# UNIT 9 LEARNING TO INTERPRET DATA

**Structure** **Page Nos.**



## 9.1 INTRODUCTION

In the previous unit, we introduced you to ways in which children can generate, record and display data. There were some examples of a simple analysis of the data too. In this unit, we carry forward this discussion of data-handling.

You may find that the level of the ideas presented in this unit is slightly higher than that of the previous unit. More specifically, we see how children are capable of drawing some inferences from data. With some guidance, they can also test whether their inferences are correct or not.

We will go on give examples which show that primary school children are capable of quantifying trends in data. In particular, we talk about introducing children to the use of the arithmetic mean and mode, maybe at a very simplistic level.

You may or may not agree with the case we are making out about introducing children to various aspects of data handling. However, try the exercises given in the unit and think of more and better activities to do with children. You will, then, be in a position to judge how far you can go in this direction with the children you are dealing with.

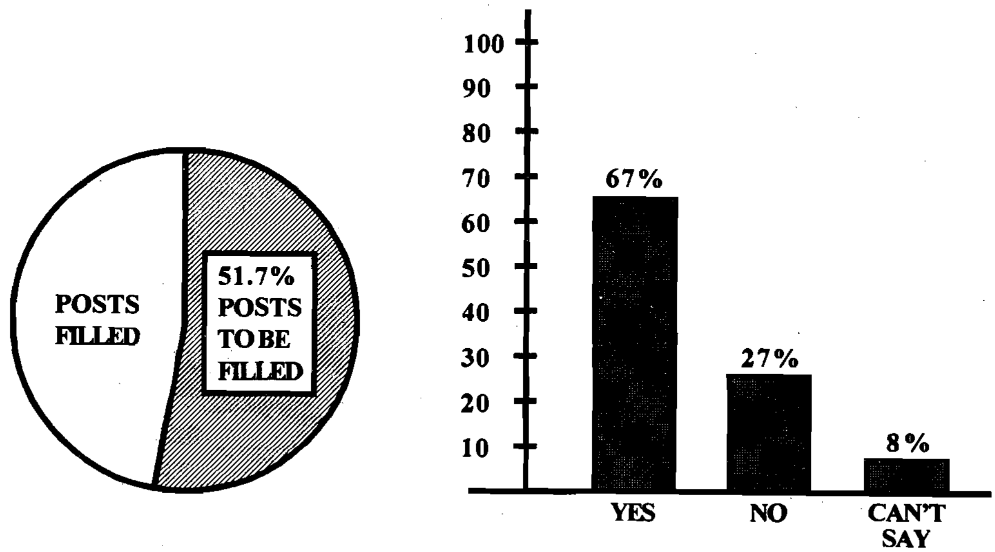
### Objectives

After studying this unit, you should be able to create and try out activities with children that help them develop their abilities to

- analyse data;
- draw inferences from data, particularly quantifying trends;
- use data to frame hypotheses and test them.

## 9.2 INTERPRETING DATA

As we have already seen, data are not just numbers. But when we look at any data, we usually interpret the numbers (quantity, say) associated with it. Also, all data comes with a natural context and meaning. So, we look at it in that context to try and make meaningful statements from it. For some examples, consider the data given by the pie chart in Fig.1(a) and bar diagram in Fig.1(b).




(a) (b)

**Fig.1**

Fig.1(a) represents the data gathered about the number of primary school teachers in Orissa (ref. The Hindu, 10/10/2000). As you can see, most of the posts required are not filled. Fig.1(b) depicts the data gathered from a survey done on the internet. The question asked was 'Should the UTI terminate its Rajlakshmi Scheme?'. Only 27% of the people polled said it should continue (ref. TOI, 7/10/2000).

Can we reach any more conclusions from the data shown in Fig.1? For instance, can we conclude that most young children in Orissa do not have access to teachers? Can we conclude that most people think that the UTI scheme for the girl child is not of much use?

Let us also consider the examples of the previous unit, and see some statements that naturally emerge from the data there.

| Example | Conclusion drawn from data |
|---|---|
| 1 | A week in June was very hot — temperatures reached a 50-year high. |
| 2 | Children who like cricket are aware of good cricketers from all over the world. |
| 3 | a) The attendance is usually between 25 and 30.<br>b) The attendance varies a lot. |
| 5 | More children have a preference for bananas than for guavas. |

As you can see from these examples, even without doing any more work on the data, we naturally come to some conclusions based on it. Sometimes these conclusions are related in a very specific way to the data, as in Example 1. The statement 'This June had the hottest day in 50 years.' is very specific. Others, like 'The attendance varies a lot.', are more general.

You may also feel that some of these statements are more useful than others. The most useful statements are those that help us to predict something, that is, say something about what could happen in the future, related to the events about which we have the data. In Example 5 of Unit 8, on the basis of the conclusion about children preferring bananas to guavas, some of us may predict that children from any other class in the same school, will choose bananas rather than guavas. Of course, this prediction may or may not be correct. How can we check this? Think about it and try this exercise.

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E1) Re-read the examples of Unit 8 and look at the conclusions listed above.

a) Which of these conclusions are useful? Why?
b) What other meaningful statements can be made on the basis of the data in these examples?
c) Do you disagree with any of the five conclusions given above? Why?

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You have seen that we can make meaningful statements on the basis of any data, often several different statements from the same data. At the same time, some questions arise from the data. For instance, in Example 1 of Unit 8, we wonder: "The temperature on the last day was the lowest. Does that mean the heat wave was over?" Similarly, we may wonder in Example 3 of Unit 8: " Is the attendance usually higher on certain days of the week?" Note that these questions can't really be answered from the data we have at present. We can only make guesses. To answer the questions, we need to gather data for longer periods of time.

There are also other questions which cannot be answered even by extending the length of the period over which we gather data. For instance, in the situation of Fig.1(a) we may ask "Are there no trained teachers available for filling the posts?", or from Example 5, Unit 8, "Why do children prefer bananas to guavas?". These questions can't be answered by gathering data over a longer time.

Let us now see a classroom interaction in which children are being encouraged to make inferences from data.

**Example 1:** The Class 4 children were being introduced to ways of measuring length. The teacher, Hema, had divided them into groups of 5 or 6, and had asked the groups to measure each others heights in whichever way they wanted to. She also asked them to record the heights in any way that they wanted to. She found that some groups used handspans to record heights, some used marks against the walls, some used a footrule.

Now Hema started a discussion among them about how to compare these different ways of measuring, and what is the best way for others to see all the heights in one go. After a bit, the children concluded that marking the height on the wall was the best way. "Because," like one child said, "then we can all see that Ashu is the tallest in that group."

So, Hema got all the children to record their heights with their names on a sheet of plain paper that was stuck on the wall for this purpose. After this, Hema asked the children to get back into their groups to discuss what they could conclude from these height markings. For instance, she asked them if they could tell her

- who are the tallest and the shortest children?
- are there many marks near some heights?

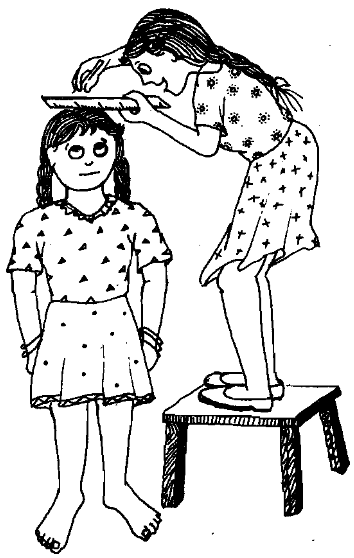

Fig.2

Following this interlude, the heights were measured using a footrule. The data found were written on the board and the following questions asked:

- which is the most common height of the children in the class?
- how many children are taller than this common height?

The children got into their discussions. Loud laughs were being heard from various groups as they were coming to various meaningful conclusions, and several comic ones too. For instance, one child decided that Tarun and Abha, the tallest children can act as giraffes in their forthcoming play.

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Why don't you try an exercise now?

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E2) Do an exercise of gathering data with young children in your neighbourhood about what they would like to be when they grow up. What could they infer from the data? If you gather similar data from more children, will their inference still be valid? Why?

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Plural of 'hypothesis' is 'hypotheses'.

Beyond observing general trends in the numbers, we ultimately want to use data to make such guesses as "The attendance is higher on Mondays than on other days of the week" (ref. Example 3, Unit 8). This is an example of a **hypothesis**, that is, a claim which may or may not turn out to be true. It needs to be tested against data. Suppose we extend the data of Example 3, Unit 8, over 12 weeks, and consistently find that the attendance is high on Mondays. This would **support** the hypothesis. (**Note** that supporting the hypothesis is just verifying it in some cases. This is not the same as proving it.) On the other hand, suppose the 12-week data shows no such feature. Then we would have to **discard the hypothesis**.

How do we help children realise this aspect of handling data? Let us see an example.

**Example 2**: Bhagat had got quite enthused about introducing children to data gathering — a notion presented to him at a workshop. He would take any and every chance to get the children to sort information and to see what they could conclude from it. For instance, in one of the environmental studies (EVS) classes of the children of Class 3, he asked them, "What are the most commonly eaten foods in our homes?" Many children came up with rice, lentils, chapati, potatoes, etc. Then he asked them, "If I say that more people in our area eat rice than chapati is that true?" There was some silence, after which came a lot of noise made up of 'Yes' and 'No'. He asked them to think how they can check whether it is true or not, rather than guess. Finally, with some help from him, the children concluded that they would gather data from their homes and from their neighbours about this hypothesis over the next two days.

In the next EVS class, all the data was pooled. The children found that out of 75 households that were sampled, some people ate rice twice a day, some ate it once a day, some once in 3 days, and so on. The whole session was spent on discussing how to classify this data so that the original claim could be checked. They finally decided to use a table like the one below.

| | |
|---|---|
| People eating rice everyday | 45 |
| People eating chapati everyday | 50 |
| People eating rice sometimes only | 20 |
| People eating chapati sometimes only | 10 |

Now Bhagat asked them again whether his claim was true or not. One of the children, Aarti said, "But if we all went to only 75 houses, how can 45 people eat rice and 50 chapati?" Sourabh spoke up, "Why? We eat both. So we'll come into both. Sir, more people eat rice." The children generally agreed that the data gathered showed that the teacher's hypothesis is right. Then one child yelled out "But from this we can't tell if all the family members eat more rice than chapati."
Here was a child making it clear that given some data, we can't answer all the related questions.

As homework, Bhagat decided to build on this. He asked them to come to the next class with three more statements that couldn't be checked from this data, and three statements which could be.

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In this example, we looked at how we can begin with a hypothesis which we want to test. Then we must decide about the kind of data to collect for checking it. Try these exercises now.

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E3) Here is a hypothesis:

"Girls of Class 6 are taller than the boys of Class 6."

What kind of data do you need to collect for testing this hypothesis? Devise an activity with children of Classes 3 or 4 to collect data and test this hypothesis.

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So far we have looked at how data can be used for reaching conclusions about what the data deals with. There are some devices that we use for telling us quantitative trends that the data shows. Let us now consider how to help children use some of these devices.

## 9.3 REPRESENTATIVE VALUES

Suppose I have a lot of data, say, the number of students who have registered for the IGNOU B.Sc. programme from each of the 100 study centres around the country, over the last 5 years. From this data I want to answer questions like how mucr material to print, how many counsellors to appoint, etc. How do I go about this? Can I organise the data in a way that will help me to deal with it efficiently? Alternatively, can I find a subset of this data that is enough for answering the questions related to the whole data?

Sometimes we can use values obtained from the given data that, in a sense, represent the whole data. Certain questions can be answered reasonably well by such appropriately chosen values. In this section, we shall talk of two values that can be used to represent certain kinds of data, the mode and the average (or arithmetic mean). You will also see how these concepts can be very comfortably introduced into the primary school curriculum.

### 9.3.1 Mode

Suppose we have a large amount of data, say, for example, the amount of time the people of a small town spend on watching a particular TV channel, TVC. You can imagine the size of the data! If you are trying to sense how popular the TVC programmes are, how would you arrange this data? One way that may help is to gather together the families who watch TVC for less than an hour, then group those who watch it for 1 to 3 hours, and so on. Suppose the chart is as given below:

| Hours/day | No. of families watching TVC |
|---|---|
| Don't watch at all | 2000 |
| Watch for up to 1 hour | 1000 |
| 1 to 3 hours | 4000 |
| 3 to 5 hours | 500 |
| More than 5 hours | 50 |

What kind of trend does this data show? In terms of quantity, we see that approximately half the population (4000 families) watches TVC for 1 to 3 hours. So, for the purposes of our question of popularity this value can represent the data. 'Watching TVC for 3 to 5 hours' is the event that is seen most frequently, that is, the value with the highest frequency. So this is the **mode** of the data.

You may wonder whether the concept of 'mode' is too advanced for children (and therefore useless for classroom work). Let us look at an example of how children relate to it naturally.

**Example 3:** Azra had given her Class 5 students a mathematics test. Twenty-four children were present. The marks obtained by them, out of ten, were as follows:

6, 3, 4, 2, 5, 6, 9, 7, 7, 4, 6, 5, 8, 5, 3, 5, 6, 8, 4, 5, 5, 7, 3, 4.

She decided to utilise this opportunity for getting the children to study data and come to conclusions based on it. So she wrote down all the marks in a row, as shown above. Now Azra asked the children if they could say anything about their performance by looking at the marks. There was a bit of silence, and then one child piped up, "Nobody got zero."

**Table 1: A frequency table**

| Marks | Frequency |
|---|---|
| 0 | 0 |
| 1 | 0 |
| 2 | 1 |
| 3 | 3 |
| 4 | 4 |
| 5 | 6 |
| 6 | 4 |
| 7 | 3 |
| 8 | 2 |
| 9 | 1 |

**Azra:** Good! What else can you say? Can you say how many have the lowest mark?

**Randhir** (a child)**:** Teacher, 2 is the least. One person has got it.

**Azra:** Good! Now, suppose I write the marks distribution in two columns. In one I'll write the marks, and against each, in the other column, I'll write the number of students who have got that particular mark (see Table 1). For example, only one child has got 2. So I'll write 1 in the right side column, against 2. Since no one got zero, I'll write 0 next to 0. Now, can you say anything about the marks? For example, can we say that the class is not doing too badly in maths?

Several children laughed and agreed, and then one of them spoke up.

**Maya:** Yes, Teacher. Many of us have got 5, it is the **mostest** mark.

**Azra:** Yes, in fact we call this 'mostest' mark, the mode. This word means what is in fashion — from the French 'A la mode'. So, what is the most popular is the mode. Also note that very few of you have done really badly. Not many have very high marks either. This is quite normal.

**Randhir:** Most of us have got between 4 and 7. Next time we'll do better.

**Azra:** Good!

As homework, Azra asked the children to find out which are the favourite films of their family members and friends at home. Next day the children were to pool their knowledge and make a frequency table for the name of film and for how many people the film was a favourite. Using this table they were to find the favourite movie of the maximum number of people, i.e., the mode of their data. Two days later, when they met in class, they put all the data together. Now, they discovered that two films were the most popular, both getting the highest number of votes, 35.

Azra asked the children what the mode would be now. She discovered, soon enough, that the children were insisting that one or the other of these is the mode. They were giving arguments like this film has so-and-so as a hero, or that it has very good songs, etc., and therefore must be the favourite film. The discussion wasn't moving anywhere till, finally, one child spoke up, asking if both can't be modes. Azra immediately utilised this child's query to bring in the notion of several modes. She was quite happy to find the ease with which the children were relating to the concept of a mode.

A feature of the frequency table in Example 3 is that there are very few children with very high or very low marks. Most of them are in the middle. As Azra pointed out, it's 'quite normal' for marks scored in a test to show these features. It is, in fact, these features of the data that make it reasonable to use the mode as the value that represents all the data values. And finding it does not require any numerical calculation. If we plot the graph of such data, we will find it is bell-shaped (see Fig. 3). We also say such data is **normally distributed**.

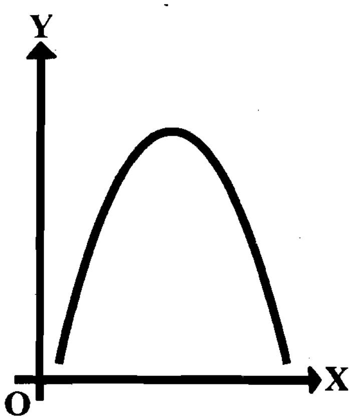

**Fig.3: The graph of normally distributed data.**

Any normally distributed data has a unique mode. So, when we find data with more than one mode, like the 'favourite film' data, it is not normally distributed.

Here are a couple of exercises related to what you have just read.

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E4) Give some children around you a data-gathering activity to do in which the data is distributed with most of the values in the middle, very few values which are very low or very high. Talk to the children to find out what quantitative understanding they have of the problem they have gathered the data about. How did you help them realise that the mode could be taken to represent the data?

E5) Give one example each to show when the mode is a representative of the data, and when it isn't.

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The data of Example 3 (students' marks) was almost ready-made for a frequency table. The main reason was that the number of distinct data values (marks) was small. This need not always be the case. As the following example shows, children working in a classroom can readily generate a lot of data with a much greater spread in values. Then, they would want to know how to interpret it.

**Example 4:** The children in Class 3 of my neighbourhood school were measuring each other's heights with a tape measure. Since these children were very small, the teacher, Chandan, instructed them to use only the centimetre markings on the tape. The readings obtained, and written on the board, were as follows:

108, 110, 122, 108, 106, 103, 113, 108, 103, 106, 117, 98, 112, 116, 103, 107, 116, 110, 112, 111, 104, 102, 119, 109, 114

The children were divided up into groups and asked to make a frequency table with this data. All the groups found it difficult. Then Chandan asked them if they could say what the average height of the class was. After a bit, one child said, "108 cm". When asked why, she said, "It is written the most number of times on the board."

In another group, the children were asking each other what average meant. Finally they asked the teacher. He said, "It means that suppose you didn't measure your classmate, but wanted to guess her height given the data you have collected. Then, what would you say her height was — about how many centimetres?" A child answered, "Less than 123". To this Chandan responded, "Of course, the height is more than 97 cm and less than 123 cm. But can you give a better guess? Suppose you put your data differently. Suppose you group them together with 5 cm in each group. Then what do you get?"

After a bit of discussion in the groups one child said, "98 cm is the lowest, so we can have 98-102 cm." "Yes," said Chandan, "and then?" With a few more hints, the children decided to group the data as 98-102 cm, 103-107 cm, 108-112 cm, 113-117 cm and 118-122 cm.

The next step was to get the children to give the frequency table corresponding to these groups. This the children were able to do. He asked them to tell him what they had got, and wrote it on the board:

| Groups | Frequency |
|---|---|
| 98-102 | 2 |
| 103-107 | 7 |
| 108-112 | 9 |
| 113-117 | 5 |
| 118-122 | 2 |

Then Chandan said, "Now tell me which group is seen the most." With a few more hints and a discussion, he led them to the concept of a modal group and that it represented the height of a "typical" classmate.

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In all such cases where the data values have a wide spread, it helps to group the data by choosing **equal-sized intervals**. These intervals, also called **classes** or **bins**, can be used in making frequency tables.

Here are a couple of exercises about Example 4 now.

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E6) Why did the children find it hard to make the frequency table to begin with?

E7) Look at the data of Example 4. Make a bar diagram of the ungrouped data. Now make a bar diagram of the grouped data. Is there any similarity in the general shape of the bar diagrams in the two cases? Is there any major difference? What difference would there be in the shape if you used the height data without making equal-sized intervals?

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So far we have seen how children can be made quite comfortable with the concept of a mode of data. Let us now consider how children can use another value that represents data of some kinds.

### 9.3.2 Average

Let us start this discussion with the following conversation between two Class 6 children, Mani and Dolly.

**Mani**: I don't know why they make us calculate averages. It's so much work. We have to add up all the numbers, and then divide it.
**Dolly**: Well, if we have the average, we don't need to look at all the data again.
**Mani**: Why not?
**Dolly**: Because it gives the general idea.
**Mani**: Ma'am gave us this table, the population of India in different ...
**Dolly**: ...censuses?
**Mani**: Yes, it keeps increasing. So, how will the average give us the general idea?
**Dolly**: Um.... No. I don't think it will. Did Ma'am ask you to find the average?
**Mani**: Actually, no. But we did the average of our class's exam marks. It was boring. The average was 61.6. But I had only 53.
**Dolly**: So, most of your classmates did better than you. Did anyone get over 80?
**Mani**: No. .. yes, Cyrus did. He always tops, anyway. At least, I didn't fail.
**Dolly**: Did many people fail?
**Mani**: No, only Ravi. I think most of us got between 55 and 65.
**Dolly**: See, most people got marks around the average, didn't they?
**Mani**: Well yes, this time. How do you know it'll always be so?
**Dolly**: I don't know. But I think ... most of the time ... most people get marks near the average. That's why we take averages.

As this conversation shows, Dolly believes that the average is a value that can represent the data in some cases. Do you agree with her view? Actually, in some cases when the data is normally distributed (i.e., it shows a tendency to stay near a central value or values) this is so.

However, trends in data may be of different kinds. For example, there may be an overall increasing or decreasing trend. If we look at the data for the population of India, as mentioned by Mani, we will see that it increases steadily from one census to the next. So, in this case the average of the data values that we have till now would not represent the data, which is steadily increasing. The average would also not help us to know what to expect in the future.

As you can see, to get the 'average' we just add all the data values together and divide by the total number of values. Its technical name is **arithmetic mean, A.M.** in short. As its name suggests, it requires some arithmetic to calculate the A.M. So, if a child can divide, she can calculate the A.M! But the point is to go further — not just calculate the AM but to understand what it means.

We find that most children can and do calculate the AM in several problems by the time they reach Class 5. But most of them don't see any reason to do so, and they can usually not interpret what an average represents. Here's an example of how this problem was overcome.

**Example 5:** The teacher, Murmu, had introduced average to the children in a formal way. He found that the children couldn't really understand what it represented and why it should be calculated. So, in the next class, he gave the following problem to the 25 children of Class 4:

Are the benches in Class 3 lower than the benches in Class 5 on the average?

Murmu asked the children to come out with their answers. Most of them said that the benches were of the same height. It was decided that this hypothesis would be checked out by actually measuring 10 benches arbitrarily chosen from different rows in each of the classrooms (i.e., 10 each for Classes 3 and 5). The children did this by dividing up into 4 groups.

The next step was to draw a bar diagram of the various heights.
The children did this in their groups after a whole class discussion on what scale would be appropriate for this purpose. Their bar graphs are given below. Murmu decided that these bar diagrams provided a convenient tool for helping children understand what an average is. In each of the charts, e.g., in Fig.4(a), he cut off the tops of the taller bars and stood them on top of the shorter ones so that all the bars in the chart were of the same height. He told the children that this common height was the average height for Class 3. The children saw the same result with the chart for Class 5.

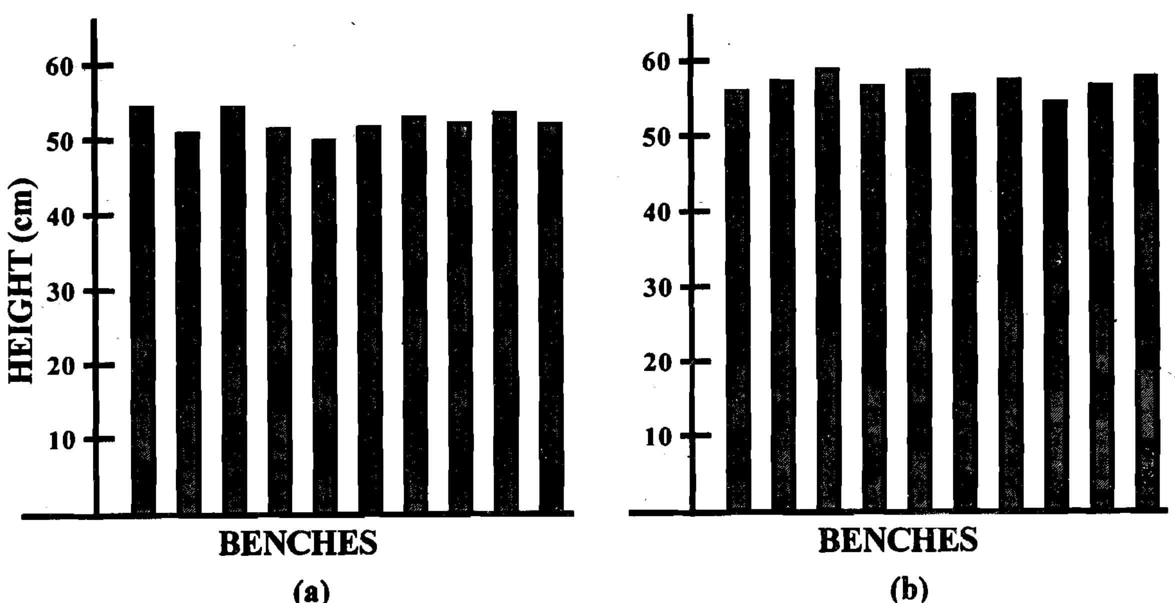


**Fig.4: The heights of the benches in (a) Class 3, (b) Class 5**

The children were quite thrilled when they realised what their usual calculations of AM meant visually. Then the two averages were measured, and it was found that there was very little difference between them.

Now Murmu asked them what they could infer from the result they had just got. Some children came out with, "They have the same benches in all the classes." Others said that when they were in Class 3 their feet would dangle when they sat on the benches, but they expect sitting to be comfortable by the time they get to Class 5.

Murmu heard them out, and decided to share his data and the children's inferences with the headmistress of the school. Maybe this would help he. in ordering more suitable furniture in future!

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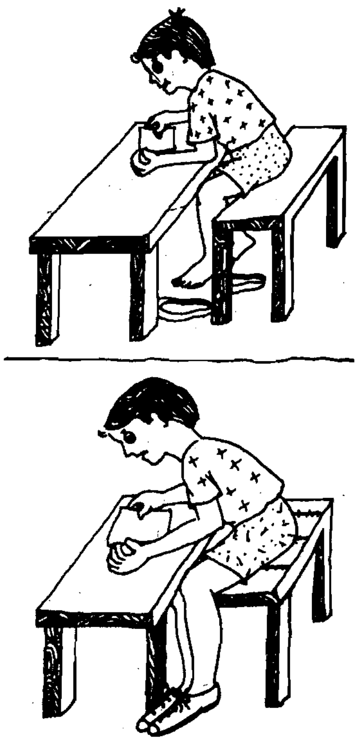

Fig.5: One man's meat is another man's poison!

Now here's an exercise about introducing children to the AM.

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E8) Try the following activity with children of Classes 4 or 5.

Ask the children to:

a) find the average number of spots on a face of a ludo die.

b) write down their ages in years and months, and find the average age of the class.

c) find how many hours in a month they spend on sleeping, and then find the average per day.

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So far you have studied two values that are obtained from a given set of data. You have also seen situations in which these values do represent the data values, and situations in which they don't. There are other representative values of data too. For instance, there is the **median**. This, as you know, is the data value at the half-way point when the data is arranged in increasing or decreasing order. Some people have tried to introduce the concept of the median to children in different ways. But, in all the examples used, the data is normally distributed so that the median and the mean coincide. So the children don't see any need to use the median.

However, the two representative values we have considered are easy for children to deal with. Of course, the question is which of the two — mode and arithmetic mean — should one use in a given situation? That depends a lot on the situation. However, when the data are distributed 'normally', in the sense mentioned in Example 3, the two values turn out to be close. So, either would give a good estimate. To allow children to see situations in which the mode and AM are close and in which they are not, try the following exercise.

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E9) Ask the children to gather data related to:

i) The heights of children in Class 1.

ii) The prices of the vegetables in the market.

In both these situations ask them to find the mode(s) and the average. Which of these values do they think represent the data, and why?

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The emphasis in this unit has been on making **quantitative** inferences based on data. The idea of mode and average, are all essentially quantitative in nature. But let us not forget that our aim throughout has been to help children make sense of data, to draw conclusions and, if possible, to make predictions.

Let us now summarise what we've done in this unit.

## 9.4 SUMMARY

In this unit we have discussed the following issues.

a) talked about meaningful statements that arise out of data.
b) seen examples of questions which arise from data.
c) discussed hypotheses and their verification by analysing relevant data.
d) suggested ways of introducing the concepts of the mode and the arithmetic mean to children in primary school.

## 9.4 COMMENTS ON EXERCISES

E1) a) These conclusions are said to have emerged from the data. We have to decide whether each of the conclusions is useful. For example, you can say that 'the attendance varies a lot' is a useful conclusion because it implies that there is no definite number that we can expect in the classroom everyday.

As another example, you may give reasons for saying why it is or is not important to know whether children prefer bananas to guavas.

(c) We have listed some conclusions that can arise from the examples in Unit 8. Is there anything wrong with any of them? If you feel that these conclusions cannot be drawn from the data, please explain why you feel so.

A conclusion may be useful even if the prediction it leads to is not found to be true.

E2) The data that you get can be categorised into broad or focussed categories and analysed. For example, one category could be how many of them want to be self-employed. Write down, in detail, how you helped children make inferences from this data. How would the inferences change if more data is gathered?

You may also like to get children to collect other data. For example, how many families live in that area, and how many persons from those families take part in sports. You can also ask children to collect the ages of those who take part in sports.

E3) You have to decide whether this hypothesis is correct or not. Clearly the first information you need is about the heights of the children in Class 6. How would you find these out? Give details of the activities that you design for the children, keeping in mind what you studied in Unit 7.

E4) This is similar to the earlier exercise in which you had to work with children and collect data. The idea is to collect data that is distributed with most of the data points in the middle. The data could be about the shoe sizes of the children in the class, how many times people eat in a day, how many members there are in each family, etc. Once they have gathered the data they could be asked to represent it pictorially. Using this, their understanding of the problems would be discussed. In this process you have to help them articulate their reason for accepting the mode as a representative of the data.

E5) You already have examples where the mode(s) can represent the data.
Now, suppose you have gathered data of prices per kg of various vegetables in the market. Suppose you find that, of 10 vegetables, 3 are Rs.4/- a kg, 4 are Rs.5/- a kg and 3 are Rs.3/- a kg. Can we say that Rs.5/- a kg represents the cost of buying vegetables for the usual family? It does not. So, for answering this question, the mode does not represent the data.

E6) Could it be because they had never grouped data before? They may have remembered an earlier tabulation in which the data was not grouped — each data point was an independent number.

E7) If you use the height data without making equal-sized intervals, the data would be extremely scattered. What else would happen and what would be its impact on the analysis?

E8) Give the children the task suggested after a discussion and an explanation on the board as to why they need to do it. The children could be divided into small groups so that they can share and learn from each other. This will also help them analyse the answers they get. This process could be done for all the activities suggested.

E9) Children could collect these data, organise them in categories or individually, depending upon the size of the data. Let them find out the mode and the average, and say whether these values are close. Here, you have to decide what 'close' means, i.e., how small a difference is acceptable as close. How would you decide on this?