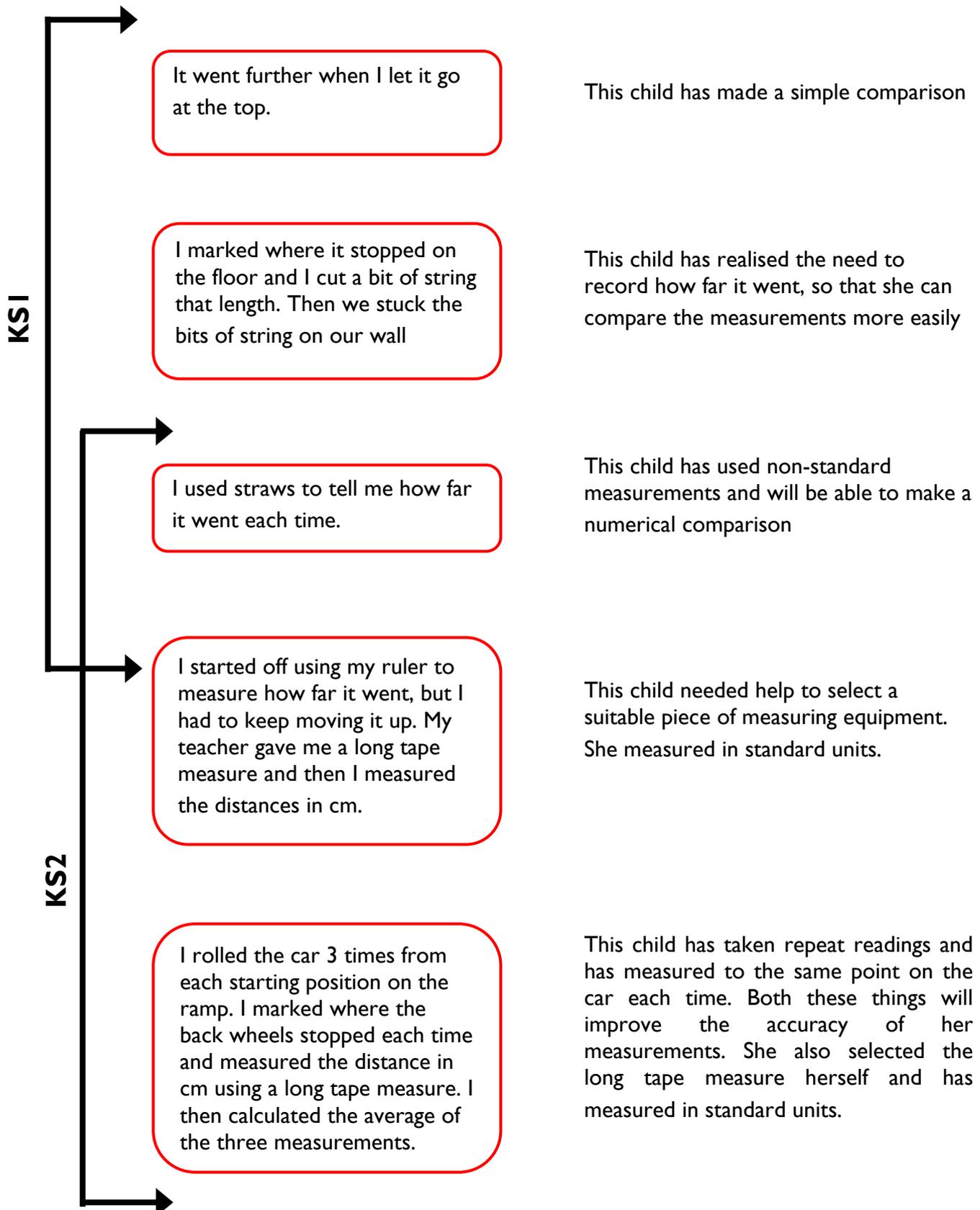


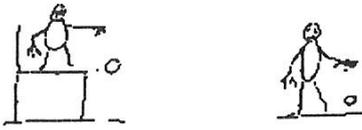
Progression in measuring

All these children are making comparisons between the distances rolled by a toy car which was started at different points on a ramp.



Progression in developing tables

These examples show how tables can be adapted to suit the different abilities of children in the primary school. In every case children are investigating how the height from which you drop a ball makes a difference to the height of the bounce.



This child has observed and recorded what happens when she dropped the ball from two different heights.

and

Where we rolled it off	How high it bounced

Progression in constructing and using graphs charts

This child has completed a table which has been constructed mainly by the teacher. She has carried out three tests and has put the picture record of her results in the correct place.

These examples show how charts and graphs might develop in the primary school. They follow on

Where did you drop it	How high it bounced
Top of door	5 boxes
Bookshelf	4 boxes
Bottom of window	2 boxes
Table	2 boxes

This child has completed a table where the headings were given by the teacher. She knew she had to do four tests but she had to decide what to write in the first column and what to record in the second column.

from the tables produced during

Height that we dropped it	How high it bounced
1m	0.38m
1.25m	0.59m
1.5m	0.68m
1.75m	0.76m

This child constructed her own table choosing her own headings, the number of tests to carry out and the heights from which she would drop the ball. The teacher had suggested that she should drop the ball from heights between 1m and 2m.

Height of drop	Height of bounce			Average
	1 st go	2 nd go	3 rd go	
1m	0.39	0.40	0.5	0.38m
1.25m	0.58	0.64	0.55	0.59m
1.50m	0.68	0.79	0.80	0.76m
1.75m	0.85	0.80	0.81	0.82m
2.000m	0.82	0.93	0.89	0.88m

This child constructed this table on her own choosing the headings, the number of tests, the range of heights she would use and the intervals between them. She also chose to repeat her tests and take an average. She knew the type of table she should use to show all her results.

KS1

KS2

the bouncing ball investigations on page 33. In every case they are changing the height of drop (independent variable) and measuring the height of bounce (dependent variable).

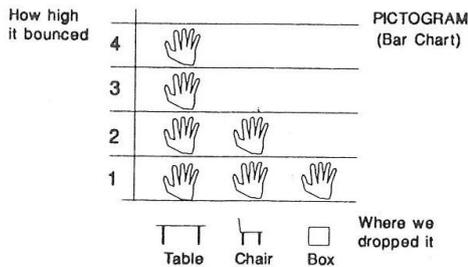
Standing on a chair

Big bounce

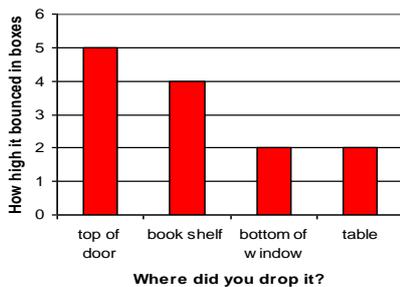
Standing on the floor

Little bounce

Independent and dependent variable are both described in words so no graph can be drawn

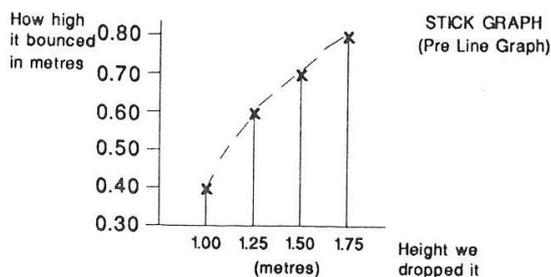


This child measured the height of the bounce in hands having marked the spot on the wall. He has stuck the correct number of hands one above the other in the correct column on a chart, which was prepared by the teacher.

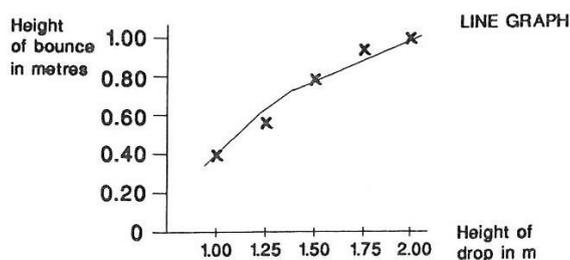


Bar Chart

This child has completed a bar chart where the labelling of the axes with the independent and dependent variable had been prepared by the teacher, along with the numbers on the vertical axis. The child filled in the different drop heights on the horizontal axis and coloured in the correct number of boxes in each column



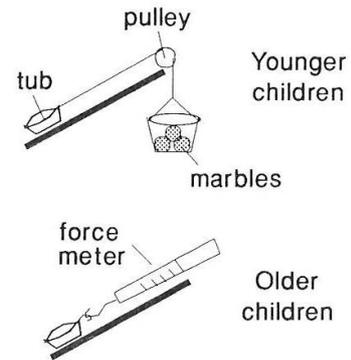
In this example the teacher helped the child to decide on the scale that should be used on both the vertical and horizontal axes. The child labelled both axes with the independent and dependent variables. The child drew the sticks to the correct length for each value of the independent variable using the scale on the vertical axes correctly. [N.B. If the child had joined up the crosses on the top of the sticks, it would lead into the line graph.



This child has completed the line graph on her own, labelling the axes, deciding on the scales for both axes and correctly marking the crosses according to the measurements recorded on her table of results. She has drawn a line of best fit and she could use this to help her predict the height of bounce for any drop within her range of values.

Progression in explaining results

All these children are talking about an investigation where they are changing the angle of a slope and seeing how many marbles/how much force is needed to pull a loaded margarine tub up the ramp



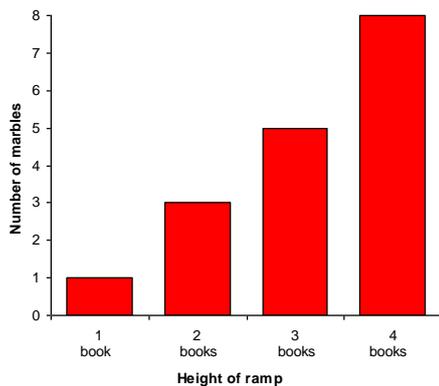
KS1

We needed more marbles to pull it up when it was a steep slope. I thought we would.

This child said what happened and has related it back to his original prediction.

My prediction was right because when it was flat we only needed a few marbles to make it go but we needed lots more when it was a steep slope. I think that when the slope was steep it needed more pull to make it go up the ramp

This child has described what happened and has related it back to his prediction. He has also given a simple explanation of his results

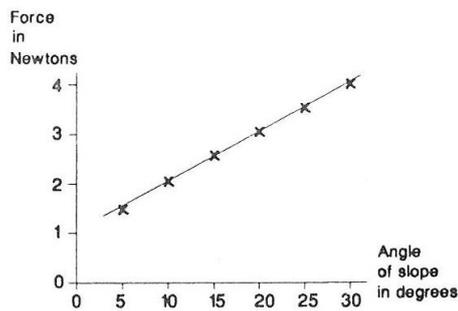


The columns on my bar chart go up in steps. This tells me that as the ramp gets steeper you need more marbles in the bucket to make it move.

KS2

Continued on the next page.

I think that more weight in the bucket gives a bigger pull force, which you need when the ramp is steeper. We thought we were going to need 2 more marbles for each extra book but we needed 3 more marbles on the last one.



My line graph goes up to the right in a fairly straight line. This means that as the angle of the slope gets more, so you need more force to make the tub move. I think that happens because when the ramp is steeper the weight of the tub pulls down more and the ramp doesn't hold it up as much. The force pulling up the ramp must be more than the force pulling down to make it move

This child has described a pattern on the bar chart.

By talking about the steps he has explained how more weight gives a bigger pull force and so is using his knowledge and understanding to make sense of the results

This child has described the pattern in the line graph and the relationship between the independent variable and dependent variable. He also linked his results to his knowledge that forces can act in different directions