

**Task-7: Project Work**

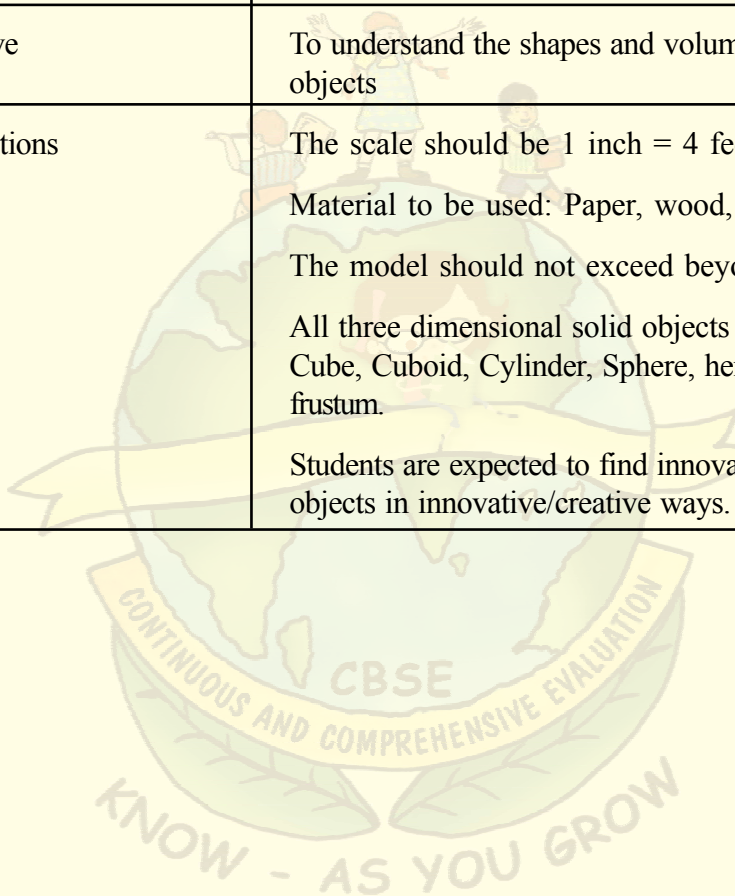
Topic	Surface Area & Volumes
Nature of task	Post Content
Content Coverage	Whole chapter
Learning Objectives	To apply the knowledge of Surface Area & Volumes in real life.
Task	Project work
Execution of task	<p>The class may be divided into groups of 6 to 8 students (Students living in the same neighborhood may be assigned in one group). Each group is supposed to work as a team for the completion of project. Few members can take responsibility of gathering required information for the project, others can work for making a rough draft from the gathered information. All members should discuss the draft &amp; give their inputs. After finalizing few members can writes the report.</p> <p>The project work completes with the submission of report. A small seminar could be conducted where the team leader should present their work to the complete class.</p>
Duration	10 to 15 days
Criteria for assessment	<p>The project work could be assessed according to the following parameters:</p> <ul style="list-style-type: none"> <li>● Number of shapes used and design of the model (if any)</li> <li>● Team Spirit</li> <li>● Identification of project</li> <li>● Procedure adopted</li> <li>● Preparation of Report</li> <li>● Class presentation of the work</li> </ul>



## Suggested Projects

1. To design and build a model of a house
2. To design and build a model of an airship
3. To design and build a model of a naval ship

Project Title	Design and build a model of a house
Team size	10-12 students
Duration	20-25 days
Learning Objective	To understand the shapes and volumes of 3 dimensional objects
Hints and Suggestions	<p>The scale should be 1 inch = 4 feet</p> <p>Material to be used: Paper, wood, etc.</p> <p>The model should not exceed beyond <math>\frac{1}{2}</math> sq. mt.</p> <p>All three dimensional solid objects to be used. Namely Cube, Cuboid, Cylinder, Sphere, hemi-sphere, cone and frustum.</p> <p>Students are expected to find innovative ways to use the objects in innovative/creative ways.</p>



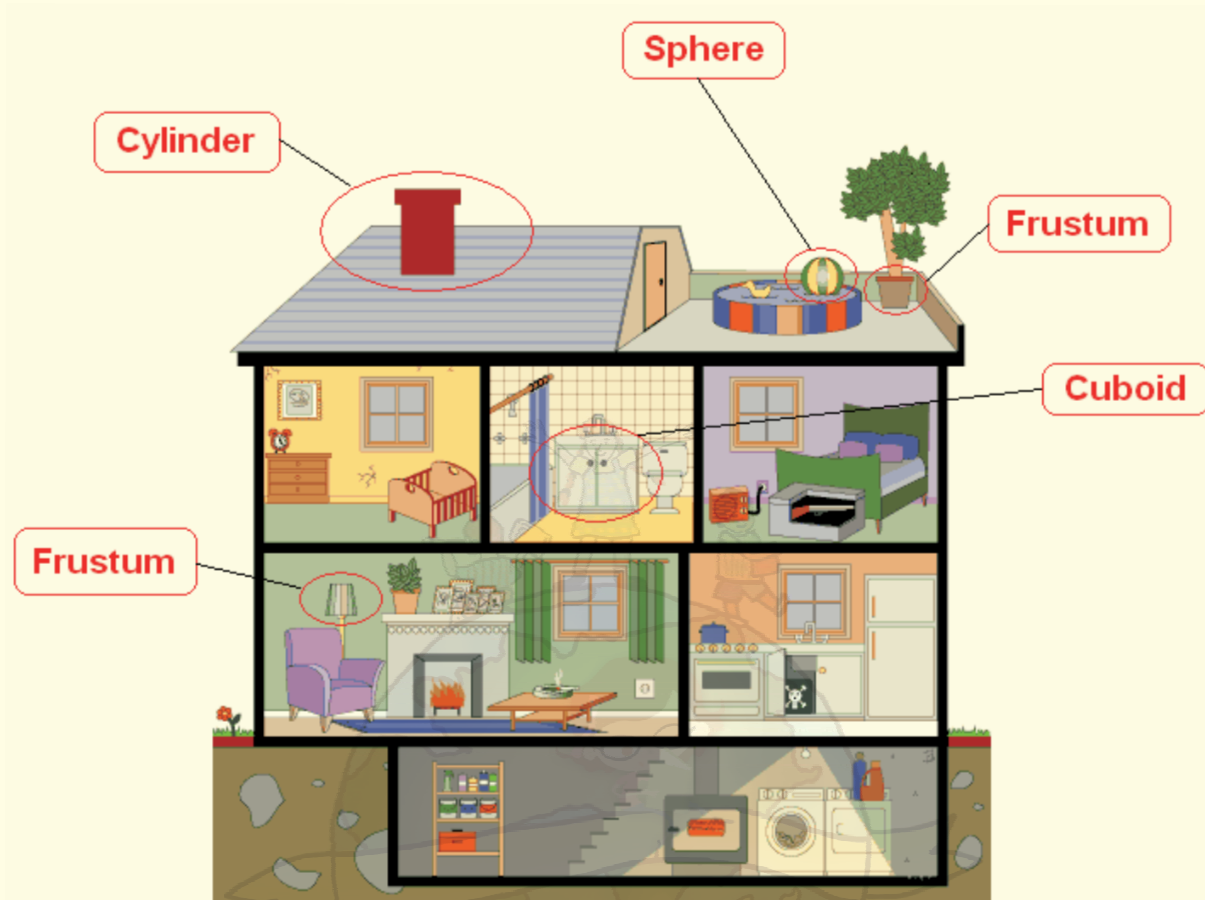


Figure 1

**Expectations from the project report:**

1. Architectural layout of the model house
2. A picture of the model prepared
3. Cost of painting the model house externally
4. Volume of material used in building the model house



# CHAPTER-14

## Statistics

### Learning Objectives :

- To find mean for grouped data by direct method, assumed mean method & step deviation method.
- To learn to find the mode for grouped data.
- To learn to calculate cumulative frequency of a class.
- To find median for grouped data using formula.
- To represent cumulative frequency distribution graphically as cumulative frequency curve (ogive) of less than type & of more than type.
- To apply the knowledge of ogives to find median of grouped data graphically.

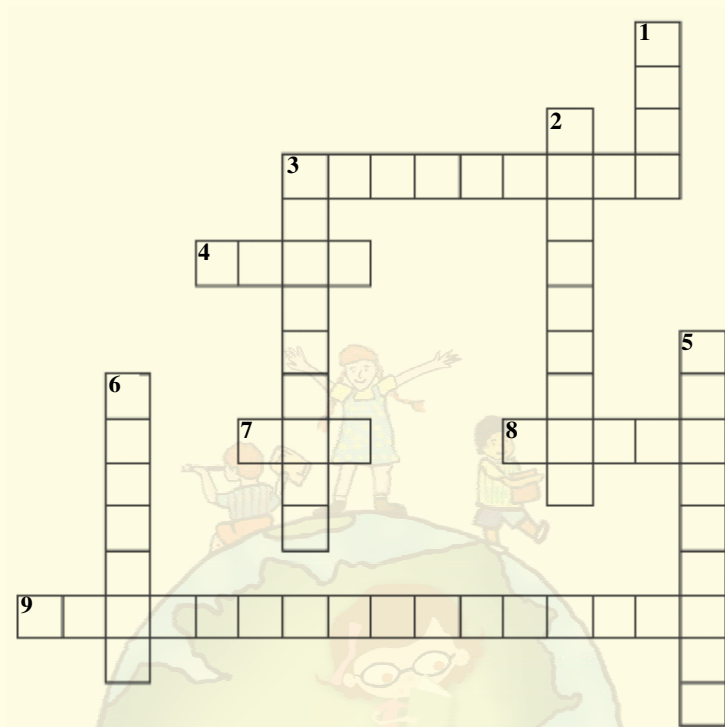
### Suggested Formative Assessment Tasks

#### Task-1: Crossword Puzzle Worksheet

Topic	Statistics
Nature of task	Pre Content
Content Coverage	Meaning of 'statistics', Primary and secondary data, Raw/ungrouped data, Range of data, Grouped data-class intervals, Class marks, Presentation of data - frequency distribution table, Discrete frequency distribution and continuous frequency distribution, Graphical representation of data, Measures of Central tendency.
Learning Objectives	To test the basic concepts related to the chapter.
Task	Crossword Puzzle
Execution of task	This task may be performed in the classroom. Students can be given the photocopy of the worksheet.
Duration	10 - 15 minutes.
Criteria for assessment	<ul style="list-style-type: none"><li>● Time involved in solving the worksheet.</li><li>● Rating scale for the worksheet.</li></ul>
Follow up	Practice worksheets



## Crossword Puzzle Sheet



### Across

3. Difference between any 2 consecutive class marks
4. Average
7. Data in original form
8. Difference of maximum value & minimum value
9. Graphical representation (in rectangles) between class marks & respective frequencies

### Down

1. Observation having highest frequency
2. Graphical representation (in rectangles) between class interval & respective frequencies
3. Mid value of class interval
5. The count of tally marks
6. Data in tabular form



**Task-2: Practice Sheet-MCQ**

Topic	Statistics
Nature of task	Post Content
Content Coverage	Complete Chapter
Task	MCQ
Execution of task	Printed assignment may be given after completing the chapter. After completion of worksheet, teacher can ask children to interchange their sheets & a quick evaluation can be done by class discussion.
Duration	20-25 minutes.
Criteria for assessment	Teacher may prepare a rating scale according to the marks assigned to this task.

**Multiple Choice Questions**

*Choose the correct answer from the given four options:*

- Construction of cumulative frequency table is useful in determining the
  - mean
  - median
  - mode
  - all, mean, mode and median
- In the formula  $\bar{x} = a + \frac{\sum f_i d_i}{\sum f_i}$ , for finding the mean of the grouped data,  $d_i$ 's are deviations from assumed mean 'a' of
  - lower limits of classes
  - upper limits of classes
  - class marks
  - frequencies of the classes.
- If  $x_i$ 's are the mid points of the class intervals of grouped data,  $f_i$ 's are the corresponding frequencies and  $\bar{x}$  is the mean, then  $\sum f_i (x_i - \bar{x})$  is equal to
  - zero
  - 1
  - 1
  - 2
- In the formula  $\bar{x} = a + \frac{\sum f_i u_i}{\sum f_i} \cdot h$ , for finding the mean of grouped frequency distribution,  $u_i =$ 
  - $(x_i + a)/h$
  - $h(x_i - a)$
  - $(x_i - a)/h$
  - $(a - x_i)/h$



5. For the following distribution:

<b>Class:</b>	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25
<b>Frequency:</b>	10	15	12	20	9

The sum of lower limits of the median class and the modal class is

- A. 15                      B. 25                      C. 30                      D. 35
6. Consider the following frequency distribution:

<b>Class:</b>	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49
<b>Frequency:</b>	13	10	15	8	11

The upper limit of the median class is

- A. 29                      B. 29.5                      C. 30                      D. 19.5
7. The abscissa of the point of intersection of the less than type and of the more than type ogives gives its
- A. mean                      B. median  
C. mode                      D. mean, mode and median

8. For the following distribution:

<b>Marks:</b>	Below 10	Below 20	Below 30	Below 40	Below 50
<b>No. of Students:</b>	8	17	32	62	80

the modal class is

- A. 10 - 20                      B. 20 - 30                      C. 30 - 40                      D. 40 - 50
9. From the following data of the marks obtained by students of class x,

<b>Marks:</b>	0-10	10-20	20-30	30-40	40-50	50-60
<b>No. of Students:</b>	8	12	20	30	10	10

how many students, secured less than 40 marks ?

- A. 70                      B. 40                      C. 80                      D. 30
10. The times, in seconds, taken by 150 athletes to run a 100 m hurdle race are given as under:

<b>Class:</b>	12.7-13	13-13.3	13.3-13.6	13.6-13.9	13.9-13.12
<b>Frequency:</b>	5	6	10	55	41

The number of athletes who completed the race in less than 13.9 sec. is

- A. 21                      B. 55                      C. 41                      D. 76



11. Consider the data:

<b>Class:</b>	25–45	45–65	65–85	85–105	105–125	125–145
<b>Frequency:</b>	4	5	13	20	14	11

The difference of the upper limit of the median class and the lower limit of the modal class is

- A. zero                      B. 19                      C. 20                      D. 38

12. Consider the following distribution:

<b>Marks:</b>	More than 0	$\geq 10$	$\geq 20$	$\geq 30$	$\geq 40$	$\geq 50$
<b>No. of Students:</b>	63	58	55	51	48	42

The frequency of the class 30 – 40 is

- A. 3                      B. 4                      C. 48                      D. 41

**Task-3: Class Worksheet / Oral Assessment**

Topic	Statistics
Nature of Task	Content Oriented
Content Coverage	Basic Concepts Used in Chapter
Learning objectives	<ul style="list-style-type: none"> <li>● To find mean, median, mode of grouped data using formulae.</li> <li>● To find median using ogives.</li> </ul>
Task	Class Worksheet
Execution of task	<ul style="list-style-type: none"> <li>● This task may be performed in the classroom in the last 20 minutes of a teaching period. A small worksheet containing short questions may be given. They would be then asked to write the answers to questions.</li> <li>● In one period, oral assessment may be done in groups.</li> </ul>
Duration	<ul style="list-style-type: none"> <li>● 20 minutes for Worksheet.</li> <li>● 1-2 period for oral assessment.(Depends on the class size).</li> </ul>
Criteria for assessment	Teacher may prepare a rating scale according to the marks assigned to this task.
Follow up	Worksheet for practice may be given.





## Class Worksheet

1. In an ungrouped distribution  $\sum fx = 160$  and  $\sum f = 8$  find  $\bar{x}$ .
2. In a class interval 50–55 write  
 Lower limit = \_\_\_\_\_  
 Upper limit = \_\_\_\_\_  
 Class Mark = \_\_\_\_\_
3. If  $d_i = x_i - a$  then  $\bar{x} =$  \_\_\_\_\_
4. If  $u_i = (x_i - a) / h$  then  $\bar{x} =$  \_\_\_\_\_
5. Complete the following table.

C.I.	x	f	u = (x- 35)/10	fu
0-10	5	5	-3	-15
10-20	15	9	-	-
20-30	-	3	-	-
30-40	35	6	0	0
40-50	-	6	-	-
50-60	-	6	-	-
		<b>35</b>		

$\therefore \bar{x} =$  \_\_\_\_\_

6. Fill in the blanks
  - i. In an ungrouped data, the value which occurs maximum number of times is called \_\_\_\_\_ of the data.
  - ii. To find the mode of a grouped data, the size of the classes is \_\_\_\_\_ (uniform/non-uniform).
  - iii. In a grouped distribution, the class having largest frequency is known as \_\_\_\_\_ class.
  - iv. The relationship between mean, median and mode is \_\_\_\_\_ median = \_\_\_\_\_ + \_\_\_\_\_.



- v. On an ogive, point A whose  $y$ -co-ordinate is  $n/2$  (half, the total number of entries) has its  $x$  co-ordinate equal to \_\_\_\_\_ of the data.
  - vi. Two ogives, less than and more than type for the same data intersect at the point P. The  $y$  co-ordinate of P represents \_\_\_\_\_.
7. In the given formula:
- $$\text{Mode} = l + \left( \frac{f_m - f_1}{2f_m - f_1 - f_2} \right) \times h$$
- What does  $f_1$  stand for ?

### Suggestive Questions for Oral Assessment

1. Class - mark of a class  $(a - b)$  is \_\_\_\_\_.
2. Mean of  $k$  observations  $x_1, x_2, \dots, x_k$  repeated  $f_1, f_2, \dots, f_k$ , times is \_\_\_\_\_.
3. Taking assumed mean as  $A$ , and deviations  $d_i$ , the mean  $\bar{x}$  is given by  $\bar{x} = \underline{\hspace{2cm}}$ .
4. Mode is that value of the variate which occurs \_\_\_\_\_.
5. Mode  $M$  of a distribution is given by
 
$$M = l + \{ \underline{\hspace{2cm}} \} \times h$$

where  $l$  is the lower limit of modal class  
 $f_1$  is the frequency of modal class  
 $f_0$  is the frequency of class preceding modal class  
 $f_2$  is the frequency of class succeeding modal class
6. For a distribution with odd number ( $n$ ) of observation median = (\_\_\_\_\_)th observation.
7. For a distribution with even number of observation the median = (\_\_\_\_\_)th observation.
8. For continuous a frequency distribution, the median is given by \_\_\_\_\_.



**Task-4: Home Assignment**

Topic	Statistics
Nature of task	Post Content
Content Coverage	Complete Chapter
Learning Objectives	<ul style="list-style-type: none"> <li>● To find mean for grouped data by direct method, assumed mean method &amp; step deviation method.</li> <li>● To learn to find the mode for grouped data.</li> <li>● To learn to calculate cumulative frequency of a class.</li> <li>● To find median for grouped data using formula.</li> <li>● To represent cumulative frequency distribution graphically as cumulative frequency curve (ogive) of less than type &amp; of more than type.</li> <li>● To apply the knowledge of ogives to find median of grouped data graphically.</li> </ul>
Task	Home Assignment (Short/Long questions)
Execution of task	Printed assignment may be given after completing the chapter.
Duration	2 days.
Criteria for assessment	Follow Rubric for H.W/Assignments
Follow up	Reference material in the form of important points to remember can be given as a support material.

**Home Assignment: Short & Long Questions**

1. Is it true to say that the mean, mode and median of grouped data will always be different? Justify your answer.
2. The median of an ungrouped data and the median calculated when the same data is grouped are always the same. Do you think that this is a correct statement? Give reasons.
3. Is it correct to say that an ogive is a graphical representation of a frequency distribution? Give reasons.
4. Daily wages of 110 workers, obtained in a survey, are tabulated below:

<b>Daily wages (In Rs.):</b>	100–120	120–140	140–160	160–180	180–200	200–220
<b>No. of workers:</b>	15	18	25	22	18	12

Compute the mean daily wages of those workers.

5. The percentage of marks obtained by 100 students in an examination are given below:

<b>Marks:</b>	30–35	35–40	40–45	45–50	50–55	55–60	60–65
<b>No. of Students:</b>	14	16	18	23	18	8	3

Determine the median percentage of marks.

6. The frequency distribution table of agricultural holdings in a village is given below:

<b>Area of land (in hectares):</b>	1–3	3–5	5–7	7–9	9–11	11–13
<b>Number of families:</b>	20	45	80	55	40	12

Find the modal agricultural holdings of the village.

7. An aircraft has 120 passenger seats. The number of seats occupied during 100 flights is given below:

<b>No. of seats:</b>	100–104	104–108	108–112	112–116	116–120
<b>Frequency:</b>	15	20	32	18	15

Determine the mean number of seats occupied over the flights.

8. The following is the distribution of weights (in kg) of 40 persons:

<b>Weight (in kg):</b>	40–45	45–50	50–55	55–60	60–65	65–70	70–75	75–80
<b>Number of persons:</b>	4	4	13	5	6	5	2	1

Construct a cumulative frequency distribution (of less than type) table for the data above.

9. Find the unknown entries  $a, b, c, d, e, f$  in the following distribution of heights of students in a class:

<b>Height (In cm):</b>	150–155	155–160	160–165	165–170	170–175	175–180
<b>Frequency:</b>	12	$b$	10	$d$	$e$	2
<b>Cummutative frequency:</b>	$a$	25	$c$	43	48	$f$

10. Weekly income of 600 families is as under:

<b>Income (In Rs.):</b>	0–1000	1000–2000	2000–3000	3000–4000	4000–5000	5000–6000
<b>No. of families:</b>	250	190	100	40	15	5

Compute in the median income.



11. The weight of coffee in 70 packets is shown below:

<b>Weight (in gm):</b>	200–201	201–202	202–203	203–204	204–205	205–206
<b>Number of packets:</b>	12	26	20	9	2	1

Determine the modal weight.

### Task-5: Hands on activity

Topic	Statistics
Nature of task	Content Oriented
Content Coverage	Tabular & Graphical Representation of Data.
Learning Objectives	To analyze a language text, using graphical techniques.
Task	Math activity
Execution of task	An instruction sheet can be given to students for reference. They will be then asked to perform the activity & record the outcome in the recording sheet.
Duration	1 period
Criteria for assessment	This activity will be a part of Math activity , so it will be assessed according to the following parameters: Observation on thinking skills Class Ethics Performance of activity File Record (marks may be allotted by the teacher accordingly)

**Note: Refer CBSE Lab Manual.**

#### Instruction Sheet:

**Objective:** Analysis of a language text, using graphical and pie chart techniques.

#### How to Proceed:

- Students will select any paragraph containing approximately 250 words from any source. e.g. newspaper, magazine, textbook, etc.
- They will read every word and obtain a frequency table for each letter of the alphabet as follows:



Letter	Tally marks	Frequency
A		
B		
C		
.		
.		
.		
Z		

3. They will note down the number of two-letter words, three-letter words, so on and obtain a frequency table as follows:

Number of words with	Tally marks	Frequency
2 letters		
3 letters		
.		
.		
.		

4. Select 10 different words from the text which have frequency greater than 1. Give ranks 1, 2, 3, ..., 10 in decreasing order of their frequency. Obtain a table as follows:

Selected word	Frequency	Rank
e.g. on		
it		
.		
.		
.		
.		

**Investigate the following:**

*From table 1*

- What is the most frequently occurring letter?
- What is the least frequently occurring letter?
- Compare the frequency of vowels



- d) Which vowel is most commonly used?
- e) Which vowel has the least frequency?
- f) Make a pie chart of the vowels a, e, i, o, u, and remaining letters. (The pie chart will thus have 6 sectors.)
- g) Compare the percentage of vowels with that of consonants in the given text.

**From table 2**

- a) Compare the frequency of two letter words, three letter words, ..... and so on.
- b) Make a pie chart. Note any interesting patterns.

**From table 3**

- a) The relation between the frequency of a word to its rank.
- b) Plot a graph between the frequency and reciprocal of word rank. What do you observe? Do you see any interesting pattern?
- c) Repeat the experiment by choosing text from any other language that you know and see if any common pattern emerges.

**Task-6: Project Work**

Topic	Statistics
Nature of task	Post Content
Content Coverage	Whole chapter
Learning Objectives	To apply the knowledge of Statistics in real life.
Task	Project work
Execution of task	<p>The class may be divided into groups of 6 to 8 students (Students living in the same neighborhood may be assigned in one group). Each group is supposed to work as a team for the completion of project. Few members can take responsibility of gathering required information for the project, others can work for making a rough draft from the gathered information. All members should discuss the draft &amp; give their inputs. After finalizing few members can writes the report.</p> <p>The project work completes with the submission of report. A small seminar could be conducted where the team leader should present their work to the complete class.</p>
Duration	10 to 15 days



Criteria for assessment	<p>The project work could be assessed according to the following parameters:</p> <ul style="list-style-type: none"> <li>● Team Spirit</li> <li>● Identification of project</li> <li>● Procedure adopted</li> <li>● Preparation of Report</li> <li>● Class presentation of the work</li> </ul>
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### Suggested Projects

- Study on call center employees.
- Study on the most popular newspaper in a locality.
- Study of the most popular news channel in a locality.
- Effect of advertisements in day to day life.

**Your Project Report should contain the following pages:**

**Pg1.** Topic/ Objective {Name, Roll Number, Class & Section}

**Pg2.** Acknowledgement

**Pg3.** List of content {Divide your project in small chapters. The name of these chapters should be written here}

*Next few pages should be devoted to the above mentioned chapters.*

*In survey based projects,*

- Introduction stating the need of conducting survey
- Questionnaire for the survey
- List of people on which survey is conducted.
- Data organized in the form of various tables, graphs.
- Analization of graphs.

**Next Pg.** Conclusion

**Next Pg.** References (List of various websites used & books referred)





## CHAPTER-15

# Probability

### Task-1: Mind Map Activity

Topic	Probability
Nature of task	Content
Content Coverage	Outcome of events, experiment
Task	Making a mind map
Execution of task	After learning the basic concepts of the Chapter, students may be asked to make a mind map of possible outcomes of various event viz. tossing a coin, tossing 2 coins simultaneously, rolling a die, rolling a pair of die, outcomes of drawing a card from a pack of cards etc.
Duration	1 Period
Criteria for assessment	Teacher may assign marks for this activity.

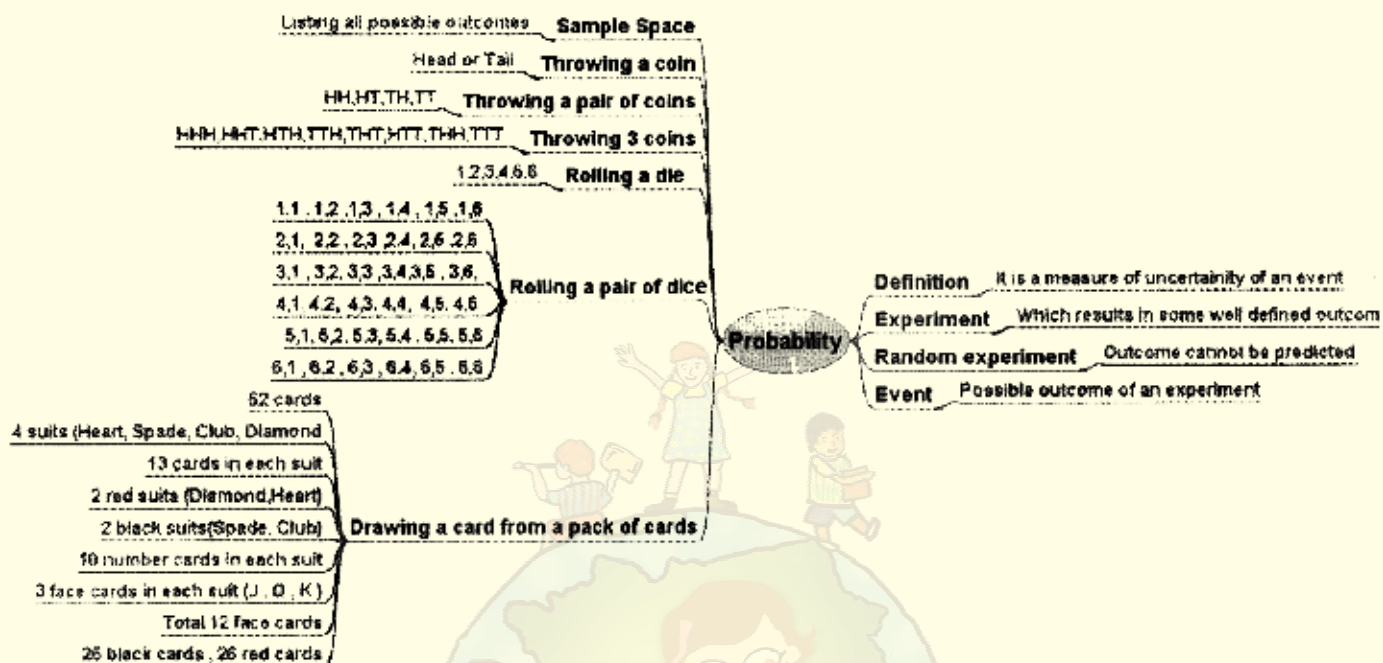
**About Mind Mapping :** This is a brainstorming activity in which students are asked to write the information about learnt concepts in the form of a diagram. In the centre of the diagram, students write the name of the Chapter and then they make child nodes in order of concepts of Chapter. Students write the important points of the Chapter in following nodes.

Used for :

- recalling
- recapitulation
- making notes
- making formula list
- recording ideas



## Sample Mind Map



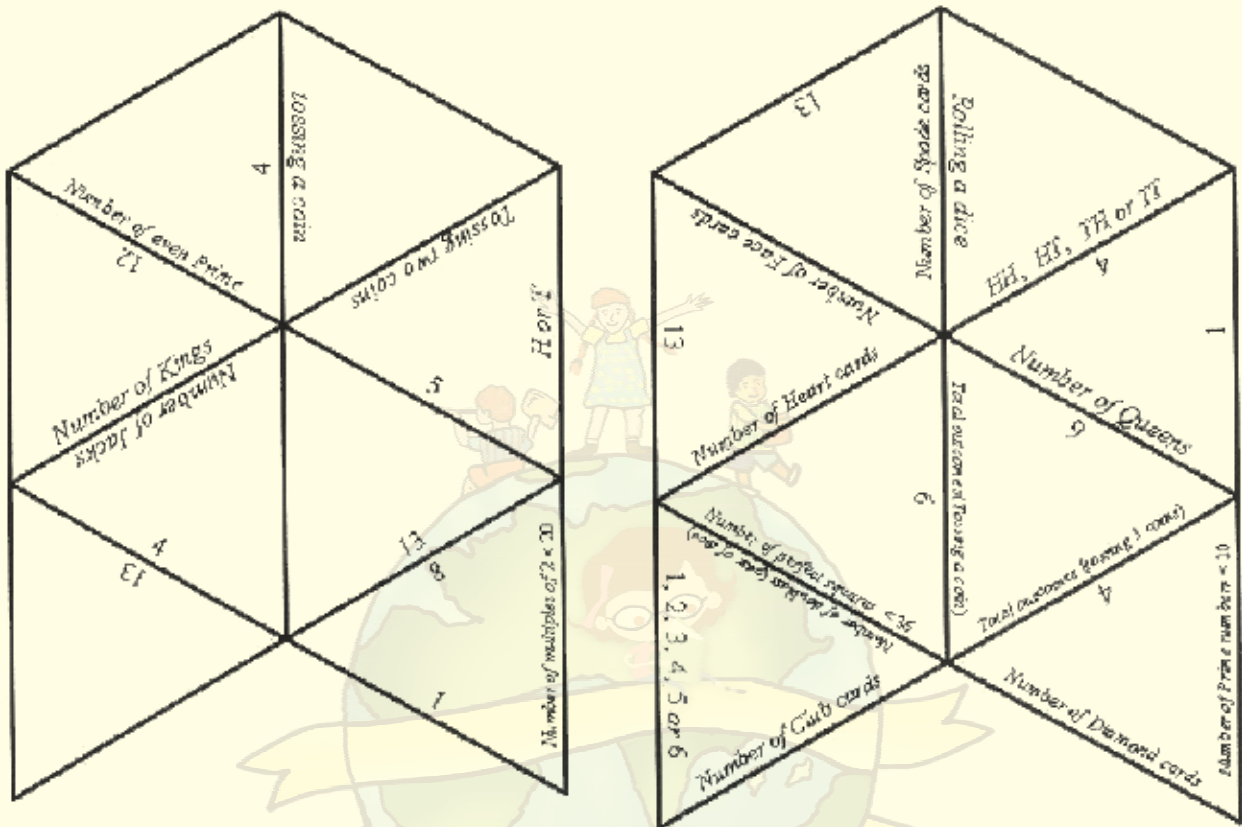
## Task-2: Play and Learn

Topic	Probability
Nature of task	Content
Content Coverage	Outcomes of events, experiment
Task	Jig saw puzzle
Execution of task	This is an interesting activity, which may be performed in groups. Teacher would divide the class into groups of 6 to 7. Each group will be given the activity sheet. See the activity sheet given below :  Students will bring pair of scissors and glue for this activity. Instructions for the activity will be given in advance.
Duration	1 Period
Criteria for assessment	Teacher may assign marks for this activity.



**Activity Sheet :**

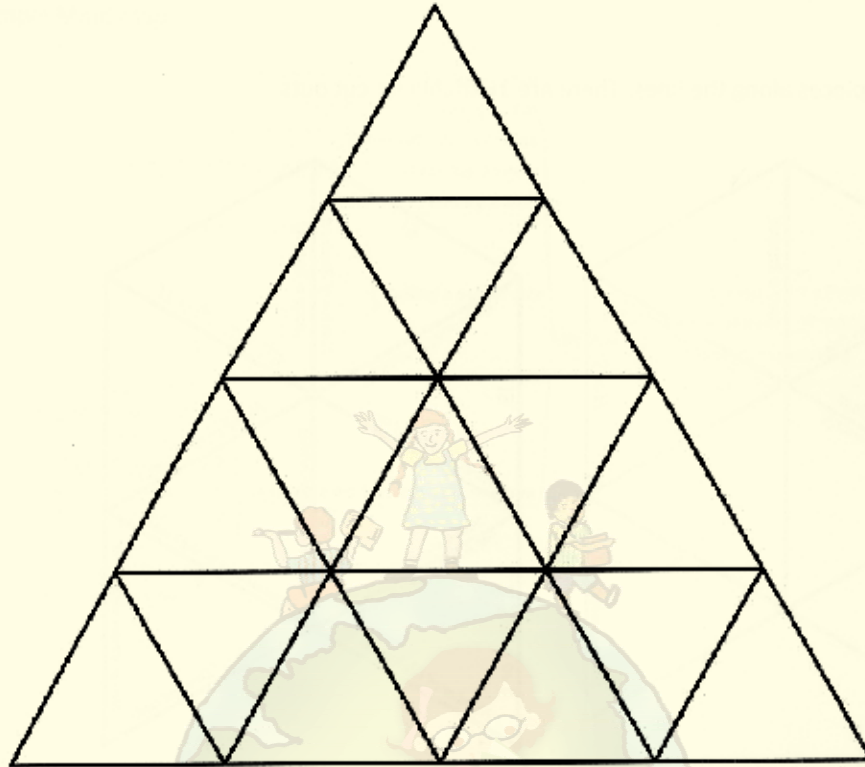
**Step-1 :** Cut all pieces along the lines. There are 16 triangular cut outs.



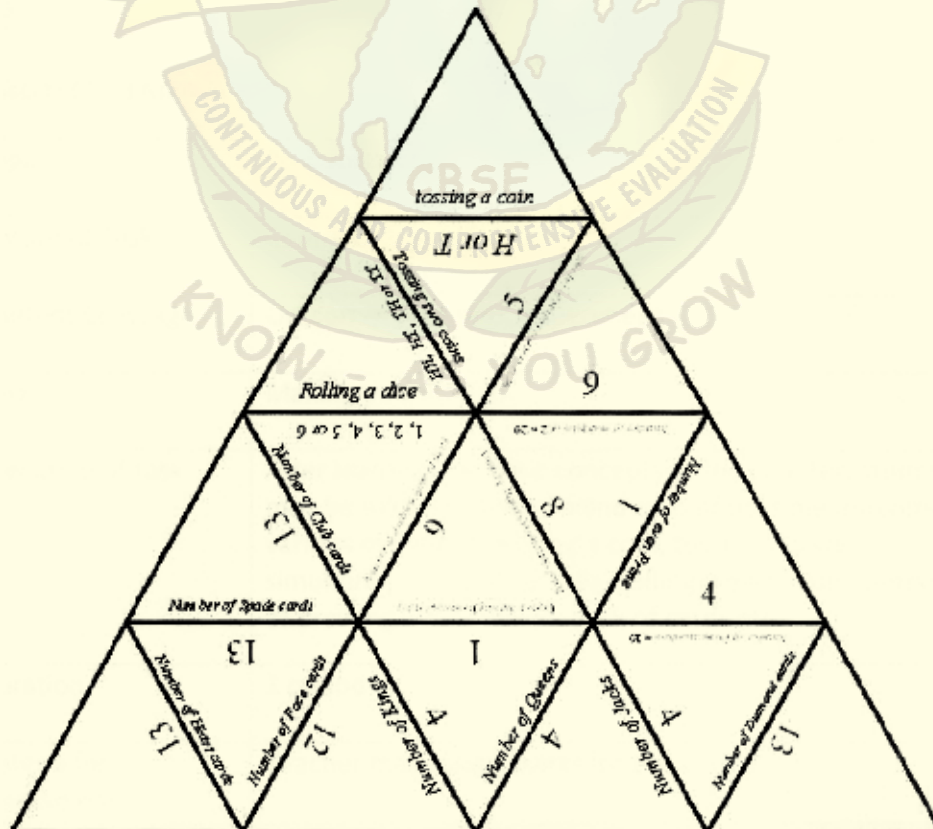
**Step-2 :** Arrange the triangular cut outs to fit into the given below shape, in such a way that two adjacent sides of two triangles match with correct answer.

e.g.





Solution :



## Suggested Formative Assessment Tasks

### Task-3: MCQ

Topic	Probability
Nature of task	Post Content
Content Coverage	Basics of Probability-Experimental approach
Task	MCQ
Execution of task	Printed assignment may be given after completing the chapter. After completion of worksheet, teacher can ask children to interchange their sheets & a quick evaluation can be done by a class discussion.
Duration	10-15 minutes.
Criteria for assessment	Observe the level of understanding. It is not necessary to give marks for this assessment.

### Multiple Choice Questions

1. A coin is tossed 1000 times and 560 times a “head” occurs. The empirical probability of occurrence of a Head in this case is

A. 0.5                      B. 0.56                      C. 0.44                      D. 0.056

2. Two coins are tossed 200 times and the following out comes are recorded

HH	HT/TH	TT
56	110	34

What is the empirical probability of occurrence of at least one Head in the above case?

A. 0.33                      B. 0.34                      C. 0.66                      D. 0.83

3. A die is thrown 200 times and the following outcomes are noted, with their frequencies:

Outcome	1	2	3	4	5	6
Frequency	56	22	30	42	32	18

- (a). What is the empirical probability of getting a 1 in the above case?

A. 0.28                      B. 0.22                      C. 0.15                      D. 0.21

- (b). What is the empirical probability of getting a number less than 4?

A. 0.50                      B. 0.54                      C. 0.46                      D. 0.52



- (c). What is the empirical probability of getting a number greater than 4?  
 A. 0.32      B. 0.25      C. 0.18      D. 0.30
4. On a particular day, the number of vehicles passing a crossing is given below
- | Vehicle   | Two wheeler | Three wheeler | Four wheeler. |
|-----------|-------------|---------------|---------------|
| Frequency | 52          | 71            | 77            |
- What is the probability of a two wheeler passing the crossing on that day?  
 A. 0.26      B. 0.71      C. 0.385      D. 0.615
5. The following table shows the blood-groups of 100 students
- | Blood group        | A  | B  | O  | AB | B+ |
|--------------------|----|----|----|----|----|
| Number of Students | 12 | 23 | 35 | 20 | 10 |
- One student is taken at random. What is probability that his blood group is B +  
 A. 0.12      B. 0.35      C. 0.20      D. 0.10
6. In a bag, there are 100 bulbs out of which 30 are bad ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is  
 A. 0.50      B. 0.70      C. 0.30      D. None of these

**Task-4: Class Worksheet / Oral Assessment**

Topic	Probability
Nature of task	Post Content
Content Coverage	Complete Chapter
Task	Class Worksheet / Oral assessment
Execution of task	This task may be performed in the classroom in the last 15 minutes of a teaching period. A small worksheet containing fill ups may be given to each child. They would be then asked to write the answers to questions.  Alternatively,  In one period oral assessment may be done in groups.
Duration	<ul style="list-style-type: none"> <li>● 10-15 minutes for worksheet.</li> <li>● 1-2 periods for oral(depends on class size)</li> </ul>
Criteria for assessment	Teacher may prepare a rating scale according to marks assigned to this task.
Follow up	Worksheet for practicing may be given



## Worksheet / Suggested Oral Questions

1. Formula for probability of occurrence of an event = \_\_\_\_\_
2. The probability P of an event lies between \_\_\_\_\_ & \_\_\_\_\_
3. The probability of a sure event is \_\_\_\_\_
4. The probability of an impossible event is \_\_\_\_\_
5. If the probability of occurrence of an event is 0.6, the probability of its non-occurrence is \_\_\_\_\_
6. A card is drawn at random from a pack of cards.
  - (i) What is the probability of this being a card of spade ?
  - (ii) What is the probability of this being not an ace ?
7. In a single throw of a dice, what is the probability of getting a number greater than 2 ?
8. Write all possible outcomes for prime numbers between 2 and 17.
9. A pair of dice is thrown simultaneously. What is the probability of getting a doublet ? \_\_\_\_\_
10. In a lottery there are 10 prizes and 20 blanks. What is the probability of getting a prize? \_\_\_\_\_

### Task-5: Home Assignment

Topic	Probability
Nature of task	Post Content
Content Coverage	Complete Chapter
Task	Home Assignment (Short/Long questions)
Execution of task	Printed assignment may be given after completing the chapter.
Duration	2 days.
Criteria for assessment	Follow Rubric for H.W/Assignments
Follow up	Reference material in the form of important points to remember can be given as a support material.



**Home Assignment: Short & Long Questions**

1. A coin is tossed three times.
  - (i) List all possible outcomes.
  - (ii) Find the probability of getting all heads.
  - (iii) Find the probability of getting exactly one head.
  - (iv) Find the probability of getting at the most two heads.
2. Two dice are thrown simultaneously. Find the probability of getting
  - (i) Same number on both the dice.
  - (ii) Different numbers on both dice.
  - (iii) Sum of the numbers appearing on dice, as 7.
  - (iv) The product of numbers on the top of dice as 12.
3. A bag contains 10 red, 5 blue and 7 green balls. A ball is drawn at random. Find the probability of this ball being a
  - (i) red ball
  - (ii) green ball
  - (iii) not a blue ball
4. The king, queen and jack of clubs are removed from a deck of 52 playing cards and then the cards are well shuffled. A card is then drawn at random from the remaining cards.  
Determine the probability that the card drawn is:
  - (i) a heart
  - (ii) a king
5. All the kings, queens and Jacks are removed from a deck of 52 playing cards. The remaining cards are well shuffled and then one card is drawn at random. Giving ace a value 1, similar values for other cards, find the probability that the card has a value
  - (i) 7
  - (ii) greater than 7
  - (iii) less than 7
6. Cards with numbers 4 to 105 are placed in a box. A card is selected at random. Find the probability that the card has
  - (i) an even number
  - (ii) a square number
7. An integer is chosen between 0 and 100. What is the probability that it is
  - (i) divisible by 9 ?
  - (ii) not divisible by 9 ?
8. A letter of English alphabet is chosen at random. Determine the probability that the letter is a
  - (i) vowel
  - (ii) consonant
9. There are 500 sealed envelopes in a box, 10 of them contain a cash prize of Rs. 100 each, 50 of them contain a cash prize of Rs. 50 each and 100 of them contain a cash prize of





Rs. 10 each, and the rest do not contain any cash price. If they are well shuffled and then an envelope is picked up out, what is the probability that it contains

- (i) no cash price ? (ii) a cash price of Rs. 100
10. A child's game has 8 triangles of which 3 are blue and rest are red, and 10 squares of which 6 are blue and rest are red. One piece is lost at random. Find the probability that it is a
- (i) Triangle (ii) square  
(iii) square of blue colour (iv) a triangle of red colour.
11. A die has its six faces marked 0, 1, 1, 1, 6, 6. Two such dice are thrown together and the total score is recorded.
- (i) How many different scores are possible ?  
(ii) What is the probability of getting a total of 7 ?
12. A bag contains 24 balls of which, the number of blue balls is thrice the number of red balls and the number of white balls is twice the number of red balls. A ball is selected at random. What is the probability that it is
- (i) not red ? (ii) while ?

### Task-6: Remedial Worksheet

Topic	Probability
Nature of task	Delivery of content/Post Content
Content Coverage	Basic Concepts, Probability of playing cards.
Learning Objectives	To provide remedial measures on specific topics based on individual needs.
Task	Need based worksheets.
Execution of task	Teacher should prepare remedial worksheets based on the following points: a) Special carefully devised UAA (under achiever's assignment) - Simpler-Simple-Complex. b) Read-Re-read-Write-Re-Write-Reproduce-Drill. For taking remedial tests teacher should group up children facing same problems & should prepare each group's need based worksheets.
Duration	1 period
Criteria for assessment	<ul style="list-style-type: none"> <li>● Positive change in class response.</li> <li>● Rubric for remedial worksheets.</li> </ul>
Follow up	Remedial practice sheets of subtopics & frequent retests.



## Remedial Worksheet

### I. Interpret the following:

1. Cards numbered from 5 to 50                      Total cards = \_\_\_\_\_
2. Prime numbers less than 10
3. Perfect square less than 25
4. Multiples of 4 from 4 to 40
5. Multiples of 4 between 4 and 40
6. Tickets numbered from 3 to 30                      Total tickets = \_\_\_\_\_
7. Number of face cards
8. Number of doublets when a pair of dice is tossed
9. Possible outcomes when 2 coins are tossed together
10. Number of outcomes when a pair of dice is tossed together

### II. Cards numbered 5 to 50, are placed in a box and mixed thoroughly. A card is drawn from the box at random. Find the probability that the number on the drawn card is:

- (a) a prime number less than 10
- (b) a number which is a perfect square.

#### Find the Error

Total possible outcomes = 45

- (i) Favourable outcomes (Prime no. less than 10) = 2, 3, 5, 7  
Required Probability =  $4/45$
- (ii) Favourable outcomes (no. which is a perfect square) = 9, 16, 25, 36, 49  
Required probability =  $5/45 = 1/9$
- (iii) Total possible outcome = 46  
(1) Favorable outcomes = 1, 2, 3, 5, 7,  
(Prime numbers less than 10)  
=  $5/46$
- (iv) Favorable outcomes = 1, 4, 9, 16, 25, 36, 49  
(Perfect square number less than 50)  
Required Probability =  $7/46$

### III. Material on Pack of Cards

Here is the information on Pack of cards.

1. There are total 52 cards
2. 2 Colors - Red, Black
3. 26 Red Cards, 26 Black Cards



4. 4 Suits - Spade, Diamond, Club, Heart
5. 13 Spade cards (A, 1, 2, 3, ....., Jack, Queen, King).
6. 13 Diamond cards (A, 1, 2, 3, ....., Jack, Queen, King).
7. 13 Club cards (A, 1, 2, 3, ....., Jack, Queen, King).
8. 13 Heart cards (A, 1, 2, 3, ....., Jack, Queen, King).
9. 12 Face cards - (4 Jacks, 4 Queens & 4 Kings)
10. Total 40 non-face cards

After learning about Pack of Cards attempt the following questions:

**Q.1.** A card is drawn from a well shuffled deck of cards. Find the probability of drawing:

1. a Spade card
2. a Red card
3. a King
4. a Black King
5. neither a King nor a Queen
6. a Face card
7. Not a Face card
8. a jack of Clubs
9. a non Red card
10. a 6 or an 8
11. a Clubs card or a King
12. a Clubs card an a King
13. a Queen of Red suit
14. a Red Face card
15. a Red card which is not a face - card

**Q.2.** King and Queens are removed from a deck of cards. A card is drawn at random. Find the probability of drawing the following:

1. a Spade card
2. a Red card
3. a King
4. a Face card
5. Not a Face card
6. a jack of Clubs



7. a non Red card
8. a 6 or an 8
9. a Queen of Red suit
10. a Red Face card
11. a Red card which is not a face - card

### Task-7: Hands on activity

Topic	Probability
Nature of task	During delivery of content
Content Coverage	Probability of an event
Learning Objectives	<ul style="list-style-type: none"> <li>● To get familiar with the idea of probability of an event through a double colour card experience</li> </ul>
Task	Math activity
Execution of task	An instruction sheet explaining the preparation of material to be used to perform the activity & steps involved to do the activity can be given to students for reference. They will be then asked to perform the activity & record the outcome in the recording sheet.
Duration	1 period
Criteria for assessment	This activity will be a part of Math activity , so it will be assessed according to the following parameters: Observation on thinking skills Class Ethics Performance of activity File Record (marks may be allotted by the teacher accordingly)
Follow up	Children should be encouraged to come up with new events to extend the activity.

**Note: Refer to CBSE Math Laboratory Manual.**

### Instruction Sheet:

#### Objective

To get familiar with the idea of probability of an event through a double colour card experiment.

Materials required: Card board of size 15cm × 15 cm, glazed paper (2 colours), pair of scissors, fevistick, sketch pens and an empty box.

#### Pre-requisite knowledge

The formula of probability of an event E is:

$$P(E) = \frac{\text{No. of favorable outcomes to E}}{\text{Total no. of outcomes.}}$$



**Procedure**

**A. Preparation of material for performing the activity.**

1. Take a card board and paste glazed papers of different colours on both sides.  
(Say red and yellow.) [Fig 1]
2. Cut the cardboard into 36 small squared cards.
3. Write all the 36 possible outcomes obtained by throwing two dice. [Fig 2].e.g. for the outcome (2, 1), write 2 on the yellow side and 1 on the red side of the squared card.
4. Put all the cards into a box.

**B. For finding the required probability of an event do the following:**

1. Take out each card one by one without replacement and fill the observation table by putting (√) on favorable outcomes and (×) otherwise.
2. Count the total number of total possible outcomes from column 2. Write total possible outcomes.
3. Count the (√) marks from the columns 3, 4, 5 and 6.

**Observations:**

Sr. No.	Possible outcomes		Sum ≥ 9	Sum < 5	Sum = 7	Odd on yellow & even on red
	yellow card	red card				
1.	1	3	×	√	×	×
2.						
	.....					
	.....					
	.....					
36.						

Total number of possible outcomes = \_\_\_\_\_

Total number of favorable outcomes (Sum ? 9) = \_\_\_\_\_

Total number of favorable outcomes (Sum < 5) = \_\_\_\_\_

Total number of favorable outcomes (Sum = 7) = \_\_\_\_\_

Total number of favorable outcomes (even number = \_\_\_\_\_  
on one side of the card and odd on other)

Using the formula calculate the required probability of each event.



## Remark

In this experiment, the student does not put back the card after taking it out. Consequently, the number of favorable outcomes for any event is certain. To arrive at the true notion of probability, the card should be put back and the experiment repeated a very large number of times. This, however, may be impractical in the actual classroom situation.

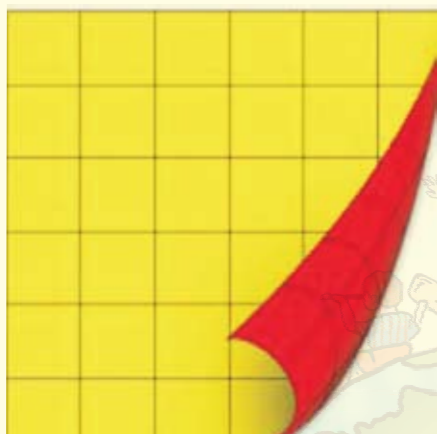


Figure 1

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Figure 2

## Task-8: Project Work

Topic	Probability
Nature of task	Post Content
Content Coverage	Whole chapter
Learning Objectives	To apply the knowledge of Probability in real life.
Task	Project work
Execution of task	<ol style="list-style-type: none"> <li>The teacher may ask the students to either work individually or at most in groups of two.</li> <li>They will collect the following data by visiting any (say) 10 classrooms in the school.</li> </ol>
Duration	5-8 days
Criteria for assessment	<p>The project work could be assessed according to the following parameters:</p> <ul style="list-style-type: none"> <li>● Team Spirit</li> <li>● Identification of project</li> <li>● Procedure adopted</li> <li>● Preparation of Report</li> <li>● Class presentation of the work</li> </ul>



## Suggested Projects

### Objective

To appreciate that finding probability through experiment is different from finding probability by calculation. Students become sensitive towards the fact that if they increase the number of observations, probability found through experiment approaches the calculated probability.

### What are the students suppose to do?

Students will collect the following data by visiting any (say) 10 classrooms in the school.

Class / section	No. of students	No. of children having birthdays in the month of											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5A	48	6	5	8	3	2	1	3	6	3	5	2	4
6A													
7A													
8A													
9A													
10A													
Total													

1. They will obtain the fraction of number of children having their birthday in the month of January, February and December from the data given in the table.
2. They will make a pie-diagram from the recorded data.
3. They will investigate if the fraction actually obtained in step 1 tallies with the calculated probability obtained for each month. Example: If total number of children whose birthday falls in the month of January is 38 and the total number of students is 500, the actual fraction of children born in January =  $38/500$

Probability for a child to have birthday in January =  $31/365$

4. The students may increase their sample size, i.e. increase the number of observations and study if the actual fraction approaches the calculated probability.

They should use a random sample for this purpose.



