Investigation 1

How many times would you have to walk around the tennis courts to cover a distance of 2km? (If a court is not available choose an appropriate area close to the mathematics classroom.)

1. The students should work in pairs or small groups to decide what strategies would be best to complete the investigation.
   What measurements could you take to help complete this investigation?
   What other practical methods could you use to help complete this investigation?
   How far would you walk in one time round the tennis court?
   What measurements do you need to take to work out the perimeter of the tennis court?
   What units are most appropriate to use?
   How accurate do your measurements need to be?
2. Allow students to carry out their chosen strategies.
3. Discuss the accuracy of their answers.
   What range of answers would be acceptable?

Investigation 2

Calculate the thickness of a page in your textbook.

1. The students should work in pairs or small groups to decide what strategies would be best to complete the investigation
   What measurements could you take to help complete this investigation?
   Can you measure the thickness of just one page accurately?
2. Allow students to carry out their strategies for measuring the paper
   What units are appropriate for the answer?
3. Share and discuss the accuracy of their answers.
   What range of answers would be appropriate?
4. Use the micrometer to check the answer.

Investigation 3

The class set of mathematics textbooks are to be covered with plastic film which is 600mm wide. Determine how many 10m rolls of film will need to be bought.

1. The students should work in pairs or small groups to decide what strategies would be best to complete the investigation
   What measurements could you take to help complete this investigation?
2. Discuss the accuracy of their answers.

Investigation 4

Construct a box with a volume of 60cm³. The dimensions of the box should be whole number centimetres. Calculate the surface area of the box. Which dimension would give the minimum surface area?

1. The students should work in small groups to decide on the dimensions of their box.
   Can you find a set of three whole numbers which will multiply to give 60?

2. The students should decide on the best way of constructing their box.
   Can you draw a net for your box?

3. Students should calculate the surface area of the box.
   How many faces does the box have?
   What is the area of each face?

4. Discuss the value of the surface area for boxes of different dimensions.
   Which dimension would give the minimum surface area?

Investigation 5

Two vans are selling hot chips at the local A&P Show. Both vans use the same size scoop to serve a measure of chips. Mr Grease twists his paper to make a cone for his chips, and Mrs Crisp uses cylindrical containers. Why do customers *think* that Mr Grease is more generous?

1. Allow the students to plan the investigation.
   What information would you need to complete this investigation?
   What volume of chips would a scoop hold?
   What assumptions should you make about the two containers?
2. Students should try the investigation.
   What are the formulae for finding the volumes of both containers?
   Volume of cylinder = area of base times height.
   Volume of cone = 1/3 times area of base times height.
3. Students should write up their investigation showing all calculations.
   What are the dimensions of containers with equal volumes?
4. Discuss the results of the investigation.

Investigation 1

The principal wants to use the mathematics classroom for an assembly for the school or the year 10 students or a house group (Choose a group of about 300 – 400 students). Investigate whether all the students and staff would fit in the room. This is a good activity to begin with as students can line up in both dimensions and count the number that would fit.

1. Allow the students time to think about and plan ways to investigate the problem
2. Discussion of strategies *What measurements could you take to help complete this investigation?*
   What calculations would you do to complete this investigation?
   How many people fit across the room's width?
   How many people fit along the room's length?
   Could you solve the problem by calculating area or volume?
3. Allow students to choose a strategy to solve the problem and work in small groups or individually.
4. Ask the students to write up their investigation and share their findings with other groups or with the class.
5. Discuss the accuracy of their answers.
   Why are there a range of answers?

What range of numbers would be acceptable?

Will the chosen group fit into the classroom based on the range of acceptable numbers?

Investigation 2

The school is installing a computer network system, and cable is to be laid for this in the mathematics classroom from the ceiling in one corner to the skirting board in the diagonally opposite corner. (Choose something appropriate for your room) The cable cannot be laid diagonally across the floor, but must be attached to the walls or ceiling. Investigate the most economical path for the cable.

1. Allow the students to investigate the problem. Ensure that all students understand what is being asked of them.
2. Discussion of strategies .
   What path would you choose?
   How do you know that is the shortest path?
   What units are appropriate for your measurements?
   What units do tradesmen use?
3. Allow students to carry out their strategy either individually or in small groups.
4. Discuss the accuracy of their answers.
   What range of cable length would be appropriate?
5. Students write up their investigation .
   Which path is the most economical for the cable?

Investigation 3

Discuss with the students how many windows there are in the room. Ask them to investigate what percentage of the walls are made up of windows.

1. Allow the students to investigate the problem *What measurements do you need to take?*
   Which measurements are needed for the windows?
   Which measurements are needed for the walls?
   What units will be most appropriate?
2. Students should draw diagrams of each window, wall etc showing the measurements.
3. Students should show all calculations.
   What range of percentages would be acceptable?
4. Students write up their investigation
5. Discuss strategies for improving the accuracy of the calculations, and discuss rounding.

Investigation 4

Discuss with the students the size of the room. Ask them to investigate how much space each person in the class has.

1. Allow the students to investigate the problem.
   What measurements do you need to take?
   What units will be the most appropriate?
2. Students should draw a diagram of the room, showing the measurements.
3. Students should show all calculations.
   What range of answers would be acceptable?
4. Students should write up their investigation.
5. Discuss strategies for improving the accuracy of the calculations, and discuss rounding.

Investigation 5

The school is to begin some landscaping on a piece of ground outside the mathematics classroom. The area needs to be dug out to a depth of 16cm, then covered with a layer of fine gravel 3cm deep for drainage, a 5cm layer of sand and then a 10cm layer of wood chips. The school trailer will be used to shift the soil to another part of the school grounds, and to bring in the gravel, sand and woodchips. How many trailer loads of soil need to be removed, and how many trailer loads of gravel, sand and woodchips will be required? (Choose an area that would require at least 4 trailer loads of soil to be removed. Depending on the ability of the students either a simple shape or a complex shape could be chosen. You may like to send the students to the local landscape supplies to check out quantities and prices, and add a costing element to the investigation.)

1. Allow the students to plan the investigation.
   What measurements will you need to take?
   What units will be the most appropriate?
2. Students should draw a diagram of the area, showing the measurements.
3. Students should show all calculations.
   What range of answers would be acceptable?
4. Students should write up their investigation.
5. Discuss strategies for improving the accuracy of the calculations, and discuss rounding.