

Grade: 7	Subject: Math	Topic: Data Handling
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SUMMARY SHEET		
Learner Previous Knowledge	Revisit the concept of data; collection and organization of data through tally marks and tables; Interpretation, construction and need for scaling in pictographs; Interpretation, and construction of bar graphs; Study the need for scaling in construction of bar graphs for very large data	
Target Knowledge for this Topic	Know that data collected through sources such as internet, journals, research reports etc. are secondary data whereas the data collected through sources such as interview, questionnaire, and surveys are primary data; Know the concept of raw data, array and range; Learn how to organize multiple data set in a tabular form; Create frequency distribution table for given data set; Know that if two data sets are given, these can be represented through a double bar graph; Interpretation and construction of double bar graph. Feel of probability using data through experiments. Notion of chance in events like tossing coins, dice etc. Observing string of throws of a dice, notion of randomness	
Learning Goals		
<i>More Complex Learning Goal- Students will be able to differentiate between bar graph, double bar graph, and primary sources of data and secondary sources of data with key features, generalize the rule of probability from the known knowledge.</i>		
<i>Target Learning Goal- Students will be able to draw frequency distribution charts and double bar graph using the given data, to solve the questions/situations related to chance and probabilities.</i>		
<i>Simpler Learning Goal- Students will be able to describe the terms array, range, frequency distribution, raw data, primary sources of data, secondary sources of data, double bar graph with examples and to describe the meaning of the terms chance and probability with examples.</i>		
Period No.	Lesson Objectives	Teaching Learning Materials Required
1,2 and 3 <i>Note: this lesson requires 2 days.</i>	Know that data collected through sources such as internet, journals, research reports etc. are	Brainstorming: Worksheet 1 Research: Worksheet 2; Worksheet 3 Worksheet 4

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	secondary data whereas the data collected through sources such as interview, questionnaire, surveys are primary data. • Know the concept of raw data, array and range. • Learn how to organize multiple data set in a tabular form. • Create frequency distribution table for given data set.	
4 and 5 <i>Note: this lesson requires 2 days.</i>	• Know that if two data sets are given, these can be represented through a double bar graph • Interpretation and construction of double bar graph.	• <u>Brainstorming:</u> Two coloured chits (100 each color); bowl (1 per group to keep the chits); A4 sheet (1 per group); Chart paper (1 per class); • <u>Double Bar Graph:</u> A4 sheet (previous day's A4 sheet to respective students); chart paper (1 per class) • <u>Creating double bar graph:</u> • <u>Worksheet-5</u> (1 per student);
6 and 7 <i>Note: This lesson requires 2 days.</i>	• Know about probability and chance meanings in statistics. • Understand the feel of probability using data through experiments. • Know about the notion of chance in events like tossing coins, dice etc. • Tabulate and count occurrences of 1 through 6 in a number of throws.	• <u>Brainstorming:</u> Coin (1 per pair); 4 different colored chalk (1 each color for teacher); • <u>Worksheet-6</u> (1 per student) • <u>Dice activity:</u> <u>Worksheet-7</u> (1 per student); bar graph sheet (1 per student); • <u>Brainstorming:</u> <u>Worksheet-8</u> (1 per student)

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Period 1, 2 and 3

Lesson Objectives

At the end of this lesson students will be able to:

- Know that data collected through sources such as internet, journals, research reports etc. are secondary data whereas the data collected through sources such as interview, questionnaire, surveys are primary data.
- Know the concept of raw data, array and range
- Learn how to organize multiple data set in a tabular form
- Create frequency distribution table for given data set.

Teaching Learning Materials required

- **Brainstorming: Worksheet-1** (1 per student)
- **Research: Worksheet-2** (1 per student); **Worksheet-3** (1 per student); **Worksheet -4** (1 per class)
- **Double bar graph:**

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 to 6 at the computer lab

Lesson Beginning <u>Time:</u> 80 mins <u>Purpose:</u> Activate the prior knowledge Generate interest to the topic Introduce the topic Develop conceptual understanding	<u>Brainstorming/Groups: Worksheet-1</u> • Begin the class by asking the following question: ○ How many kinds of graphs they got to know in grade 6? ○ What do they need in order to make those graphs? ○ How do they collect that information or data? ○ Do they know different kinds of data which they need in order to research or create any document? ○ Do they know primary source data and secondary source data? • Once they brainstorm on the above asked questions give them a reading handout to build clear and better understanding. Worksheet-1 • Then again asked, do they understand the difference between primary and secondary source data? • Take their views and make sure every student gets the difference in between the two. <u>Research work/Groups</u> • Provide Worksheet-2 to each student of the group. • Tell them to research the words given in the sheet and their relation with data. • Each group will use the computer to research and then record their findings in their individual sheet.
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	<u>Discussion/groups</u> • Project Worksheet-2 • At random ask groups to share their findings related to: ○ The terms array, range, raw data and frequency distribution. ○ How these terms are related to the word data? ○ How can it be used in organizing data? <i>Note: Students may come up with incorrect answers. In this case, ask other students who may have the correct answers to explain and justify. It is important to build consensus on all answers – this will help eradicate any errors. Make sure students understand the following:</i> ○ <i>The data obtained in the original form is called a set of raw data. For example: the weights of 25 students of a class measured in kg are given in a raw form 33, 28, 26, 30, 32, 33, 26, 31, 26, 28, 29, 30, 27, 26, 33, 30, 25, 28, 29, 28, 30, 32, 31, 25, 26</i> ○ <i>Here each numerical figure in the set of data is called an observation.</i> ○ <i>Array is a systematic arrangement of objects, usually in rows and columns.</i> ○ <i>Frequencies are the number of observations following in some class.</i> ○ <i>Frequency distribution is the listing of classes and their frequencies.</i> ○ <i>Show the frequency distribution table to show the sample how it needs to be made. Worksheet-3</i> ○ <i>The difference between the highest and the lowest values of the observations in a given set of data is called its range.</i> ○ <i>To make the students learn about the three measures of central tendency: Mean, median and mode along with their definitions. Worksheet-4</i>
Lesson Middle <u>Time:</u> 20 mins. <u>Purpose:</u> Develop conceptual understanding	<u>Worksheet/pairs</u> • Inform students that they are going to work in pairs. • Tell them to discuss and answer the given questions on Pg 62 – Exercise 3.1 and Pg 68- Exercise 3.2 of NCERT Textbook.

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Lesson End <u>Time:</u> 20 mins. <u>Purpose:</u> Consolidate students learning	<u>Whole Class – Discussion</u> • Project NCERT Exercises. • At random ask students to share the answers of the given questions. <i>Students may come up with incorrect answers. In this case, ask other students who may have the correct answers to explain and justify. It is important to build consensus on all answers – this will help eradicate any errors.</i>
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Name: _____

Worksheet-1

Topic: Data

You know different kinds of graphs to represent the given data. You knew how to collect the information and then present it in the form of tables, graphs etc. and then interpret that information to answer the questions.

But what is this data and how you get this?

Data: The collection of facts such as numbers, words, measurements, observations or even just descriptions of things is known as data.

You can get the data using two sources:

1. Primary source data
2. Secondary source data

1. Primary data is data, which is collected by the researcher themselves. This kind of data is new, original research information. Primary sources enable the researcher to get as close as possible to what actually happened and is hands on. A primary source reflects the individual viewpoint of a participant or observer. Primary sources are first-hand information from a person who witnessed or participated in an event. Examples of primary data are:

- *Interviews
- *Questionnaires
- *Observations

2. Secondary research is using information that has already been produced by other people. A secondary source is used by a person usually not present at the event and relying on primary source documents for information. Secondary sources usually analyses and interpret. Finding out about research that already exist will help form new research. Examples of secondary data are:

- *Internet
- *Books/Magazines
- *Newspapers
- *Office statistics
- *The government statistics service
- *The office of national statistics
- *Centre for applied social surveys

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The distinctions between primary and secondary sources can be ambiguous. An individual document may be a primary source in one context and a secondary source in another. Time is a defining element. For example, a recent newspaper article is not usually a primary source; but a newspaper article from the 1860's may be a primary source for civil war research.

Name: _____

Worksheet-2

Skill: Problem Solving

Topic: Data collection

Research about Raw data, array and range and make the notes in the given table:

Raw Data	Array	Range	Frequency distribution

Support the information collected related to raw data, array, range and frequency distribution with examples of graphs, tables etc.

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Skill: Problem Solving

Worksheet-3

Topic: frequency distribution

The weights of 25 students of a class measured in kg are given in a raw form:

33, 28, 26, 30, 32, 33, 26, 31, 26, 28, 29, 30, 27, 26, 33, 30, 25, 28, 29, 28, 30, 32, 31, 25, 26

Weights	Tally Marks	Frequency
25		2
26		5
27		1
28		4
29		2
30		4
31		2
32		2
33		3

Observing the above example, Organize the following marks in a class test, in a tabular form:

5, 4, 7, 2, 6, 4, 7, 8, 9, 2, 1, 4, 2, 9, 1, 3, 4, 8, 7, 6.

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Q2. Find the median and mode of the following data:

110, 140, 130, 120, 140, 120, 120, 10, 120, 110

Period 4 and 5

Lesson Objectives

At the end of this lesson students will be able to:

- Know that if two data sets are given, these can be represented through a double bar graph
- Interpretation and construction of double bar graph

Teaching Learning Materials required

- **Brainstorming:** two coloured chits (100 each color); bowl (1 per group to keep the chits); A4 sheet (1 per group); Chart paper (1 per class);
- **Double Bar Graph:** A4 sheet (previous day's A4 sheet to respective students); chart paper (! Per class)
- **Creating double bar graph; Worksheet-5** (1 per student)

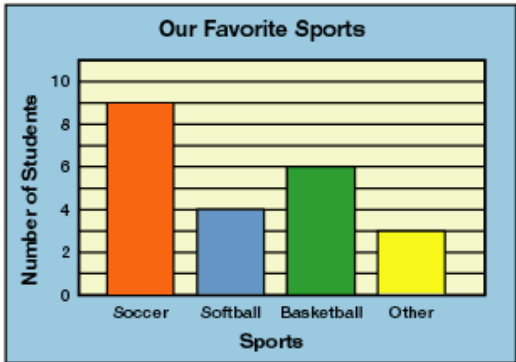
Details of Teaching Learning Experience

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Seating Arrangement: In groups of 4 or 6

Lesson Beginning <u>Time:</u> 40 mins <u>Purpose:</u> Activate the prior knowledge	<u>Brainstorming/Whole class</u> • Start out by asking students what bar graphs are and where they have seen them before. • Guide students to discuss the ideas that bar graphs show information with bars or rectangles, that longer or taller bars show greater numbers than short ones do, and that bar graphs may be in horizontal or vertical formats. • To generate interest in the topic, help students generate and organize some data about themselves. • For this tell them to go to the other sections of grade 7 and find out the sports liked by the students of those sections. • Give the following instructions to collect the data: ○ Give each group 2 coloured chits, yellow for girls and pink for boys. ○ Tell them to distribute the respective chits so that the students can write their choice. ○ Once all the students write their choice the choice then collect the chits from them. ○ Like this the collection of data will be easy and less chaotic. ○ They will have to come back to the class after the data collection for the discussion. • Allot one section to one group so that the data can't be repeated. • Give them 15 mins of time to collect the data and return back to the class. • Once all the groups are back in the class with the data ask them to share the data. • Record the data in the tabular form on the board and tell each group to create a bar graph using that data. • Give an A4 sheet to each student to create the bar graph individually while discussing with the groups. • Give them 10 mins to make the bar graph. <u>Whole Class - Discussion</u> • Paste a big chart paper on the in front of the class i.e. on the board. • Draw X and Y axis on the chart paper • Ask groups to share the data so that you can create a bar graph on the chart paper.
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	• Make sure to cross question when you find the discrepancy or errors in their answers. • Using students' responses create a bar graph on the chart paper. • A Reference image is shown to you as to know how the bar graph will look like after the completion:  <table border="1"> <caption>Our Favorite Sports</caption> <thead> <tr> <th>Sports</th> <th>Number of Students</th> </tr> </thead> <tbody> <tr> <td>Soccer</td> <td>9</td> </tr> <tr> <td>Softball</td> <td>4</td> </tr> <tr> <td>Basketball</td> <td>6</td> </tr> <tr> <td>Other</td> <td>3</td> </tr> </tbody> </table> • Tell them to correct the errors if they have done any by referring the correct bar graph and in the discussion even. • Keep the chart displayed in the class for the next lesson or activity. • Also, keep the chits collected by the students from other sections in a two different bowls for the next activity. • In one bowl keep the yellow chits in which the favorite sport of girls is written and in another bowl keep the pink chits in which favorite sports of boys is written. <i>Note: Make sure to create a correct bar graph using student's response. Students may come up with incorrect answers. In this case, ask other students who may have the correct figures and answers to explain and justify. It is important to build consensus on all answers – this will help eradicate any errors.</i>	Sports	Number of Students	Soccer	9	Softball	4	Basketball	6	Other	3
Sports	Number of Students										
Soccer	9										
Softball	4										
Basketball	6										
Other	3										
Lesson Middle <u>Time:</u> 20 mins <u>Purpose:</u> Introduce the topic Develop conceptual understanding	<u>Double Bar graph/groups</u> • Bring their focus on the previous day's bar graph and review the features of it. • Bring into the notice that the bar graph has bars of equal distance; it has X axis and Y axis etc. and it showed the data related to the favorite sports of the students. • Ask, <i>if we wanted to know how many boys and how many girls chose each sport, how can we find this information?</i>										

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- Students should respond that boys' and girls' information are on charts of different colors, and they could sort and count these for each sport. Have students do so, extending the chart to show the results.
- Lead students in making a second graph beside the first one.
- Tell students to try out making two bars of different colors side by side, for boys' and girls' choices of one of the sports.
- Give them 10 mins of time for the task.
- Then at random call students to demonstrate how to make double bars for the other sports by making the graph on the board using the colored chalks.
- Have children suggest a title for each graph. Illustrate how to show a key for the colors of the boys' and girls' bars.
- Using student's responses make sure to come up with a correct double bar graph. A reference image is given for you.



- Once the final double bar graph is on the board. Make it on the chart paper.
- Display both the chart papers in front.
- Ask students the following:
 - Compare both the bar graphs and share the differences and similarities in between the two.
 - What are some things that the double bar graph tells us?
 - When do we need to create double bar graphs?

Note: Through discussion make sure students understand the importance and need to create double bar graph. Also, differentiate in between the single and double bar graph.

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Lesson End <u>Time:</u> 20 mins <u>Purpose:</u> Consolidate students learning	<u>Creating double bar graphs/pairs</u> • Tell students today they are going to create a double bar graph in pairs. • Provide a worksheet along with a graph paper to each student. Refer. Worksheet 5 • Give them time to write the observations related to the given double bar graph, steps to create the double bar graph and to construct the bar double bar graph using the given data. • Once they are done project Worksheet 5 to take up a discussion. • At random ask pairs to share the answers of the given questions in the sheet. • Build consensus on all the answers with justification. <i>Note: Students may come up with incorrect answers. In this case, ask other students who may have the correct answers to explain and justify. It is important to build consensus on all answers – this will help eradicate any errors.</i> <u>Home Assignment:</u> • Tell the students to practice questions on Pg 72-Exercise 3.3 of NCERT Textbook.
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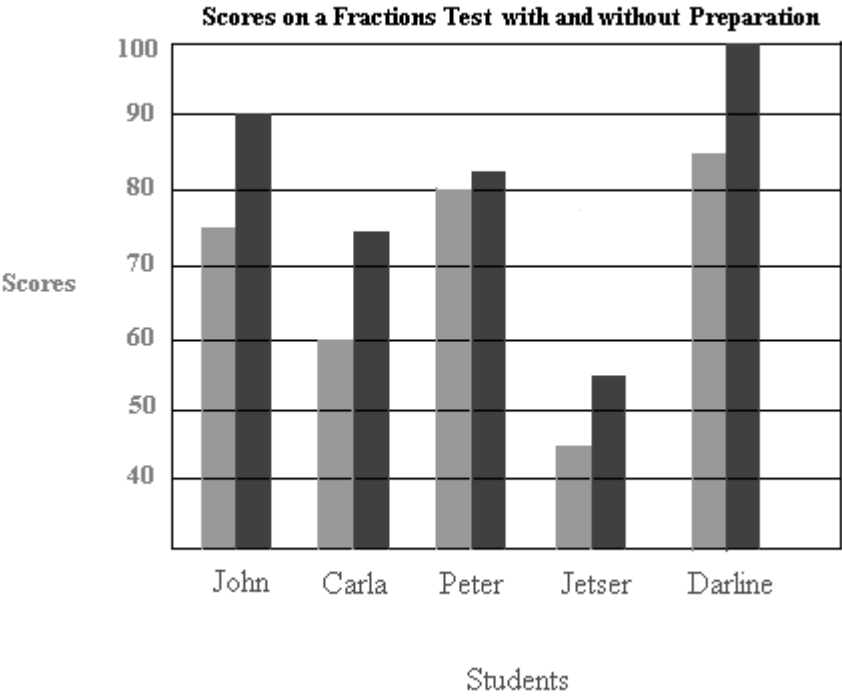
Worksheet-5

Skill: Problem Solving

Topic: Double Bar Graph

Double bar graphs, also called double bar charts, help us to compare or present more than one kind of information, situations, or events instead of just one by using bars.

What you see below is a double bar chart. Take a close look at it and study it, to answer the questions:



Write your observations related to the double bar graph.

Elaborate the steps to create the double bar graph.

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Use the table below to construct a double bar chart. Follow all steps you have outlined above to construct this graph:

Scores on the practice Test and the Test		
Students	Practice Test	Test
Jeff	60	70
Peter	75	90
John	55	55
Mary	80	95

Period 6 and 7

Lesson Objectives

At the end of this lesson students will be able to:

- Know about chance meanings in statistics.
- Understand the feel of probability using data through experiments.
- Know about the notion of chance in events like tossing coins, dice etc.
- Tabulate and count occurrences of 1 through 6 in a number of throws.

Teaching Learning Materials required

- **Brainstorming:** Coin (1 per pair); 4 different colored chalk (1 each color for teacher); **Worksheet-6** (1 per student)
- **Dice activity:** **Worksheet-7** (1 per student); bar graph sheet (1 per student); projector (1 per class);
- **Brainstorming:** **Worksheet-8** (1 per student)

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 to 6 at the computer lab

Lesson Beginning <u>Time:</u> 30 mins	<u>Brainstorming/whole class</u> • Begin the class by writing the words “chance” on the board. • Ask: ○ Do they ever hear this word?
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<u>Purpose:</u> Activate the prior knowledge Generate interest to the topic Introduce the topic	○ If yes then where, when and why? ○ What is the literal meaning of this word? (they can use the dictionary to find the meaning) ○ How this word is related to mathematics? • Tell them lest understand how we mean by chance or number of chances in mathematics. <u>Coin activity/Pairs</u> • Give a coin to each pair along with an activity recording sheet. (Refer. Worksheet-6) • Ask: If you toss this coin, how much chances are there for one side to come, when it lands? Why? Possible answer: The probability for either side is 1 out of 2 or 1/2. • Tell them to complete the activity by following the given instructions in the sheet and write their observations in the table. <u>Whole Class - Discussion</u> • Project Worksheet-6. • At random ask students to share the answers and their observations related to the pattern of getting heads and tails after tossing the coin in the air. • Build consensus on all the answers. <i>Note- Students may come up with incorrect answers. In this case, ask other students who may have the correct answers to explain and justify. It is important to build consensus on all answers – this will help eradicate any errors. Through discussion led students understand that 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.</i>
Lesson Middle <u>Time:</u> 30 mins. <u>Purpose:</u> Develop conceptual understanding Consolidate students learning	<u>Dice activity/pairs</u> • Inform students that they are going to work in pairs again. • Ask the following questions from the pairs: ○ You also might have played with a die. Yes/no ○ How many faces does a dice have? ○ When you throw a die, can you predict the number that will be obtained? ○ While playing ludo or snakes 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?

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	• Give a Worksheet-7 to each student along with a dice • Tell them to do the activity and record their observation in the sheet using the given directions. • Give them time to complete the task. <u>Whole Class - Discussion</u> • Project Worksheet-7. • At random ask students to share the data in tally graphs and bar graph. • Ask: ○ Do all of them get the same data in the tally chart? Why? ○ So, the bar graphs created by them differ as well or not? Why? ○ What do they get to know about chance with the coin and dice activity? <i>Note- Students may come up with incorrect answers. In this case, take consensus from others. It is important to build consensus on all answers – this will help eradicate any errors. Through discussion let students understand that 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.</i>
Lesson End <u>Time</u>: 20 mins. <u>Purpose</u>: Consolidate students learning	<u>Brainstorming/whole class</u> • Begin the class by writing the words “Probability” on the board. • Ask: ○ Do they ever hear this word? ○ If yes then where, when and why? ○ What is the literal meaning of this word? (they can use the dictionary to find the meaning) ○ How this word is related to mathematics? ○ How probability is related to ratio? Express your definition of probability: Probability is the likelihood or chance that a given event will occur. It is usually expressed as a ratio of the number of likely outcomes compared with the total number of outcomes possible. • Ask students if they can give an example of probability. • Share your example of probability by write the situation on the board with a drawing of the spinner as given here. • Show the colored portions with colored chalks.

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Situation: A spinner has 4 equal sectors colored yellow, blue, green and red.
What are the chances of landing on blue after spinning the spinner? What are the



chances of landing on red? _____

- Ask them to share their responses with justification.

Possible solution: The chances of landing on blue are 1 in 4, or one fourth.

The chances of landing on red are 1 in 4, or one fourth.

- Ask: when we throw a coin in the air how many possible outcomes do we have?

Possible answer is 2 i.e. head or tail.

- Ask: What is the probability of getting Head or Tail, when a coin has been tossed out?

Possible answer: The probability for either side is 1 out of 2 or $\frac{1}{2}$

- Ask, for a die, what is the possibility of getting either of 1, 2, 3, 4, 5 or 6 is?

Possible answer: If a die with numbers 1-6 is rolled, the probability of any number showing is 1 out of 6 or $\frac{1}{6}$.

- Now tell students to do an activity or exercise related to understand the meaning of the term probability.
- Give them **Worksheet-8**
- Tell them to discuss and work in pairs.

Note: Though students will be discussing in pairs but will fill in the details in their individual sheets.

Whole Class - Discussion

- Project Worksheet-8.
- At random ask students to share the answers of the questions given in the sheet with justification.
- Build consensus on all the answers.

Note: Students may come up with incorrect answers. In this case, take consensus from others. It is important to build consensus on all answers – this will help eradicate any errors. An explanation is given for your reference:

- *To figure out each problem, students must set up a ratio between the total number of outcomes—in these problems either the total number of seats or rows — and the specific question asked. You can give hint to the students that that they will write their answer as a fraction, decimal, and*

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Worksheet-7

Topic: Dice activity

Take a die and throw it 30 times and fill the data in the following table. 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 60 throws and find out the number of each outcome for 60 throws.

Number on die	Tally marks	Number of times it occurred

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

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Worksheet-8

1. Imagine that you have boarded an airplane. The rows are numbered from 1 to 30, and there are six seats per row, three on each side of the aisle. Seats in each row are labeled A to F. Using that information, work together in groups to solve the problems listed below:

a. How many seats are in the airplane?

b. What are your chances of sitting in row number 7?

c. What are your chances of sitting in a window seat?

d. What are your chances of sitting in an "A" seat?

e. What are your chances of sitting in an even-numbered row?

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