

Plan

Collect

Process

Discuss

## Improving the school environment: **Where's worst?**



Images of Strand School courtesy of Martyn Arnold

Image © Stockport Council, 2006

Plan



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## Improving the school environment

Pupils can spend over a 1000 hours at school each year! It is important that all this time is spent in a good working environment.

In many schools, the building, classrooms and facilities need improving. The Government has made money available but it is limited.

**BBC NEWS**

You are in: [Education](#)

Wednesday, 19 December, 2001, 11:52 GMT

### Cash boost for 'crumbling' schools



The aim is to get school buildings in top order

Schools in need of refurbishment could be set for a facelift, as the government gives details of a capital investment package worth more than £800m.

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## Each person has a say!

With a *limited* amount of money available schools will have to focus on improving only *one or two* parts of their environment.

How can the decision about *which area* be made in a fair way –one which lets every person have their say?



**Your task will be to write a mini-report for the school council giving your recommendation and evidence to back up your argument.**

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## Where's worst?

If money is going to be spent improving the school, on which parts would you spend it and why?

Are your reasons the same as your neighbours?

Is there a right answer?

How can you compare different parts of the school in a fair way?

For example, comparing a sports pitch with an ICT room?



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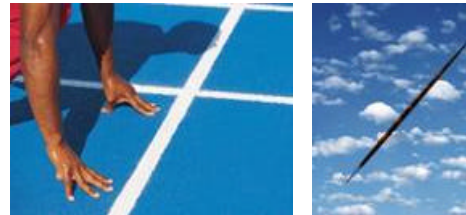
Process

Discuss

## Qualitative or Quantitative?

There are two ways in which we judge something.  
A good example is in sports.

In some sports, you  
are judged on your  
time or distance.



This is a **quantitative** measurement.



In other sports, judges  
hand out scores based on  
their opinions.

This is a **qualitative** measurement.

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To make a fair judgement you will need more than just your opinion!

If you are going to survey other pupils, how can you collect a lot of opinions quickly and fairly?

Some geographers use **Environmental Quality Indexing** to compare different environments. They score environments based on factors that they think are important.

These are **qualitative** measurements because they are based on individual judgements

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## Making Qualitative Measurements

Geographers and social scientists often use qualitative measurements.

Consider this living space.  
Suppose we want to give it a score out of 20.



This is made easier by using *factors* or **criteria** to judge it with and then adding up the total score.

What would be the possible top and bottom scores?

Cold	1	2	3	4	5	Warm
Untidy	1	2	3	4	5	Tidy
Noisy	1	2	3	4	5	Quiet
Hostile	1	2	3	4	5	Welcoming

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## What data should we collect?



Which parts of the school will you consider?

What criteria will you use to judge each part of the school?

**Example criteria**

What range of scores will you give your criteria?

How many people will you survey?



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## Possible Criteria

### Negatives

These  
should get  
low scores.

Boring	-	Interesting
Noisy	-	Quiet
Unattractive	-	Attractive
Monotonous	-	Varied
Dislike	-	Like
Dirty	-	Clean
Hostile	-	Welcoming
Neglected	-	Well maintained
Enclosed	-	Open
Polluted	-	Unpolluted
Crowded/Congested	-	Deserted/Empty
Inaccessible	-	Accessible
Depressing	-	Stimulating

### Positives

These  
should get  
high scores.

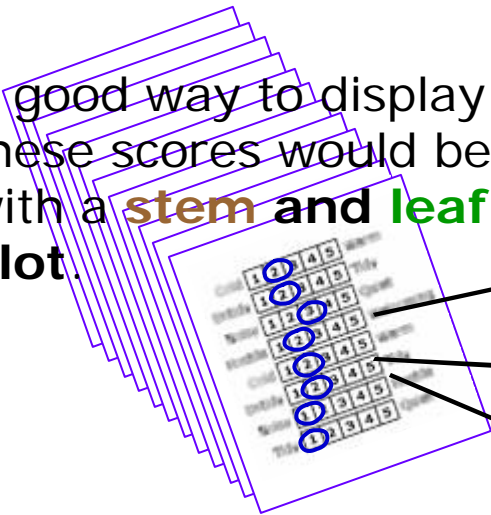


## Where's worst?

Here are some scorecards for pupils looking at their school library.

First, let's calculate total scores for each card.

A good way to display these scores would be with a **stem and leaf plot**.



27	7	11	32
12	32	23	18
28	34	27	20
25	26	24	21
15	28	29	8



## Where's worst?

To start we will choose the following **intervals**.  
Which gives us these **stems** and these **leaves**.

	stem	leaves				
	0(0)		27	7	11	32
	0(5)	7				
	1(0)	1	12	32	23	18
	1(5)					
	2(0)		28	34	27	20
	2(5)	7				
	3(0)	2	25	26	24	21
	3(5)		15	28	29	8

Key

$$2 \mid 7 = 27$$

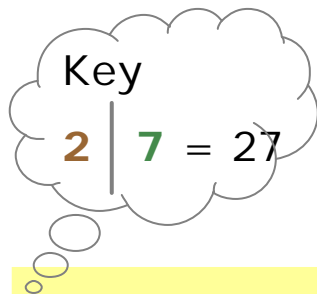


# Process

## Where's worst?

To start we will choose the following **intervals**.  
Which gives us these **stems** and these **leaves**.

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



Now that all the leaves have been added (and put into order), we can see the **distribution** of scores.

What do you notice about the scores from this set of pupils?



# Process

## Finding The Median

The median can be found by gradually crossing of leaves from the **top** and **bottom**.

If there are **two** numbers in the middle then find the mean of the two numbers.

Median =

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

Key

$$2 \mid 7 = 27$$



# Process

Or by working out the position of the median...

- Add one to the number of leaves and divide by 2.  
This will tell you how many leaves to count.
- Starting at the lowest leaf, count up until you reach the 'n<sup>th</sup>' leaf.

**Number of leaves = 20**

$$20 + 1 = 21$$

$$21 \div 2 = 10.5$$

**Median is between  
10<sup>th</sup> and 11<sup>th</sup> leaves**

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

Between  
23 & 24  
= **23.5**

Key  
2 | 7 = 27

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## Where's worst?

Students surveyed these four places using the criteria listed on slide 9.



Plan

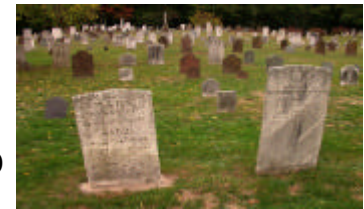
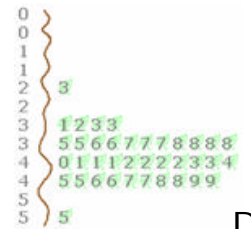
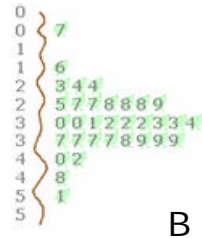
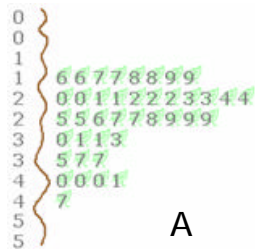
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They drew stem and leaf diagrams to show the total scores for each environment.



Can you match the location photograph to the Stem and leaf diagram?



What words would you use to describe them?

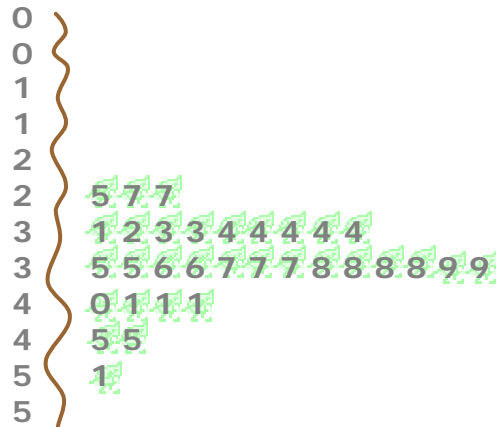




What comments can you make about your own graphs?

Try to use the structure:

1. Describe what you see
2. Say what that means mathematically
3. Give a reason why it might be



1. The leaves are not very spread out
2. The range of the scores is quite small
3. All the people had similar feelings about the environment

Key

$$3 \mid 7 = 37$$

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**Discuss**

Once you have interpreted your graphs you can report your findings to the school council.

Which are of school do you think should be the priority?

What evidence have you got to back up your opinion?

Is there anything else you would like to find out before you finalise your report?



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## The Problem Solving Approach

