

- (iii) In which years were fewer than 250 books sold?
 (iv) Can you explain how you would estimate the number of books sold in 1989?
3. Number of children in six different classes are given below. Represent the data on a bar graph.

Class	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Number of Children	135	120	95	100	90	80

- (a) How would you choose a scale?
 (b) Answer the following questions:
 (i) Which class has the maximum number of children? And the minimum?
 (ii) Find the ratio of students of class sixth to the students of class eight.
4. The performance of a student in 1st Term and 2nd Term is given. Draw a double bar graph choosing appropriate scale and answer the following:

Subject	English	Hindi	Maths	Science	S. Science
1 st Term (M.M. 100)	67	72	88	81	73
2 nd Term (M.M. 100)	70	65	95	85	75

- (i) In which subject, has the child improved his performance the most?
 (ii) In which subject is the improvement the least?
 (iii) Has the performance gone down in any subject?
5. Consider this data collected from a survey of a colony.

Favourite Sport	Cricket	Basket Ball	Swimming	Hockey	Athletics
Watching	1240	470	510	430	250
Participating	620	320	320	250	105

- (i) Draw a double bar graph choosing an appropriate scale.
 What do you infer from the bar graph?
 (ii) Which sport is most popular?
 (iii) Which is more preferred, watching or participating in sports?
6. Take the data giving the minimum and the maximum temperature of various cities given in the beginning of this Chapter (Table 3.1). Plot a double bar graph using the data and answer the following:
- (i) Which city has the largest difference in the minimum and maximum temperature on the given date?
 (ii) Which is the hottest city and which is the coldest city?
 (iii) Name two cities where maximum temperature of one was less than the minimum temperature of the other.
 (iv) Name the city which has the least difference between its minimum and the maximum temperature.



TRY THESE

Think of some situations, atleast 3 examples of each, that are certain to happen, some that are impossible and some that may or may not happen i.e., situations that have some chance of happening.

3.9 CHANCE AND PROBABILITY

These words often come up in our daily life. We often say, “there is no chance of it raining today” and also say things like “it is quite probable that India will win the World Cup.” Let us try and understand these terms a bit more. Consider the statements;

- (i) The Sun coming up from the West
- (ii) An ant growing to 3 m height.
- (iii) If you take a cube of larger volume its side will also be larger.
- (iv) If you take a circle with larger area then it’s radius will also be larger.
- (v) India winning the next test series.

If we look at the statements given above you would say that the Sun coming up from the West is impossible, an ant growing to 3 m is also not possible. On the other hand if the circle is of a larger area it is certain that it will have a larger radius. You can say the same about the larger volume of the cube and the larger side. On the other hand India can win the next test series or lose it. Both are possible.

3.9.1 Chance

If you toss a coin, can you always correctly predict what you will get? Try tossing a coin and predicting the outcome each time. Write your observations in the following table:

Toss Number	Prediction	Outcome

Do this 10 times. Look at the observed outcomes. Can you see a pattern in them? What do you get after each head? Is it that you get head all the time? Repeat the observation for another 10 tosses and write the observations in the table.

You will find that the observations show no clear pattern. In the table below we give you observations generated in 25 tosses by Sushila and Salma. Here H represents Head and T represents Tail.

Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Outcome	H	T	T	H	T	T	T	H	T	T	H	H	H	H	H
Numbers	16	17	18	19	20	21	22	23	24	25					
Outcome	T	T	H	T	T	T	T	T	T	T					



What does this data tell you? Can you find a predictable pattern for head and tail? Clearly there is no fixed pattern of occurrence of head and tail. When you throw the coin each time the outcome of every throw can be either head or tail. It is a matter of chance that in one particular throw you get either of these.

In the above data, count the number of heads and the number of tails. Throw the coin some more times and keep recording what you obtain. Find out the total number of times you get a head and the total number of times you get a tail.

You also might have played with a die. The die has six faces. When you throw a die, can you predict the number that will be obtained? While playing ludo or snake and ladders you may have often wished that in a throw you get a particular outcome.

Does the die always fall according to your wishes? Take a die and throw it 150 times and fill the data in the following table:

Number on Die	Tally Marks	Number of Times it Occured
1		
2		



Make a tally mark each time you get the outcome, against the appropriate number. For example in the first throw you get 5. Put a tally in front of 5. The next throw gives you 1. Make a tally for 1. Keep on putting tally marks for the appropriate number. Repeat this exercise for 150 throws and find out the number of each outcome for 150 throws.

Make bar graph using the above data showing the number of times 1, 2, 3, 4, 5, 6 have occurred in the data.

TRY THESE

(Do in a group)

1. Toss a coin 100 times and record the data. Find the number of times heads and tails occur in it.
2. Aftaab threw a die 250 times and got the following table. Draw a bar graph for this data.

Number on the Die	Tally Marks
1	
2	
3	
4	
5	
6	



3. Throw a die 100 times and record the data. Find the number of times 1, 2, 3, 4, 5, 6 occur.

What is probability?

We know that when a coin is thrown, it has two possible outcomes, Head or Tail and for a die we have 6 possible outcomes. We also know from experience that for a coin, Head or Tail is equally likely to be obtained. We say that the probability of getting Head or Tail is equal and is $\frac{1}{2}$ for each.

For a die, possibility of getting either of 1, 2, 3, 4, 5 or 6 is equal. That is for a die there are 6 equally likely possible outcomes. We say each of 1, 2, 3, 4, 5, 6 has one-sixth ($\frac{1}{6}$) probability. We will learn about this in the later classes. But from what we

TRY THESE

Construct or think of five situations where outcomes do not have equal chances.

have done, it may perhaps be obvious that events that have many possibilities can have probability between 0 and 1. Those which have no chance of happening have probability 0 and those that are bound to happen have probability 1.

Given any situation we need to understand the different possible outcomes and study the possible chances for each outcome. It may be possible that the outcomes may not have equal chance of occurring unlike the cases of the coin and die. For example, if a container has 15 red balls and 9 white balls and if a ball is pulled out without seeing, the chances of getting a red ball are much more. Can you see why? How many times are the chances of getting a red ball than getting a white ball, probabilities for both being between 0 and 1.

**EXERCISE 3.4**

- Tell whether the following is certain to happen, impossible, can happen but not certain.
 - You are older today than yesterday.
 - A tossed coin will land heads up.
 - A die when tossed shall land up with 8 on top.
 - The next traffic light seen will be green.
 - Tomorrow will be a cloudy day.
- There are 6 marbles in a box with numbers from 1 to 6 marked on each of them.
 - What is the probability of drawing a marble with number 2?
 - What is the probability of drawing a marble with number 5?
- A coin is flipped to decide which team starts the game. What is the probability that your team will start?

WHAT HAVE WE DISCUSSED?

- The collection, recording and presentation of data help us organise our experiences and draw inferences from them.
- Before collecting data we need to know what we would use it for.
- The data that is collected needs to be organised in a proper table, so that it becomes easy to understand and interpret.
- Average is a number that represents or shows the central tendency of a group of observations or data.
- Arithmetic mean is one of the representative values of data.
- Mode is another form of central tendency or representative value. The mode of a set of observations is the observation that occurs most often.
- Median is also a form of representative value. It refers to the value which lies in the middle of the data with half of the observations above it and the other half below it.
- A bar graph is a representation of numbers using bars of uniform widths.
- Double bar graphs help to compare two collections of data at a glance.
- There are situations in our life, that are certain to happen, some that are impossible and some that may or may not happen. The situation that may or may not happen has a chance of happening.