Unit 6a
Handling data 1

Five Daily Lessons

National Numeracy Strategy

Year 5
Autumn term

This Unit Plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Unit Objectives
Year 5

• Discuss the chance or likelihood of particular events. • Solve a problem by representing and interpreting data in tables, charts, graphs, and diagrams, including those generated by a computer, for example: bar line charts, vertical axis labelled in 2s, 5s, 10s, 20s and 100s, first where intermediate points have no meaning (e.g. scores on a dice rolled 50 times), then when they may have meaning (e.g. room temperature over time). • Find the mode of a set of data.	Page 113 Pages 115, 117 Page 117

Link Objectives

Year 4

- Solve a problem by collecting quickly, organising, representing and interpreting data in tables, charts, graphs and diagrams, including those generated by a computer, e.g. tally charts and frequency tables; pictograms – symbol representing 2, 5, 10 or 20 units; bar charts – intervals labelled in 2s, 5s, 10s or 20s; Venn and Carroll diagrams (two criteria).

(Key objectives in bold)

Year 6

- Use the language associated with probability to discuss events, including those with equally likely outcomes.
- **Solve a problem by** representing, **extracting and interpreting data in tables, graphs, charts**, and diagrams, including those generated by a computer e.g. line graphs (e.g. for distance/time, for a multiplication table, a conversion graph, a graph of pairs of numbers adding to 8); frequency tables and bar charts with grouped discrete data (e.g. test marks 0-5, 6-10, 11-15…).
- Find the mode and range of a set of data. Begin to find the median and mean of a set of data.

Resources needed to teach this unit:

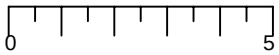
- Resource sheet 6a.1
- Activity sheet 6a.1
- Activity sheet 6a.2
- OHT 6a.1
- OHT 6a.2
- OHT 6a.3
- OHT 6a.4
- Dice
- Counting stick
- 1cm squared paper
- OHT of 1cm squares
- A4 sheets of paper, labelled 1 to 8

department for education and skills

Planning sheet	**Day One**	**Unit 6a** ***Handling data 1***	**Term:** ***Autumn***	**Year Group:** ***5***
Oral and Mental		**Main Teaching**		**Plenary**

Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/ Focus Questions**
Use the relationship between multiplication and division. VOCABULARY groups of product equal groups of divide quotient factor RESOURCES Counting stick Individual Whiteboards	• Ask children to count up in multiples of 3 from 60 to 90 as you point to positions on a counting stick. Encourage children to state the full calculation, e.g. 20 x 3 = 60, 21 x 3 = 63 etc. • Indicate points on the counting stick and ask questions such as: **Q** Which multiple of 3 was here? Vary the vocabulary used in questioning to include: groups of, product, equal groups of, divide, quotient, factor. • Encourage children to record on individual whiteboards some of the multiplication and division calculations discussed. • Change the multiple and the starting point.	Solve a problem by collecting, organising, representing, extracting and interpreting data in tables, graphs and charts. VOCABULARY outcome maximum/minimum values frequency axis RESOURCES Resource sheet 6a.1 OHT 6a.1	• Display Resource sheet 6a.1 and discuss what it shows. Clarify the meaning of 'frequency' and discuss the scale on the frequency axis. • Explain that children are going to use this bar chart to check the statement: 'A quarter of children in Year 5 read 4 or more books last week.' • Guide the children into forming an opinion by posing questions such as: **Q** How many children are there in total in Year 5? **Q** What is the largest number of books anyone read in the week? **Q** How many children read four or more books? **Q** What was the most common number of books read? Discuss and establish which questions will help to check whether the statement is correct. • Ask children to check the statement in pairs. Take feedback, asking children to justify their answers. • Show OHT 6a.1 and encourage children to work in pairs to find out whether the statement is correct. Guide them by asking: **Q** Have you got all the information you need to answer the question? What do you need to do with the information first? **Q** Before you organise the data, what other questions could you ask? **Q** How could you make the data easier to interpret? Discuss how the data can be reorganised to help the children to answer these questions easily. Draw out that constructing a frequency table or bar chart could be helpful. **Q** What labels should be on your tables/bar charts? Establish that the chart needs an appropriate scale, labels and a title. • Ask them to work in pairs to write down three questions they want to find the answers to, construct a table, bar chart or both, then record the answers to the given question and then their own questions.	• Discuss the answers to the statement about Blankside Primary School's football team. • Discuss the bar charts children drew e.g. **Q** What scale did you use on the frequency axis? **Q** Could you answer all your questions from your chart? Discuss whether charts could have shown more information. **By the end of the lesson, the children should be able to:** • **Discuss a bar chart showing the frequency of an event and check a prediction.** (Refer to supplement of examples, section 6, page 115.)

Planning sheet	**Day Two**	**Unit 6a** ***Handling data 1***	**Term:** ***Autumn***	**Year Group:** ***5***
Oral and Mental		**Main Teaching**		**Plenary**

Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Order a set of fractions such as 2, $2^3/4$, $1^3/4$, $2^1/2$ and position them on a number line. VOCABULARY equivalent RESOURCES Individual whiteboards	• Ask the children to draw a line on their board with 10 divisions, representing a scale from 0 to 5.  Write the following fractions on the board and ask children to order the values shown and then correctly position them on their line: 2½, 2¾, 2¼, ¼, 4½. • Repeat by writing: $^{25}/_{100}$, $^{50}/_{100}$, $^5/_2$, $2^5/_{10}$. • Discuss with children any values which are equivalent and need to be written at the same point. **Q** What fraction could we write in this empty space? • Discuss responses and strategies children used to give their answer.	Discuss the chance or likelihood of particular events in the future. VOCABULARY probability fair/unfair likely/unlikely certain/uncertain probable/improbable possible/impossible chance (good, poor, no) 50-50 chance/even chance RESOURCES Activity sheet 6a.1	• Discuss the vocabulary of 'probability' in terms of the likelihood of an event e.g. 'I will play for Manchester United'. **Q** What words do we use when we talk about probability? • List suggestions from children and display for all to see. • Draw a horizontal line and introduce it as a probability scale. **Q** What words could we place at either end of the line? **Q** Do any of the words have the same meaning? • Build up the scale such as that on page 113 in section 6 of the Supplement of Examples. • Discuss how 'unfair' in everyday language differs from its mathematical definition. For example, a child needing to throw a 6 in a board game may feel the die is unfair if it doesn't appear for 20 goes yet the die is still mathematically fair. • When a reasonable amount of vocabulary has been added to the line ask a child to come out and point to where the original statement, 'I will play for Manchester United' should be placed. • Choose one or two more children to come and point to positions along the line that match further statements until children are confident e.g. I will watch television tonight, I will grow taller than my mother, it will snow next Christmas. • Discuss the difficulty of finding statements that are at both extremes of the line i.e. certain and no chance (impossible). • Look at the range of statements on Activity Sheet 6a.1. Children are to decide where to place them on the scale by marking and numbering their positions according to the statement numbers. Explain that some positions will have more than one number. • After some time, take feedback about the positioning of the statements. **Q** Has anyone placed this statement in a different place on the probability line? Why? • Ask children to write a sentence that matches a different point on the scale.	• Draw a scale and mark it with a range of vocabulary picking out some words the children were not using automatically. • Ask selected children to read out their own statements with the class deciding where they would have positioned them. **Q** If an event has a '50-50 chance' of happening, where would you put it? **Q** What other phrases describe this probability? Establish that a fifty-fifty chance is an even chance. **By the end of the lesson, children should be able to:** • **Discuss events which have a good chance of happening and those which have a poor chance;** • **Place statements on a simple probability scale.** (Refer to supplement of examples, section 6, page 113.)

Planning sheet	**Day Three**	**Unit 6a** ***Handling data 1***	**Term:** ***Autumn***	**Year Group:** ***5***
Oral and Mental		**Main Teaching**		**Plenary**

Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Use decimal notation for tenths and hundredths. VOCABULARY hundredths tenths RESOURCES OHT 6a.2 Individual whiteboards	• Display OHT 6a.2. Point to a combination of numbers from each line (for example 20, 4, 0.3, 0.08) and ask children to write down the number made. **Q** How do we say that number? **Q** How would we say this if it was an amount of money? **Q** How would we say this if it was in metres/centimetres or kilograms/grams or litres/ millilitres? • Discuss responses if necessary and repeat with a different combination.	Solve a problem by representing and interpreting data in bar line graphs. VOCABULARY bar line chart outcome equal chance frequency RESOURCES Foam dice 1-6 Dice (1 between 2) Squared paper OHT squared paper	• Ask the children whether they have a 'lucky number' when throwing a 1-6 dice. **Q** Is any one number more likely to turn up than any other? Discuss the question, and discuss how it can be tested. Agree to throw the dice and collect data, drawing a tally chart | 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | Roll the foam dice a limited number of times (say, about 15) such that there is still a wide variety of outcomes. • Use OHT squared paper to draw a bar line chart of the results. **Q** 'Here's the chart, it proves that 'x' is the lucky number – it comes up the most' – who agrees? Invite discussion on the flawed assertion. After some discussion, add in some more dice throws. **Q** Have the frequency of the numbers become closer to each other? • Now invite the children to work in pairs and repeat the experiment. Collect data in exactly the same way. • When ready, collect two sets of data and add them to yours. Repeat the question. Collect two more, until the trend towards equal totals is established. Collect up the children's sheets and say that they will all be added in before tomorrow's lesson (ask two children to do the addition). • Ask the children to draw a bar line chart for the data collected so far. Discuss and agree the frequency axis scale before they start.	• Review the children's bar line charts. **Q** When a dice is thrown lots of times, does each number have the same chance of coming up? **Q** If one number <u>did</u> come up much more than the others when the dice was thrown 1000 times, what would that tell you? Establish that such a dice would be 'loaded' or being rolled to bias it in favour of one number. **By the end of this lesson, children should be able to:** • **Test a hypothesis about the frequency of an event by collecting data quickly, draw and discuss a bar chart or bar line chart and check the prediction.** (Refer to supplement of examples, section 6, page 113.)

Planning sheet	Day Four	Unit 6a *Handling data 1*	Term: *Autumn*	Year Group: *5*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Use known facts and place value to multiply and divide mentally. VOCABULARY divide multiply inverse	• Display a series of empty box questions such as: 500 x 90 = ☐ 70 x ☐ = 42 000 ☐ ÷ 1000 = 9 3900 ÷ = ☐ 245 x 2 = ☐ ☐ x 2 = 314 150 x ½ = ☐ ☐ x ½ = 245 2000 = 600 x ☐ + 200 Ask children to work out the answers mentally. **Q** What strategies did you use for finding the missing numbers? • Encourage children to use mathematical vocabulary to describe how they worked out their answers. **Q** Are any of the strategies more efficient than others? Agree efficient strategies, acknowledging that different children might not all use the same strategy for a particular calculation.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Find the mode of a set of data. VOCABULARY mode most common most popular RESOURCES Activity sheet 6a.2 (HOMEWORK)	• Briefly review the outcome from adding all the experiment results from day 3. The result should be more uniform. • Explain to the children that a 'winter baby' is born in December, January or February; 'spring' is March, April and May and so on, the seasons being approximately the same length. **Q** Do we have an equal number of babies born in different seasons in this class? • Discuss with the children how the question can be answered. Establish that one good way would simply be to form four groups, and count how many members in each group. After the groups have formed, count together and record the information on the board. If there is a group which has more members than any other, establish this is called the mode, which is the most common season for birthdays in the class. If you wish, repeat for individual birthday months. • In the same way, invite children to re-group in different ways: for example, number of children in the family; eye colour, (after a discussion on the range of colours); favourite fruit (from an agreed choice of four or five). **Q** What is the mode group this time? • Invite the children to suggest some ways of dividing the class into sub-groups (football team, car colours, TV programmes). For each, limit the number of choices to four or five. Together, agree which to test; but this time, the children make a written record of the question being asked, the agreed groups, the numbers in each group and the mode.

Plenary

Teaching Activities/Focus Questions

• Look together at the information collected.

Q Which group had largest mode?
Q Were there any situations where the mode was a 'tie'?

Establish with the children that finding the mode – the group with the most members – is a useful way of looking for simple patterns in data.

• Show a bar chart of babies born in each season in the class.

Q If we collected data for the whole school and constructed a bar chart, would the shape be the same as for our class? What might it look like?
Q Would a bar chart of a football team look the same? Would the mode be the same?

HOMEWORK

• Give out Activity Sheet 6a.2. Explain the sheet is about collecting information and finding the mode.

By the end of the lesson, children should be able to:

• **Understand and find the mode of a set of data.**

(Refer to supplement of examples, section 6, page 117.)

Planning sheet	**Day Five**	**Unit 6a** *Handling data 1*	**Term:** ***Autumn***	**Year Group:** ***5***

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Find the mode of a set of data. VOCABULARY mode	• Review last night's homework. Find out how many children chose each task and choose the most popular. Draw up a table on the board and find the mode for this data. Discuss any similarities or differences between the information collected from the class and the individual results. **Q** Did everyone have the same model for car colour… programme type… etc? **Q** Do you think there is an equal chance of seeing each colour of car? How could we find out? Discuss children's suggestions.

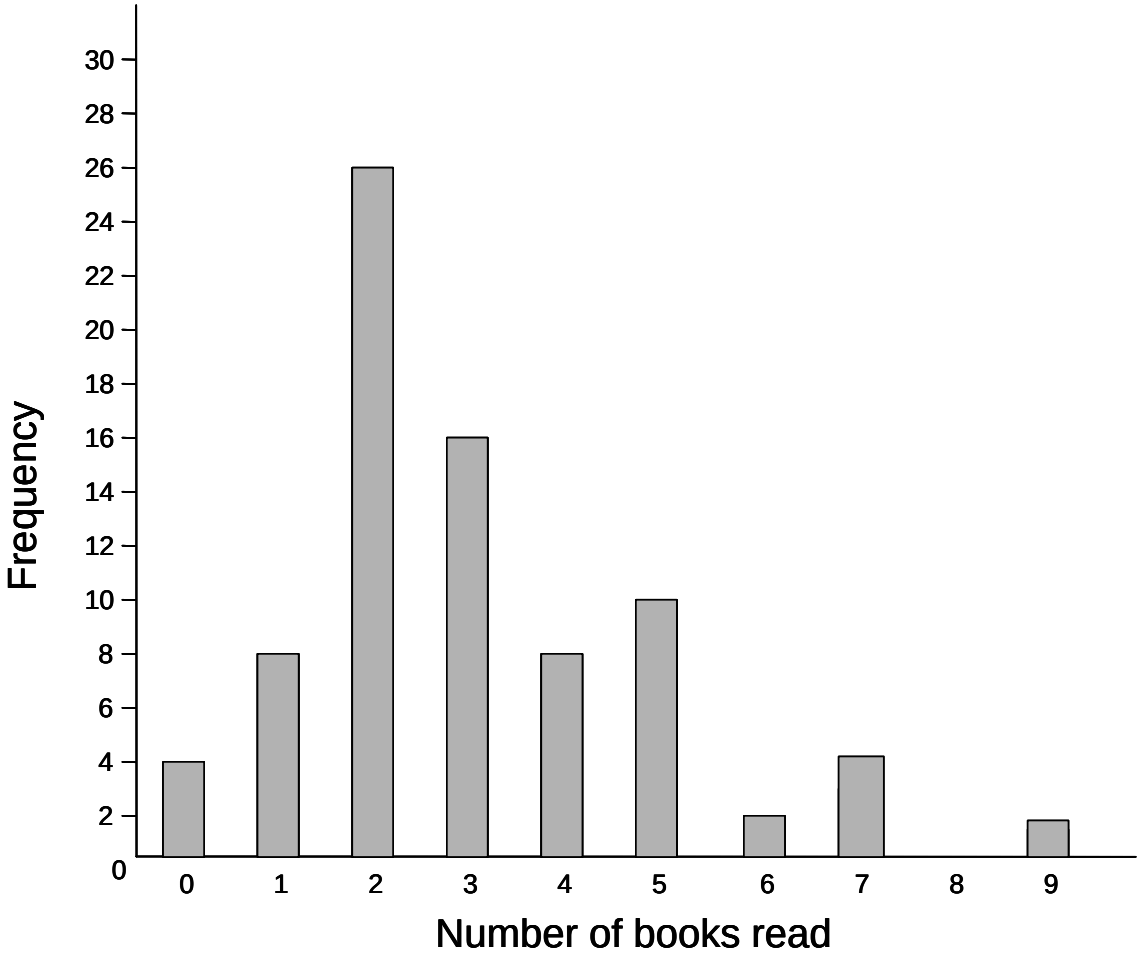
Main Teaching

Objectives and Vocabulary	Teaching Activities
Find the mode of a set of data. Begin to find the range of a set of data. VOCABULARY mode range RESOURCES A4 sheets Numbers 1-8 1cm squared paper OHT 6a.3 Squared paper	• Ask the children if they know their shoe size; allow them time to check, and use comparison if the information is unclear. In the same way as yesterday, invite the children to form groups according to shoe size, and to record the number of children in each group. **Q** What is the mode for shoe size in the class? **Q** What might be the mode if we asked Year 6 and Year 4 children. Record data on the board. • Remind the children how to construct a bar line chart using this information. Agree the x- and y-axis headings and the scale. Children draw the chart using squared paper. Whilst they are doing so, draw a similar chart on an OHT. • Establish that the children have drawn a chart similar to yours. Invite the children to work in pairs, and to think of questions that can be asked about it – how many children with shoe size greater than, …, the biggest shoe size, the most common shoe size… Collect and answer questions together. • Explain to the children there is another way to simply describe data: the range – the difference between the largest and smallest value of the item being measured, in this case, the shoe size number. Point out how a range can only be found when the data being measured is numerical; not favourite fruit etc. **Q** What is the smallest shoe size in our class? The largest? The range? What might the range be for Year 6 and Year 4? Might it be the same? Why? • Show OHT 6a.3 which has a line graph of speed during a car journey. Cover the axes labels and title of the graph. Ask the children to discuss in pairs. **Q** What could this graph be about? What might the axes be? What might the title be? Show the labels and titles. **Q** What was happening between 07:30 and 09:00? Where might the car have been at 11:30 and 12:30? **Q** How fast was it going at 09:15? Discuss and establish that only the speed shown at the plotted points has real meaning. Speeds between each point are unknown, their values may or may not be the same as the line suggests. Ask children in pairs to sketch a line graph of the car journey from 14:30 to 22:30 and to describe the 'story'. Share some of these as a whole class.

Plenary

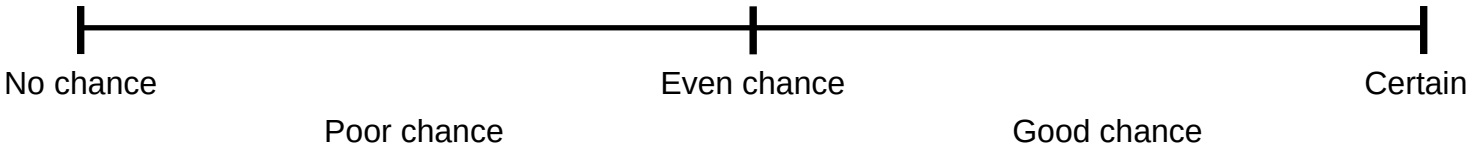
Teaching Activities/Focus Questions
• Show OHT 6a.4 of dice throws. Explain that each dot shows the number rolled on a die. The number was recorded once a minute, but the die was rolled between the times shown. **Q** If we join these points together would the intermediate parts of the line have any meaning? **Q** What question could be answered from this graph? **Q** Is there another way to present the data? Draw out that the question asked should determine the graph drawn. **By the end of the lesson, children should be able to:** • **Develop understanding of the mode and the range of a set of data;** • **Interpret a simple line graph.** (Refer to supplement of examples, section 6, page 117.)

Books read by Year 5 last week



Likely or Not?

1. If I throw a 1-6 die, I will get a number below 10.
2. I will eat my lunch in the next hour.
3. I will visit a foreign country tomorrow.
4. I will meet a member of the Royal family next week.
5. If I throw a 1-6 die, I will get an even number.
6. If I throw a 1-6 die I will get a number greater than 7.
7. If I pick a number on the 100 grid it will be greater than 50.
8. I will be 10 this year.
9. I will watch television when I get home today.
10. I will travel in a car this week.
11. On my way home from school I will see at least 1 house.
12. It will rain tomorrow.
13. February will come before March.
14. There are 60 seconds in 1 minute.
15. Dinosaurs will roam the earth again.



Homework

Finding the mode

There are various ways to form a simple view of large amounts of mathematical information. One simple way is to find the **mode**. When the groups are being compared, the group which is **largest** is the mode. If for examples, car colours are being compared and this information is collected:

White 12; Black 14; Red 12; Blue 9; Green 11

Then the mode is black because more black cars were seen than any other colour.

With adult permission, collect information using ONE of these ideas. Decide the groups, collect information, until you are sure the pattern is clear. Then write down the mode.

1. **Car colours passing**

Sort by:	White	Black	Red	Blue

2. **Types of TV programme**

Sort by:	Children's	News/ information	Films	TV drama/ soaps	Game Shows

3. **How long TV programmes last**

Sort by:	0-30 mins	31-60 mins	61-90 mins	91-120 mins	121-150 mins

4. **Toy collections** (cards, character figures – anything where there are lots of them).

   Sort by – you decide!

Note: tomorrow we are doing further work based on children's shoe sizes. Please can you help your child to find out their shoe size (English: 1 to 8, including '½' sizes) if they don't know it.

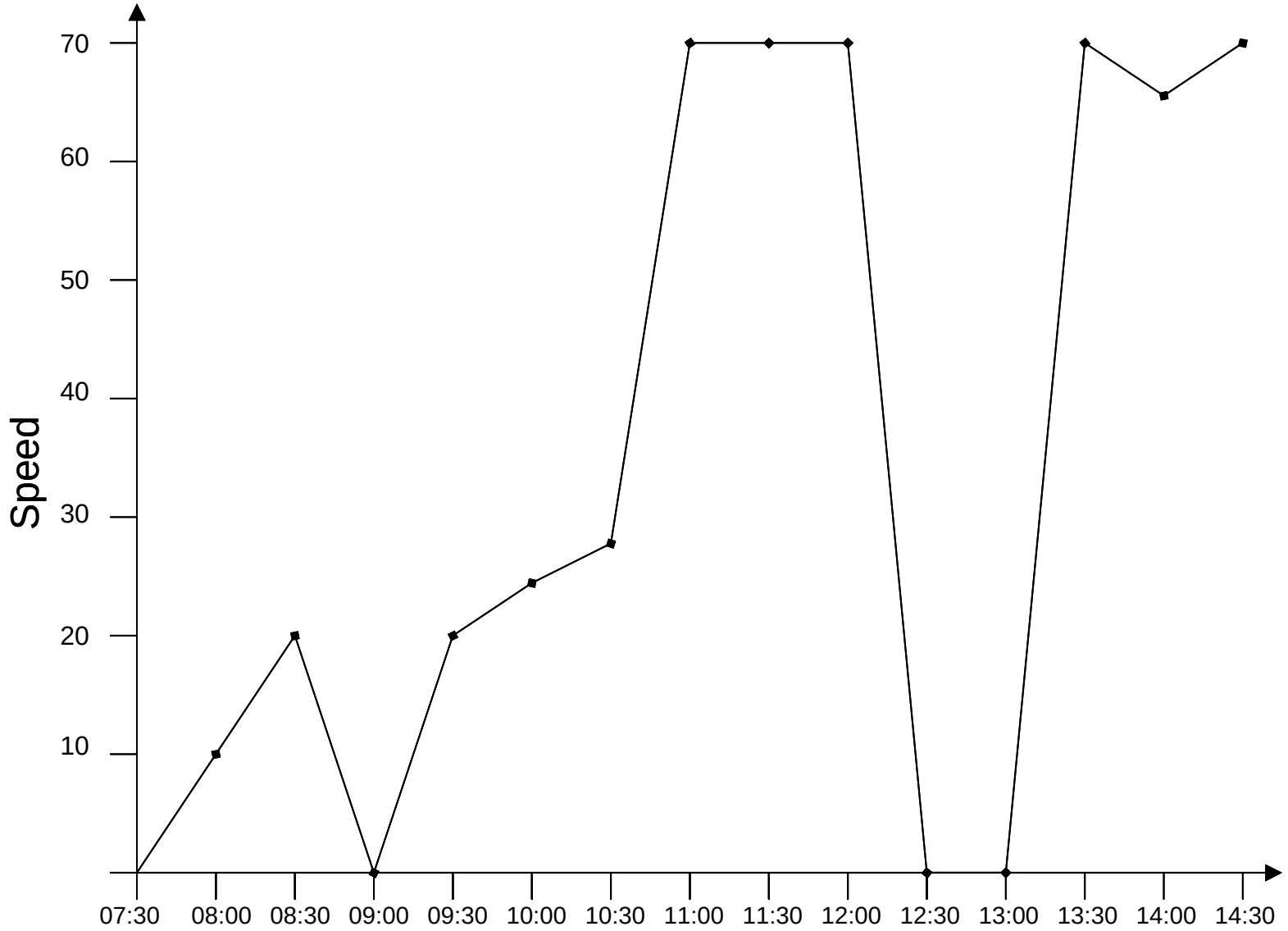
'I think Blankside Primary School football team scored twice as many goals as the team who scored the least number of goals.' Am I right?

Here are the end of season results:

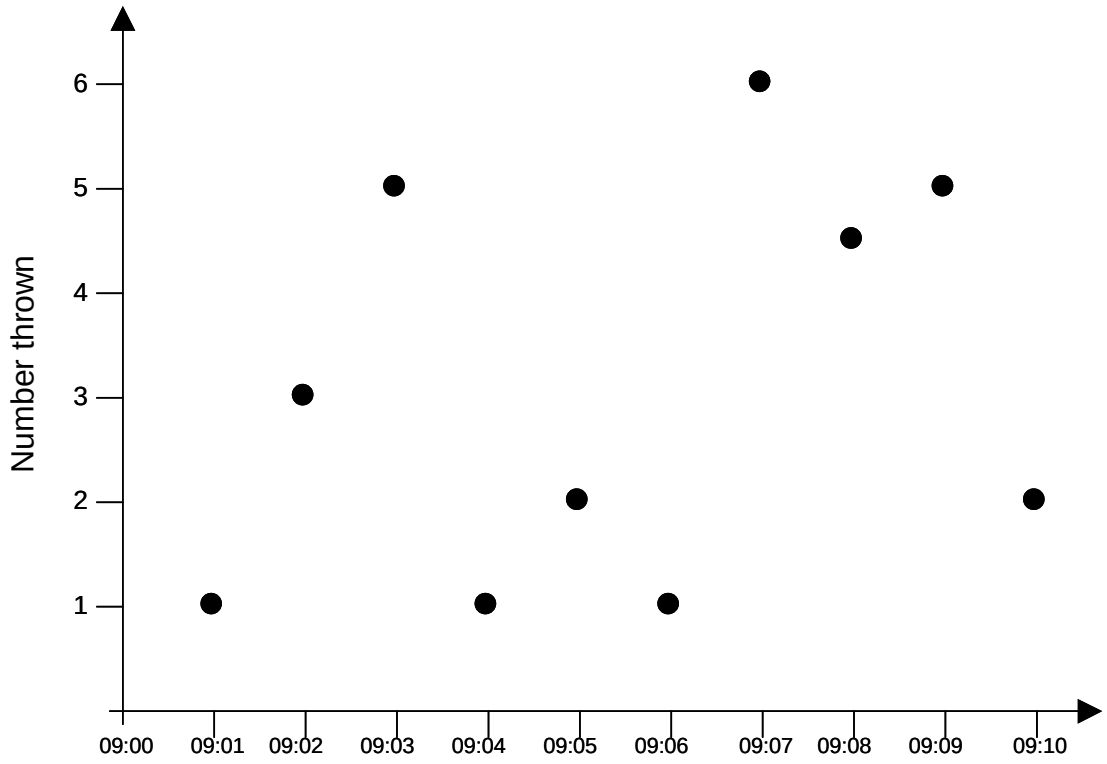
Blankside Primary	3 – 1	Zedton Juniors
Onetown Primary	2 – 2	Pointfield Primary
Blankside Primary	3 – 0	Onetown Primary
Zedton Juniors	2 – 1	Pointfield Primary
Blankside Primary	1 – 2	Pointfield Primary
Zedton Juniors	0 – 0	Onetown Primary
Zedton Juniors	3 – 3	Blankside Primary
Pointfield Primary	1 – 1	Onetown Primary
Onetown Primary	1 – 3	Blankside Primary
Pointfield Primary	3 – 2	Zedton Juniors
Pointfield Primary	0 – 1	Blankside Primary
Onetown Primary	2 – 3	Zedton Juniors

10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

A Car Journey



Dice Throws


Number thrown
6
5
4
3
2
1
09:00
09:01
09:02
09:03
09:04
09:05
09:06
09:07
09:08
09:09
09:10