8.6

Tell the story



8.7

Summary

- Consider ways of presenting graphs for students to interpret
- Design suitable questions to get students to think about what they see
- Get students to design their own graphs for others to interpret
- Always ask students to explain their answers

8.8

Mathematics workshop 5

Session 9: Interpreting graphs and diagrams 2

Objectives

By the end of this session you will:

- have considered some strategies for teaching students to interpret statistical diagrams and graphs
- have designed some questions to ask students
- looked at some exercises to help students interpret graphs

9.1

Discrete data

- Tally chart
- Frequency table
- Frequency bar chart
- Frequency line graph
- Pie chart
- Pictogram

9.2

Essential features of a graph

- **A title**
  essential to knowing what the graph is about
- **Labels on the axes**
  show what the data are and the units used
- **Numbering of the scale(s)**
  shows how to read the values of the data
- **A key for two or more sets of data**
  shows which line or bar refers to which data set
- **The source**
  acknowledges the source of the data, where appropriate

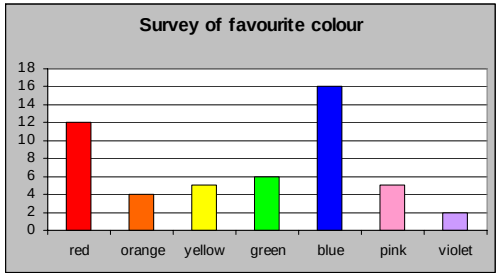
9.3

Survey of favourite colours

Colour	Tally	Frequency
red	𝍸 𝍸 ||	
orange	||||	
yellow	𝍸	
green	𝍸 |	
blue	𝍸 𝍸 || 𝍸 |	
pink	𝍸 ||	
violet	||	
	Total	

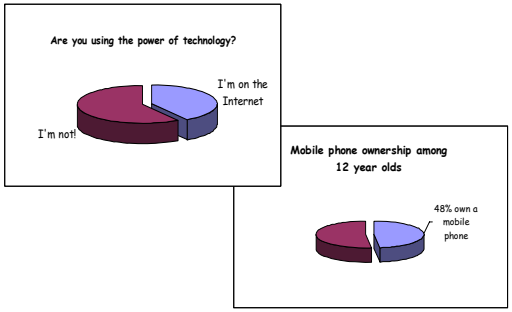
9.4

Reading information



9.5

Inappropriate pie charts



Source: CensusAtSchool, Nottingham Trent University

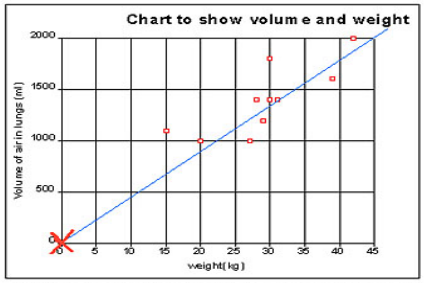
9.6

Bivariate data

- Two-way table
- Scatter diagram
- Line of best fit

9.7

Scatter graph with line of best fit

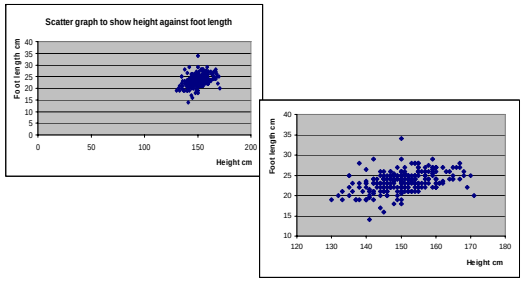


Conclusion:Generally the more you weigh the bigger your lungs are.

Source: A student's work from National Curriculum in Action website

9.8

Inappropriate scales



Source: CensusAtSchool, Nottingham Trent University

9.9

Continuous data

- Frequency table
- Grouped frequency table
- Grouped frequency diagram
- Histogram
- Frequency polygon
- Cumulative frequency graph
- Stem-and-leaf diagram
- Box-and-whisker plot

9.10

Stem-and-leaf diagram

Hours of sunshine for UK weather stations: 10/05/00

(stem = hours, leaves = tenths)

0	6 9
1	6 9
2	2 2 5 6 6 7 9
3	0 0 0 0 1 2 2 5 5 5 7 8 9
4	0 1 5 5 6 6 6 7 9
5	0 1 5 5 6 8 9 9
6	1 2 2 3 6 6 7 8 8 9 9 9 9 9
7	0 0 1 6 7 8 8
8	0 0

9.11

Summary

- Consider ways of presenting statistical diagrams and graphs to students for interpretation
- Design suitable questions to get students to think about what they see
- Get students to design their own graphs and their own questions to ask each other
- Always ask students to explain their answers

9.12

Mathematics workshop 5

Session 10: Report from School 3

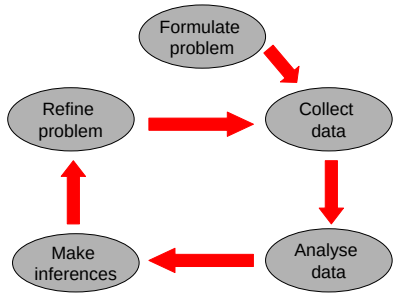
Objectives

By the end of this session you will:

- have heard how other colleagues have implemented the standards
- have revisited the data handling cycle in statistics and considered its implications for teaching and learning
- have considered criteria for assessing a statistical investigation

10.1

The data handling cycle



10.2

Websites

UK

- www.stats4schools.gov.uk
- www.censusatschool.ntu.ac.uk
- www.coventry.ac.uk/discuss
- www.statistics.gov.uk

USA

- www.fedstats.gov

10.3

Difficulties for students

- Defining the problem to be investigated
- Planning the investigation and deciding what variables to use
- Deciding how to collect, measure and organise the data
- Deciding on the most appropriate statistics and diagrams
- Analysing the data
- Revisiting the problem, adding refinements if necessary
- Making conclusions and presenting the findings

10.4

Assessment of investigations 1

Award marks to the student for:

- working independently with minimal help from the teacher
- the quality and the definition of the problem to be investigated
- the quality of the planning of the investigation and the decisions about what variables to use
- the methods of data collection, measurement and organisation

10.5

Assessment of investigations 2

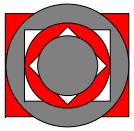
Award marks to the students for:

- choice of appropriate statistics and diagrams
- correctness of the mathematical analysis of the data
- working to sensible degrees of accuracy
- revisiting the problem and making appropriate refinements in the light of a trial run-through
- drawing sensible conclusions
- presenting the entire investigation succinctly, clearly, logically and unambiguously, using ICT where appropriate

10.6

Mathematics workshop 5

Session 11: Themes through the grades



Objectives

By the end of this session you will:

- have identified some themes that can be explored at different levels through different grades
- have engaged in some investigative work to develop an extended theme
- have thought about other developmental strands within the standards and how they might be developed

11.1

Planning for an extended overview

- Identify themes that can be developed through the grades
- Have in mind an overview of this development
- Know that teaching and assessment styles may need to vary from grade to grade
- Identify steps that are crucial to the next phase of understanding
- Decide how student mastery of these crucial steps is to be assessed

11.2

Didactic engineering

- Identify what students need to learn
- Challenge students but don't over-extend them
- Develop problems that both stimulate and aid learning and understanding
- Concentrate on the essentials of a problem, building on students' current understanding and leading them to the next level of development and understanding
- Allow students freedom to explore ideas for themselves, but don't spend too much time letting them 'reinvent the wheel'
- Encourage logical reasoning, discussion and a critical, questioning attitude

11.3

Reviewing tasks 1

Modify tasks in the light of use. Ask:

- Did the tasks achieve what they were meant to achieve?
- Did the investigative approach act as a stimulus to learning?
- Did it help improve the learning and understanding of mathematics?
- Did it speed up or hinder the learning process?
- Was enough time allocated to the task?

11.4

Reviewing tasks 2

- Were students sufficiently challenged? Was there extension work for the brightest? Consolidation work for the weakest?
- Could all students make some progress?
- Were students familiar with working on an extended task?
- Was it hard to manage the classroom activities and student groupings?
- How effective were the different levels and forms of assessment and the tracking of student progress?
- How could the tasks be improved?

11.5

Mathematics workshop 5

Session 12: The normal distribution

Objectives

By the end of this session you will:

- understand probability distributions
- be able to identify some common probability distributions
- know the characteristics of the normal distribution
- appreciate the importance of the normal distribution

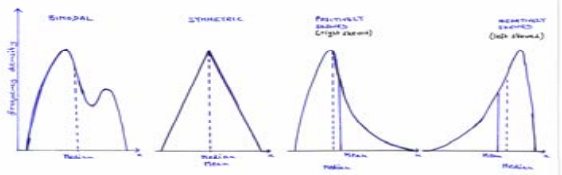
12.1

Features of probability distributions

- In a discrete probability distribution, the sum of all the probabilities is 1
- In a continuous probability distribution, the total area under the density curve is 1
- A probability density curve always lies on or above the variable axis

12.2

Symmetry and lack of symmetry



12.3

Discrete probability distributions

- Discrete uniform (rectangular) distribution
- Binomial distribution
- Geometric distribution
- Poisson distribution

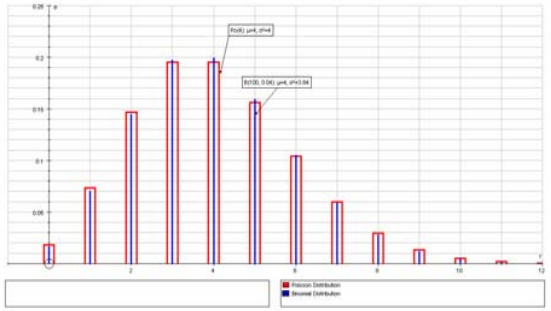
12.4

Continuous probability distributions

- Continuous uniform (rectangular) distribution
- Exponential distribution
- Normal distribution

12.5

Binomial approximation to Poisson



12.6

Importance of the normal distribution

- Good model for some distributions of real data
- Good approximation to results of many kinds of chance outcomes
- Statistical inference based on the properties of normal distributions works well for other approximately symmetric distributions

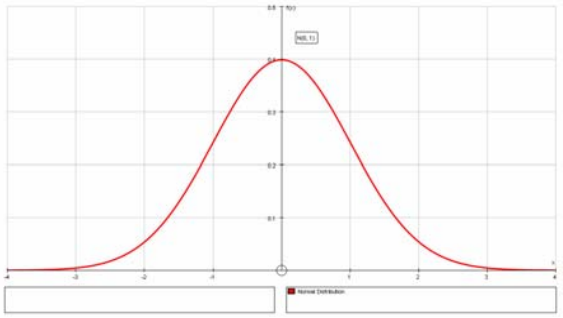
12.7

Key features

- Bell-shaped curve
- Symmetry about mean value
- The mean and median values are equal
- There is an inflexion point one standard deviation either side of the mean
- The variable axis is an asymptote to the curve at extreme values either side of the mean
- The '68–95–99.7 rule'

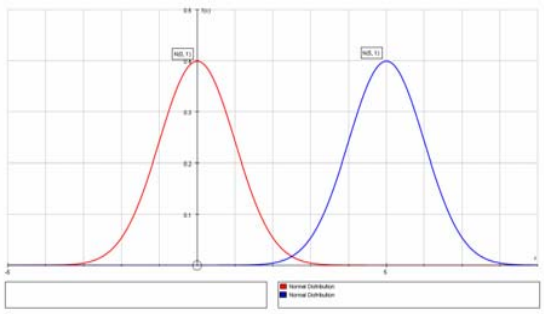
12.8

The standard normal curve



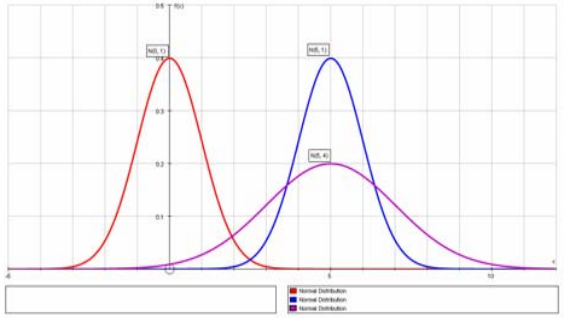
12.9

N(0, 1) and N(5, 1)



12.10

Normal curves



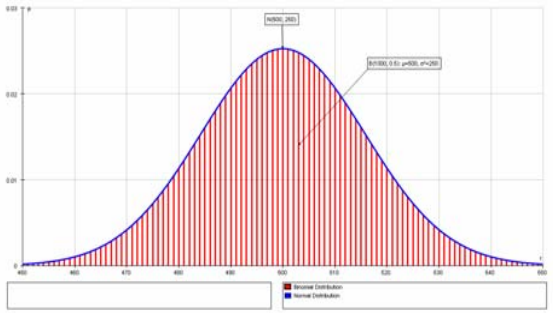
12.11

Equations of normal curves

- N(0, 1) has equation $\phi(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$
- N(μ, 1) has equation $\phi(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2}}$
- N(μ, σ^2) has equation $\phi(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$

12.12

Approximation to binomial distribution



12.13

Mathematics workshop 5

Session 13: Report from School 4

Objectives

By the end of this session you will:

- have heard how other colleagues have implemented the standards
- have discussed progress made by students
- have considered how diagnostic and formative assessment can be used to inform planning

13.1

Responding to assessment

- Do you record the results?
- What do you do next?
- How does assessment inform your decision making?

13.2

Responding to diagnostic assessment

- All the class get high scores
  Teacher response – repeat assessment with the next level of work to identify a suitable starting point
- 50% or more students get low scores
  Teacher response – teach to whole class making use of the students who scored well
- A small number of students get low scores
  Teacher response – provide special help and delay the main teaching until these students have caught up

13.3

Responding to formative assessment

- All the class get high scores
  Teacher response – consider whether the work is at too low a level or too slow a pace
- 50% or more get low scores
  Teacher response – review teaching methods and repeat work before moving on
- A small number of students get low scores
  Teacher response – provide additional help, set targets and involve students in assessing their own progress

13.4

Setting targets

- How do teachers set targets?
- How do students set their own targets?
- How are targets checked?
- What do you do if students do not meet targets?

13.5

Review

When you draw up an assessment policy for the mathematics team, consider all aspects of assessment

- What form will the assessment take?
- How should teachers respond to the results of assessment?
- How should results be recorded?
- How can you measure progress?

13.6

Mathematics workshop 5

Session 14: Applications of mathematics

Objectives

By the end of this session you will:

- have reviewed the standards relating to applications
- have considered the significance of mathematical models
- have looked at the mathematics of motion
- have used software to do vector algebra

14.1

Generic standards

- Solve complex problems in simpler stages
- Plot and interpret graphs
- Use graphics calculator in modelling physical situations
- Generate, use and manipulate formulae from physical situations
- Use standard and inverse operations, and standard and inverse functions
- Use SI units of standard and compound measures
- Compare two mathematical models of a physical situation

14.2

Mathematical tools 1

- Use standard form
- Use the laws of exponents
- Use the algebra and geometry of straight lines
- Use the algebra and geometry of quadratic and other algebraic functions
- Understand the meaning of ‘is directly proportional to’
- Understand the meaning of ‘is inversely proportional to’
- Use exponential and logarithm functions

14.3

Mathematical tools 2

- Use circular functions and trigonometry
- Use Pythagoras’ theorem
- Use bearings, latitude and longitude, great circles
- Find loci
- Use vectors
- Use random numbers for simulations

14.4

Mathematical tools 3

- Use gradients of tangents to curves
- Use differentiation
- Use integration
- Use parametric equations
- Solve differential equations

14.5

Imagine ...

Imagine a leaking oil tanker sailing up the Gulf ...

- Start to imagine how the oil slick spreads out
- Think about the factors that might determine how the slick spreads
- Think about how these factors might be translated into some mathematics that can be analysed and used to predict how the slick will spread and how it might be contained
- Think about how to translate the mathematics back to reality to carry out some preventive actions

14.6

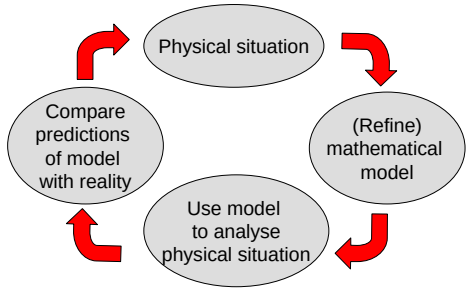
Imagine ...

Imagine a girl wandering randomly from counter to counter in a department store ...

- You have been watching her, but she suddenly disappears
- Where might she be?
- Is it possible to model her random behaviour so as to narrow down where she might be?
- What technique might be used?

14.7

What is a mathematical model?



14.8

Mathematical models

- Is the mathematics of a recognisable type?
- If so, what is known about the type?
- Do solutions exist, and under what conditions?
- How can the solutions be found?
- How do the solutions relate back to the real situation?

14.9

Man on Moon

Photograph: © NASA
Source: www.moonshine-design.co.uk

14.10

Some key words

- mass, length, time
- position, displacement, distance
- rate of change
- derivative with respect to …
- integral with respect to …
- speed, velocity, acceleration
- force, pressure
- energy, work, power

14.11

Motion in one dimension

For constant acceleration ***a***, initial speed ***u*** and final speed ***v*** after time ***t*** and distance travelled ***s***

- $v = u + at$
- $v^2 = u^2 + 2as$
- $s = ut + \frac{1}{2}at^2 \qquad s = \frac{u+v}{2}t$

14.12

Using differential calculus

- Notation: position ***x***, speed ***v***, acceleration ***a***, time ***t***, mass ***m***
- $v = \frac{\mathrm{d}x}{\mathrm{d}t}$
- $a = \frac{\mathrm{d}v}{\mathrm{d}t}$
- $a = \frac{\mathrm{d}v}{\mathrm{d}t} = \frac{\mathrm{d}x}{\mathrm{d}t}\frac{\mathrm{d}v}{\mathrm{d}x} = v\frac{\mathrm{d}v}{\mathrm{d}x}$
- force $F = \frac{\mathrm{d}}{\mathrm{d}t}(mv) = m\frac{\mathrm{d}v}{\mathrm{d}t} = ma$ for constant m

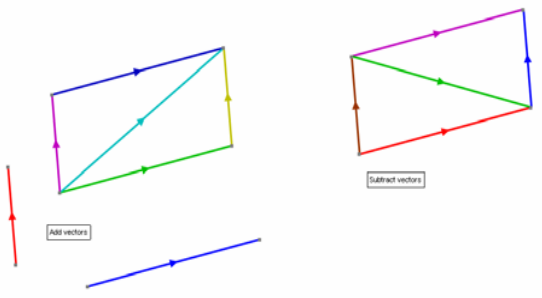
14.13

Using integral calculus

- Notation: position ***x***, speed ***v***, acceleration ***a***, time ***t***, mass ***m***
- Distance, $s = \int_{t_1}^{t_2} v\,\mathrm{d}t = \int_{t_1}^{t_2} \frac{\mathrm{d}x}{\mathrm{d}t}\mathrm{d}t = \int_{a}^{b} \mathrm{d}x = b - a$
- $v = \int_{t_2}^{t_2} a\,\mathrm{d}t$
- $m\int_{x_1}^{x_2} v\frac{\mathrm{d}v}{\mathrm{d}x}\mathrm{d}x = m\int_{v_1}^{v_2} v\,\mathrm{d}v = \frac{1}{2}mv_2^2 - \frac{1}{2}mv_1^2$

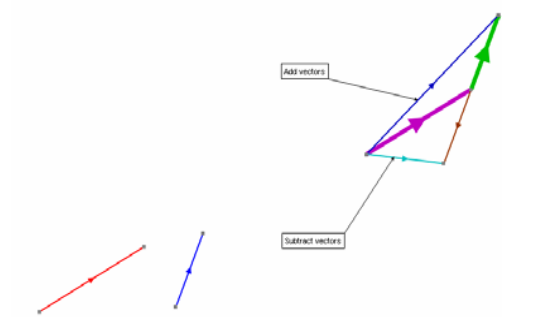
14.14

Vector addition and subtraction



14.15

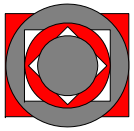
Vector triangles



14.16

Mathematics workshop 5

Session 15: Investigating with ICT



Objectives

By the end of this session you will:

- have considered some strategies for teaching using ICT
- have explored some mathematical problems using ICT
- have practised using mathematical software

15.1

Pedagogical issues

- When should students be allowed to use ICT to solve mathematical problems?
- How can using ICT improve students' understanding of mathematics?
- Which software packages are effective in teaching mathematics?
- Do teachers have sufficient expertise to use ICT in their teaching?

15.2

Summary

- What advantages have you found in using ICT to help you solve the given problems?
- Consider how you are going to plan your teaching to include the use of ICT.
- Look for good problems and share them with your colleagues.

15.3

Mathematics workshop 5

Session 16: Summing up

Objectives

By the end of this session you will:

- have watched videos tailored to the local context
- have reflected on the workshop

16.1

Aims of the workshops

To help subject leaders and teachers to:

- get to know the new mathematics standards
- consider the implications of the standards for planning, teaching and assessment
- begin planning or refine a mathematics scheme of work
- support colleagues as they implement the standards

16.2

Review: planning

- Are you working together as a team to plan your teaching and assessment within your school?
- Do you exchange lesson plans with each other?
- How well developed is your scheme of work? Do colleagues use it to help them to plan lessons? Or do they plan lessons by looking at the next chapter of a textbook?
- To what extent are problem solving and the use of ICT integrated into your scheme of work and lesson plans?

16.3

Review: teaching

- Do you have a better understanding of what students should be taught in the grades that you teach?
- Do you have some new ideas to help you to teach your students?
- Do you understand the need to work closely with your colleagues to ensure that you are using consistent teaching methods?
- Can you share ideas across schools?

16.4

Review: assessment

- Do you understand that assessment does not equate to 'multi-choice tests'?
- Do you know why diagnostic assessment is an important feature of planning lessons?
- Do you have some new ideas for assessment activities?

16.5

Review: resources

- Do you have all the apparatus and equipment that you need to support your teaching and students' learning? What about ICT?
- How will you make sure that there is progression for the students in your use of ICT?
- Do teachers have sufficient expertise to use ICT in their teaching?
- Can you share ideas for the use of resources across schools?

16.6