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Master Lesson Plan

for

08 - Comparing quantities (ବ୍ଯବହାରିକ ଗଣିତ)

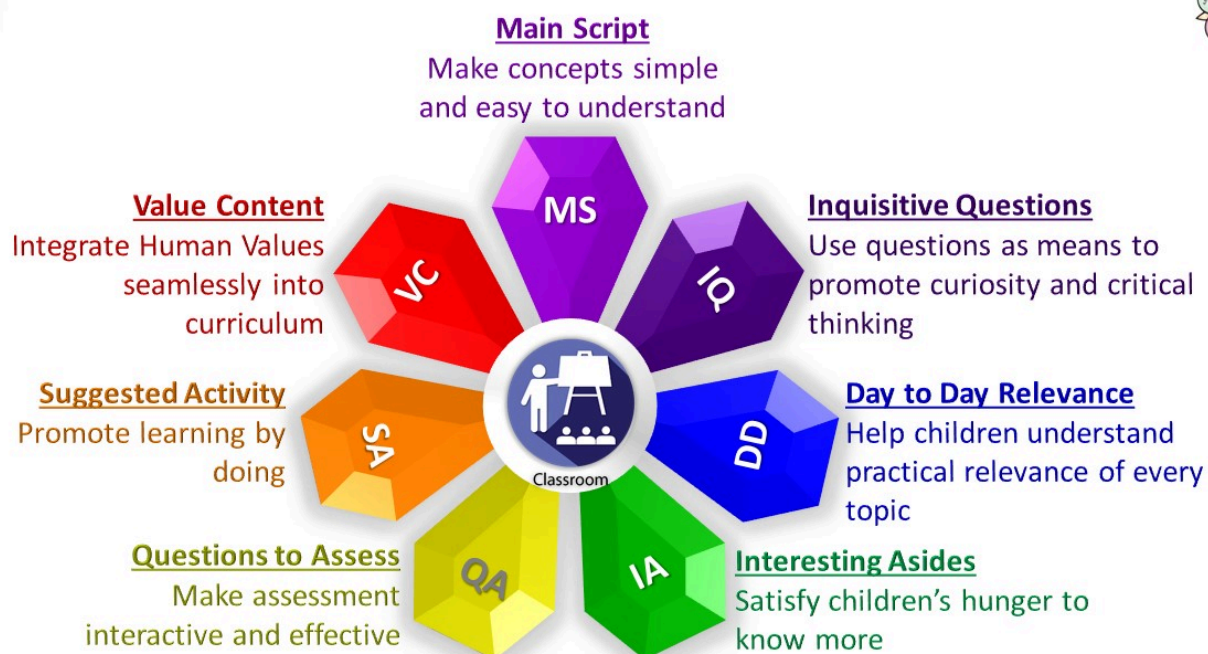
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Master Lesson Plan (MLP) - Covers the entire chapter with the help of these 7 asset types



For more information on how to use the lesson plan effectively, please scroll to the guidelines at the end of this document.

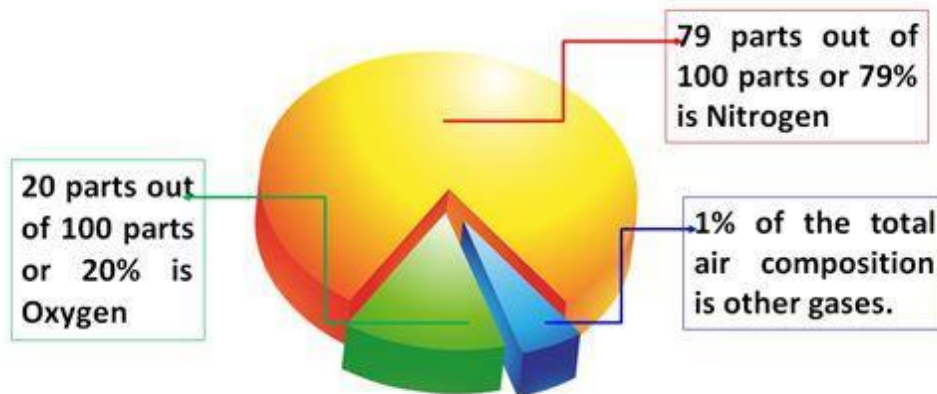
MS_Percentage

Introduction

Percentage is very much a form of ratio. It is a ratio in which the 'consequent term' (the denominator in a fraction) is always 100. The term Percent is derived from the Latin word "Percentum". Percentum is made of two words 'Per' and 'centum'. The meaning of cent is 100. So, Per cent literally means per hundredth or for every hundred. Percent is denoted by % sign.

Examples

- If Ram scored 70% it means he got 70 marks out of 100.
- If a shop gives a discount of 15% , means there is a discount of Rs.15 for every Rs.100 worth of items purchased.
- The concept of percentage can be explained using the example of air composition.



We all know that air is made up of many gases. This means that all the gases in the atmosphere, if combined together, form 100 parts. If the total air composition is 100 then 79 parts out of 100 parts or 79% of the total air composition is formed by nitrogen. Similarly, 20 parts out of 100 parts or 20% of the total air composition is formed by oxygen and the remaining 1 part out of 100 parts or 1% of the total air composition consists of other gases.

Definition

Percentage is the numerator, of a fraction, whose denominator is 100

$$8\% = 8/100$$

Note-In the above example, 8 is the numerator of the fraction and 100 is the denominator of the fraction.

Percentage can be expressed as a decimal also. For example,
 $8\% = 8/100 = 0.08$

Calculating Percentage – Conversion of fraction to percentage

Seema is fond of collecting coins. She has a collection of 100 coins of different countries. She plans to organise a coin exhibition someday. Seema's friend asked her about the percentage of Indian coins in her collection.

There are 100 coins in all, so the number of coins from each country can be written as fractions with 100 as the denominator.

In Seema's coin collection,

30 out of 100 coins are from India. $30/100$ is a fraction of coins from India.

To convert a fraction (with denominator 100) into a percentage we multiply it by 100.

$$30/100 \times 100 = 30\%$$

Therefore, 30 % of Seema's coin collection is made up of coins from India.

Here is the table created by Seema which helps her keep a track of varied coins.

Name of the country	Number of coins	Fraction	Percent
India	30	$30/100$	30%
Germany	15	$15/100$	15%
China	20	$20/100$	20%
Japan	12	$12/100$	12%
U.S.A	8	$8/100$	8%
Sri Lanka	15	$15/100$	15%

From the above table, we find that 15% of coins are German, 20% Chinese coins, 12% Japanese coins, 8% U.S coins, coins and 15% Srilankan in Seema's collection.

Calculating percentage when the total is not 100

If the total number of items do not add up to 100, then we need to convert the fraction into an equivalent fraction with denominator 100.

Example

Karim has a box of 50 colour pencils with 3 different colours. There are three methods of finding out the percentages of these three colours in the box.

Method I:

In this method, we multiply the fraction by $100/100$. This helps to convert the denominator of the fraction into 100. Thus the percentage of various colours is easily obtained.

Colours	Number of Pencils	Fractions	Converting Denominator to 100	In percentage
Purple	23	23/50	$\frac{23}{50} \times \frac{100}{100} = \frac{46}{100}$	46%
Green	9	9/50	$\frac{9}{50} \times \frac{100}{100} = \frac{18}{100}$	18%
Yellow	18	18/50	$\frac{18}{50} \times \frac{100}{100} = \frac{36}{100}$	36%
TOTAL	50		—	100%

Method II:

In this method, we use the property of proportionality to convert the denominator of the fraction to 100.

Out of 50 pencils, number of purple pencils are 23. Let 'a' be number of purple pencils, if total pencils is 100.

$$50:23::100:a$$

Product of extremes=Product of means

$$50 \times a = 23 \times 100$$

Therefore, out of 100 the number of purple pencils are, $23 \times 100 / 50 = 23 \times 2 = 46$

Percentage of purple pencils in the box is 46%. Similarly, the percentage for other colour pencils is obtained.

Method III:

The third method for converting a fraction into percentage is to convert its denominator to 100 by multiplying suitably.

Fraction of purple pencil = $23 / 50$

$$= 23/50 \times 2/2 \text{ (Here 50 is multiplied by 2 to get 100)}$$

$$= 46 / 100$$

$$= 46 \%$$

These are the three methods of finding out the percentage when the total, do not add up to 100.

Note:

Usually the 1st or 2nd method is most preferred for converting fractions into percentage. The 3rd method is not suitable for all fractions. For fractions like $31/7$, where denominator 7 is not a factor of 100, it is difficult.

In the above examples we have seen the conversion of fraction into percentage.

Calculating percentage - Conversion of decimal into percentage

Consider decimal number 0.08. In order to express it in percentage, we first convert it into a fraction.

$$0.08 = 8/100$$

Now convert the fraction into percentage

$$\frac{8}{100}=8\%$$

$$0.08=\frac{8}{100}=8\%$$

Illustrations

1) Convert the following fractions into percentage.

a) $\frac{7}{25}$ b) 1

Solution:

a) $\frac{7}{25} = \frac{7}{25} \times \frac{100}{100} = \frac{28}{100} = 28\%$

b) $1 = 1 \times \frac{100}{100} = \frac{100}{100} = 100\%$

2) Express each of the following statements in the percentage form.

a) 3 out of 20 eggs are bad.

b) 27 apples out of 45 are good.

Solution

a) $\frac{3}{20} = \frac{3}{20} \times \frac{5}{5} = \frac{15}{100} = 15\%$

15% of eggs are bad.

b) $\frac{27}{45} = \frac{27}{45} \times \frac{100}{100} = \frac{60}{100} = 60\%$

60% of apples are good.

3) A new road connecting two small cities is estimated to be 84 kms when completed. At present, only 21 kms of the high way have been finished. What percent of the road is finished?

$\frac{21}{84}$ part of the road is finished. We will find the percentage of the finished work.

$$\frac{21}{84} = \frac{21}{84} \times \frac{100}{100} = \frac{25}{100} = 25\%$$

25% of the road is finished.

4) Convert the following decimals to percentage

a) 0.63 b) 0.7

Solution

a) $0.63 = \frac{63}{100} = 63\%$

b) $0.7 = \frac{7}{10} = \frac{7}{10} \times \frac{100}{100} = \frac{70}{100} = 70\%$

Image Source: surekhapsarathy@gmail.com

Time to teach	Asset type	Theme	Sub Theme
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20 minutes	Main Script	Comparing Quantities	Converting decimals to percentage
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QA_Fraction to percentage

Fill in the blanks

- a) 15 out of 240 =.....%
- b) 25 out of 200 =.... %

Express each of the following statements in the percentage form

- a) 47 students out of 50 are present.
- b) What percent of 60 is 18?

Solve the following questions

- 1) In a test, you gained 24 marks out of 40. What percentage is this?
- 2) A track is 4 km long. Shrikrishna has jogged 3 km. What percentage of the track has he jogged?
- 3) Ramu spent a fraction i.e. $\frac{19}{50}$ of his salary on food and other expenses. The rest he saved. What percent of his salary did he save?

Answers

Fill in the blanks

- a) $\frac{15}{240} = \frac{x}{100}$
 $x = \frac{25}{4} = 6 \frac{1}{4} \%$
- b) $\frac{25}{200} = \frac{x}{100}$
 $x = \frac{25}{2} = 12 \frac{1}{2} \%$

Express in percentage form

- a) $\frac{47}{50} = \frac{47}{50} \times \frac{2}{2} = \frac{94}{100} = 94\%$
94% of students are present.
- b) $\frac{18}{60} = \frac{18}{60} \times \frac{100}{100} = \frac{30}{100} = 30\%$
18 is 30% of 60.

Solve the following

- 1) Convert $\frac{24}{40}$ to percentage. $\frac{24}{40} = \frac{24}{40} \times \frac{100}{100} = \frac{60}{100} = 60\%$
The percentage scored in the test is 60%.
- 2) Total length of the track = 4 km
Distance of track covered = 3 km
Fraction of distance covered by Shrikrishna = $\frac{3}{4}$

Percentage of distance covered $\frac{3}{4}$ th = $\frac{3}{4} \times \frac{100}{100} = \frac{75}{100} = 75\%$
 Shrikrishna has jogged 75% of the track.

3) Fraction of salary spent on food and other expenses = $\frac{19}{50}$

Percentage of salary spent = $\frac{19}{50}$
 $= \frac{19}{50} \times \frac{2}{2} = \frac{38}{100} = 38\%$

Percentage saved = $(100-38)\% = 62\%$

Ramu saved 62% of his salary.

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Questions to Assess	Comparing Quantities	Converting fractional numbers to percentage

SA_Percentage game

Percentage Game

Aim:

To apply properties of percentage and play the percentage game.

Materials Required:

Activity sheet -1 per team, Pen-1 per team

Settings of activity: Indoor

Type of Activity: Group activity, Experiment by students

Instructions to teacher:

- Teacher should prepare the activity sheet and make copies for each team, prior to the day of the activity.
- On the day of the activity, teacher divides the class into groups of 6 students each.
- Teacher distributes the activity sheet and explains the activity as given in the procedure.
- The team that completes the games first with all correct answers is declared as the winner.
- Teacher begins the activity with questions to recall.

Questions to recall

1)Convert 47/50 into percentage.

Expected answer: $47/50 \times 2/2 = 94/100 = 94\%$.

2)Convert 0.13 into percentage.

Expected answer: $0.13 = 13/100 = 13\%$

3)What is first 50% of the letters in the word 'FOOD'?

Expected Answer:There are 4 letters in the word 'FOOD'.

$50\% \text{ of } 4 = 50/100 \times 4 = 2 \text{ letters}$

First 2 letters is FO

Procedure

- In the first game, each team should apply the properties of percentage and find the answer to each clue and fill the boxes in the order of the clues. Decode the message.
- In the second game, each team should apply the properties of percentage and match the states and their capital cities .
- Each member of the team should participate in both the games (Each team member should solve at least one question in the game).In the first game one team member can write the answers in the boxes and decode the message.
- The team that completes the activity sheet first with all correct answers is declared winner.

Observation

Game-1

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Clues :

1. The last 50 % of MAKE
2. The last 40 % of SLEEP
3. The first 60 % of SMIRK
4. The first $16\frac{2}{3}$ % of LETTER
5. The last $37\frac{1}{2}$ % of STARTING

The decoded message is 'KEEP SMILING'

Game-2

State	A	B	Capitals
Tamil Nadu	$\frac{50}{100}$	80%	Jaipur
West Bengal	$\frac{43}{100}$	3%	Mumbai
Bihar	$\frac{70}{100}$	43%	Kolkata
Maharashtra	0.03	50%	Chennai
Gujarat	$\frac{8}{50}$	70%	Patna
Rajasthan	$\frac{20}{25}$	16%	Gandhi Nagar

The states and their capitals are

- Tamilnadu-Chennai
- West Bengal-Kolkata
- Bihar-Patna
- Maharashtra-Mumbai
- Gujarat-Gandhi Nagar
- Rajasthan-Jaipur.

Conclusion

The percentage game is played by applying the properties of percentage.

For Teacher's reference only

Answer for clues

1. The last 50% of MAKE

Make contains 4 letters.

$$50\% \text{ of } 4 = 50/100 \times 4 = 2$$

The last 50% of MAKE is the last two letters **KE**

2. The last 40% of SLEEP

SLEEP contains 5 letters.

$$40\% \text{ of } 5 = 40/100 \times 5 = 2$$

The last 40% of SLEEP is the last two letters **EP**

3. The first 60% of SMIRK

SMIRK contains 5 letters.

$$60\% \text{ of } 5 = 60/100 \times 5 = 3$$

The first 60% of SMIRK is the first three letters **SMI**

4. The first $16 \frac{2}{3}$ % of LETTER

LETTER contains 6 letters

$$16 \frac{2}{3} \% \text{ of } 6 = (50/3)/100 \times 6 = 50/300 \times 6 = 1$$

The first $16 \frac{2}{3}$ % of LETTER is the first letter **L**

5. The last $37 \frac{1}{2}$ % of STARTING

STARTING contains 8 letters

$$37 \frac{1}{2} \% \text{ of } 8 = (75/2)/100 \times 8 = 75/200 \times 8 = 3$$

The last $37 \frac{1}{2}$ % of STARTING is the last three letters **ING**

Note to the teacher: Activity sheet is attached.

Time to teach	Asset type	Theme	Sub Theme
20 minutes	Suggested Activity	Comparing Quantities	

MS_Increase or Decrease as Percent

Introduction

In some occasions, for ease of understanding, we may need to know the increase or decrease of a quantity in terms of percentage.

Consider the following example.

Example-1

Profit of a grocery shop is Rs.70,000 this year compared to Rs.40,000 last year. Find the percent increase in profit.

Original profit=Rs.40,000

Increase in the profit = 70000- 40000 =Rs.30,000.

Percentage Increase=(Amount of change/Original amount) x 100

=(Increase in amount of profit/original profit) x 100

=(30000/40000) x 100

=75

Increase in profit =75%

Example-2

The number of people using land line phones decreased to 6 lakhs this year from 15 lakhs last year. Find the percentage of decrease in users.

Original number of users = 15 lakhs

Decrease in users=15-6 = 9 lakhs

Decrease percentage=(amount of decrease /original amount) x 100

=(9/15) x 100

=60

Decrease in users=60%

Illustrations

1) Sham weighed 90 kg in March and 85 kg a month later. What percentage of his weight did he lose?

Original weight = 90 kg

Loss in weight = 90 – 85 = 5 kg

Percent change in weight = 5/90 X 100 = 5.55

Percentage of weight loss=5.55%

2) The price of sugar decreases from Rs 60 per kg to Rs 54 per kg. Find the percent decrease in price.

Original price = Rs 60

Decrease in price = 60 – 54 = Rs 6

Percent decrease in price = $6/60 \times 100 = 10$

Sugar price decreased by 10%

Time to teach	Asset type	Theme	Sub Theme
10 minutes	Main Script	Comparing Quantities	

DD_Percentages in Daily Life

Percentage has become a part of our everyday life that we are hardly aware of it. When we speak of “fifty – fifty”, for example, we do not realise that we assume a knowledge of percentage, 50% being equal to $\frac{1}{2}$. The phrase, “There is nil percentage gain in it” meaning “It will do me no good” assumes that everybody knows that profit is measured in percentages of turnovers or costs as the case may be.

Here is a list of some applications of percentages.

- Shops advertise discounts on products. These discounts are percentages.
"Up to 40% off on marked prices".
 1. Financial institutions quote interest charged to the client on loans, or interest paid for money invested, as a percentage.
"Housing Loans - 4.85% p.a. for the first 12 months".
 1. Companies describe their success or failure as an increase or decrease in profit levels.
"A company's profit fell down by 15% for the last financial year".
 1. A salesperson may be given a commission as incentive for selling goods. The commission can be a percentage of the sales made.
"2% commission on sales up to Rs.10 lakhs. 5% commission on all sales above 20 lakhs".
- Percentages are used in displaying exam results.

Time to teach	Asset type	Theme	Sub Theme
5 minutes	Day-to-day Relevance	Comparing Quantities	

IA_History of percents

History of Percents

Augustus, the first Roman Emperor

As the first Roman Emperor, Augustus led Rome's transformation from republic to empire.

The month of August was named after him.

During his reign, art, economy, agriculture flourished making it one of the golden eras of the Middle Ages.

He had imposed tax in the form of $\frac{1}{100}$ on goods sold at auction.

This led to computation using fractions with multiples of $\frac{1}{100}$, which was similar to percentages.

History of percents dates back to the early Roman period when fractions and percentages were used.

Time to teach	Asset type	Theme	Sub Theme
3 minutes	Interesting Asides	Comparing Quantities	

IQ_Profit or Loss

2) The cost of 15 pens is equal to the Selling Price of 12 pens. Find the loss or profit percent irrespective of the cost of the pen.

Solution:

Let the cost of one pen be Rs. x

Then cost of 12 pens = Rs. $12x$

Selling Price of 12 pens = Cost Price of 15 pens = $15x$

Selling Price is more than Cost Price.

Thus, Profit = Selling Price of 12 pens – Cost Price of 12 pens = $15x - 12x = 3x$

$$\begin{aligned}\text{Profit \%} &= \left(\frac{\text{Profit by selling 12 pens}}{\text{Cost of 12 pens}} \right) \times 100 \\ &= \left(\frac{3x}{12x} \right) \times 100 = 25\end{aligned}$$

Profit percentage is 25.

3) By selling an article 20% discount off on the Market Price a shop keeper still makes 12.5% profit on his cost. If Cost Price is Rs. 3,200, find the Marked Price.

Solution:

Cost Price of the article = Rs. 3,200.

Profit = 12.5% of Rs. 3,200 = Rs. $\left(\frac{12.5}{100}\right) \times 3200$ = Rs. $\left(\frac{25}{200}\right) \times 3200$ = Rs. 400.

Selling Price = Cost Price + Profit = Rs. (3200 + 400) = Rs. 3,600

Let the Marked Price be Rs. x

Discount is 20%

When the Marked Price is Rs. 100, Selling Price is Rs. 80

When the Marked Price is Rs. x, Selling Price is Rs. 3,600

100:80 = x:3600

$80x = 3600 \times 100 = 3,60,000$

$x = \frac{360000}{80} = 4,500$

Marked price of the article is Rs. 4,500.

Time to teach	Asset type	Theme	Sub Theme
12 minutes	Inquisitive Questions	Comparing Quantities	Cost price and Selling price

MS_Profit or Loss as Percentage

Introduction

Consider the following situations.

- Ravi purchased a book at Rs.150 and sold it at Rs.175 to his friend.
- Ashok bought a cycle at Rs.2000 and sold it next year for Rs.1500.
- Vivek bought a toy for Rs.90 and sold it at Rs.90.

From the above cases we understand that

1. Ravi has sold the book at a higher price than the price he paid at time of purchase. Hence, he has made a profit.
2. Ashok has sold the cycle at a lower price compared to the price at the time of purchase. Hence, he has made a loss.
3. Vivek sold the toy at the same price at which he purchased. Hence, he did not make any profit or loss.

In all business transactions it is necessary to compare the profit or loss with the previous business results. In such cases, the comparison will be meaningful if we calculate the profit or loss percentage. Thus, you can see another application of percentage. i.e. calculating profit or loss in business.

Definitions of terms and Formulae

Cost price(CP): The amount for which an article is bought is called its cost price.

Selling price(SP): The amount for which the article is sold is called its selling price.

Profit

When selling price is more than cost price, there is a gain or profit.

Profit = Selling price – Cost price.

Loss

When cost price is more than selling price, there is a loss.

Loss = Cost price – Selling price.

Profit percentage

Percentage profit = (profit/cost price) X 100

Loss percentage

Percentage Loss = (loss/ cost price) X 100

Note:

If SP=CP then there is no loss or profit.

Explanation with examples

Consider the following cases.

Case-1

A trader spent a total of Rs 480 in procuring an item, which he sold after a few days for Rs. 560. Find the profit or a loss.

Ans:

Cost Price = Rs 480

Selling Price = Rs 560.

Since the $SP > CP$, it is a Profit.

Profit = Selling Price - Cost Price

= $560 - 480 = 80$.

Therefore, the trader made a Profit of Rs. 80 on this item.

Case-2

Supposing the trader had sold it for Rs 460 because the item went out-of-fashion, did he incur a loss? If so, how much?

Cost Price = Rs 480

Selling Price = Rs 460.

Since the $CP > SP$, it is a Loss.

Loss = Cost Price – Selling Price

= $480 - 460 = 20$.

Therefore, the trader suffered a loss of Rs 20 on this item.

Case-3

Suppose Ram bought an item for Rs.2000 and sold it for Rs.2400 whereas his friend Shyam bought some other item for Rs.5000 and sold it for Rs.5750. Who made more profit?

Ans:

In case of Ram

Cost Price = Rs.2000

Selling Price = Rs.2400

Profit = $SP - CP =$ Rs. 400.

In case of Shyam

Cost Price = Rs.5000

Selling Price = Rs.5750

Profit = $SP - CP =$ Rs. 750.

It appears that Shyam has made more profit than Ram.

Let us calculate the profit percentage.

Percentage of Profit is calculated on the basis of Cost Price.

Ram's Percentage of Profit = $(400 / 2000) \times 100 = 20\%$.

Shyam's Percentage of Profit = $(750 / 5000) \times 100 = 15\%$.

Clearly Ram's profit is greater than Shyam's because the actual profit or loss has to be based on the Cost Price and not on the gross amount in Rupees. Therefore, expressing a Profit or a Loss as a percentage gives a more meaningful picture than merely expressing it in gross Rupees.

Illustrations

1) An item costing Rs 215 was sold by a merchant for Rs. 275. What is the percentage profit?

$$\text{Profit} = \text{SP} - \text{CP} = 275 - 215 = \text{Rs. } 60$$

$$\text{Percent profit} = \text{Profit} / \text{Cost price} \times 100 = 60 / 215 \times 100 = 27.9$$

2) Cost of a mobile is Rs. 2500 and the shopkeeper sells it for a loss of 15 %. Then, what would be price at which he sold the mobile.

There are two ways of solving this problem.

I method:

If the cost price is Rs. 100, then, the loss would be Rs. 15.

Therefore, the Selling price = CP-loss

$$= 100 - 15 = \text{Rs. } 85.$$

If CP is Rs. 100 ,SP is Rs. 85.

And if the CP is Rs. 2500, then $\text{SP} = 85/100 \times 2500 = 2125$

The Selling price of the mobile is Rs. 2,125.

II method:

Loss is 15 % of the CP.

$$\text{Loss} = 15 \% \times 2500$$

$$= 15/100 \times 2500 = \text{Rs. } 375.$$

$$\text{Loss} = \text{CP} - \text{SP}$$

$$375 = 2500 - \text{SP}$$

$$\text{SP} = 2500 - 375 = 2125$$

The selling price of the mobile is Rs. 2,125.

By both the methods, the answer is Rs. 2,125.

Discounts

Discount is a reduction in the price of the product.

During festive season, many shops offer discount on clothes, electronic goods etc. Discounts are also offered during year end clearance sales of goods. Definitely the customer gets the product at a cheaper rate but even then the shopkeeper also makes a marginal profit. This is possible because the shopkeeper keeps a marked price on each item. Marked price is indicated on a label stuck on the product. The discount is offered on the marked price only.

Consider the following example.

The marked price on a table was Rs. 1200. This price was 20% above the cost price. The shopkeeper sold it at a discount of 10% on the marked price. Find his profit percent.

Solution

Given MP=Rs.1200

MP=CP+20% of CP

Let CP be y

$$1200=y+(20/100)y=(120/100)y$$

$$y=1000$$

CP=Rs.1000

$$\text{Discount}=10\% \text{ of MP}=10/100 \times 1200=120$$

SP=MP-Discout

$$=1200-120$$

$$\text{SP}=1080$$

$$\text{Profit}=\text{SP}-\text{CP}=1080-1000=80$$

$$\text{Profit percent}=\text{Profit}/\text{CP} \times 100=(80/1000) \times 100=8\%$$

Profit is 8%

Time to teach	Asset type	Theme	Sub Theme
20 minutes	Main Script	Comparing Quantities	

QA_Practice Questions on Profit and Loss

Fill in the blanks

- 1) CP = Rs. 720, SP = _____, Profit = Rs. 55.50
- 2) CP = _____, SP = Rs. 1254, Loss = 32
- 3) CP = Rs. 980, SP = Rs. 940, Loss = _____.

Answers:

- 1) Rs.775.50
- 2) Rs.1286
- 3) Rs.40

Choose the correct answer:

- 1) The CP of a chair is Rs. 3300. If it is sold at a loss of 10%, then SP is
a) Rs. 3000 b)Rs. 3070
c) Rs. 2790 d) Rs. 2970
- 2) If CP = Rs. 950 and gain = 6%, then SP = ?
a) Rs. 1100 b) Rs. 1007
c) Rs. 1117 d) Rs. 1170
- 3) A man bought a second hand scooter for Rs.1200 and spent Rs.200 on its repairs. He sold it for Rs.1680. His gain per cent is
a)20% b)10%
c) 8% d) 16%

Answers :

- 1 (d) 2 (b) 3 (a)

Solve the following

- 1) Ramesh purchases an article for Rs 27, 000 and sold it at 20% loss. Find the loss and selling price of the article.
- 2) A vendor sold 6 quintals of rice at a gain of 7%. If one quintal of rice cost him Rs.3,000 and his total overhead charges for transportation etc.were Rs 700, find his total profit and selling price of 6 quintals of wheat.
- 3) A carpenter allowed a discount of 15% on a chair he made. What was his Marked price if he sold it at Rs.680?

Answers

- 1) CP=27000

Loss=20% of 27000=5400

SP=CP-Loss=27000-5400=21,600

Answer: Loss is Rs 5400, Selling price is Rs 21, 600

2) CP of 1 quintal=Rs.3000

CP of 6 quintal=6 x 3000=Rs.18,000

CP of 6 quintals+ Overhead charges=18000+700=Rs.18700

Gain=7% of 18700=7/100 x 18700=Rs.1309

SP=CP +Profit=18700+1309=Rs.20,009

Answer: Profit is Rs 1309. Selling price = Rs. 20, 009

3) SP=MP-Discunt=MP-15% of MP

680=MP-(15/100)MP

680=(85/100)MP

MP=680 x 100/85=800

Marked price is Rs.800

Extra questions(Not for PPT)

1) Nikhil bought a TV for Rs 45, 000 and sold it for Rs.52, 500. Find percentage profit.

Answer: 16.66%

2) Santhosh purchased an old scooter for Rs 32, 000 and spent Rs 2, 850 on its overhauling. He sold it to his friend for Rs.37, 400. How much percent did he loss or gain?

Answer: 7.32%

Time to teach	Asset type	Theme	Sub Theme
14 minutes	Questions to Assess	Comparing Quantities	

MS_Simple Interest

Introduction

For starting any business we need to invest money. We may borrow money from friends and relatives, if possible. Otherwise, we usually go to a bank to borrow money. Banks lend money for a certain period of time. Bank charges a certain amount for lending the money. The amount paid for the use of money is called **interest**.

For example, you want to start a business, say coffee powder business. Assume that you require about Rs 3,00,000 to start the business (to buy coffee seeds, to pay the advance for the building etc.)

If you want to borrow Rs 3, 00,000 from a local bank and the bank charges interest of 10% for a period of 1 year. 10% interest means bank will charge Rs.10 for every Rs.100 borrowed for a period of 1 year or it means 10% of Rs.3,00,000 for a period of 1 year. 10% of Rs 3, 00,000 = Rs 30, 000.

After one year,

Amount to be repaid= original amount borrowed + interest amount
= Rs.3,00,000 + Rs.30,000.

In this example, you are the borrower and the bank is the lender.

The principal of the loan is $P = \text{Rs } 3, 00,000$

The interest $I = \text{Rs } 30, 000$

The total amount paid by you to the bank after one year is, $A = \text{Rs } 3, 30,000$

Terminologies in Simple Interest

- 1)Principal(P)-Money that is borrowed or lent.
- 2)Interest(I)-Money paid on the Principal.
- 2)Rate(R)-Percentage of Principal paid as interest.
- 3)Time(T)-Duration for which Principal is borrowed.
- 4)Amount(A)-Money paid back at the end of the time period.

$$A = P + I$$

Interest for multiple years

If you keep the money for two years then the bank charges you another 10% for the extra year.

You pay the interest 10% of 3, 00,000 twice.

$$10\% \text{ of } 3, 00,000 \times 2 = 10/100 \times 300000 \times 2 = 60000$$

Note:

The principal remains the same for any number of years and the interest alone gets added up. This type of interest is called **SIMPLE INTEREST**

Simple Interest Formula

Suppose a principal P is borrowed from a bank at the interest of R% per annum.

For every Rs.100 borrowed, the interest to be paid after a year is Rs.R.

By property of proportionality,

For Rs.P borrowed, the interest to be paid after a year is $(P \times R)/100$

For Rs.P borrowed, the interest to be paid after 2 years is $[(P \times R)/100] \times 2$

For Rs.P borrowed, the interest to be paid after 3 years is $[(P \times R)/100] \times 3$

In general,

For a principal P, the interest I to be paid after T years is $I = (P \times R \times T)/100$

This is the formula for Simple Interest.

Examples

1) Rs 4000 is borrowed for a five year period at 8% rate of interest. What is the total amount of interest this loan will cost?

Principal amount(P) = Rs.4000

T = 5 years

R = 8%

$I = PTR/100 = 4000 \times 5 \times 8/100 = 1600$

The amount of interest to be paid is Rs. 1,600.

2) Suresh received an interest payment of Rs. 9,000. His investments result in two such payments per year. If the simple interest rate is 9%, how much is his investment?

Given: T=1 year R=9%

Let the principal amount invested be P.

Total interest received by Suresh in a year= $I=9000+9000=Rs.18,000$.

$I = PTR/100$

$18000 = P \times 1 \times 9/100$

$9P = 1800000$

$P = 200000$

Suresh invested Rs.2,00,000.

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Main Script	Comparing Quantities	

QA_Questions on Simple Interest

Fill in the blanks

- 1) When $I = \text{Rs.}192$, $R = 6\%$, $T=4$ years, $P = \dots\dots\dots$
- 2) When $P = \text{Rs.}9,600$, $I = \text{Rs.}72$, $T = 3$ months, $R = \dots\dots\dots$
- 3) When $P = \text{Rs.}500$, $R = 7.5\%$, $I = \text{Rs.}150$, $T = \dots\dots\dots$

Solve the following

- 1) Iqbal borrowed Rs. 21,500 from bank for a year at the rate of 8 % interest per annum. Calculate the interest rate and the amount he has to pay at the end of the year.
- 2) Ram took a loan of Rs. 2,800 and he pays Rs. 240 as interest for the past three years. What is the interest rate?
- 3) At what rate per annum will Rs.6,360 yield an interest of Rs.1,378 in 2 years and 6 months?
- 4) At what rate per annum will the Principal triple in 16 years?

Answers

Fill in the blanks

- 1) Rs.800
- 2) 3% [Hint-write T as (3/12) years]
- 3) 4 years

Solve the following

- 1) Sum borrowed $P = \text{Rs. } 21,500$.

Interest rate $I = 8\%$ p.a.

The interest $I = 8\%$ on Rs.21,500.

$$= \frac{8}{100} \times 21,500 = \text{Rs. } 1720.$$

The interest to be paid at the end of the year is Rs. 1,720.

The total amount to be paid after a year

$$A = P + I$$

$$= \text{Rs.}21,500 + \text{Rs.}1720$$

$$= \text{Rs.}23,220$$

The amount to be paid at the end of the year is Rs.23,220.

- 2) $P = \text{Rs. } 2,800$, $I = \text{Rs. } 240$ and $T = 3$. Need to find $R\%$?

$$I = \frac{P \times T \times R}{100}$$

$$240 = \frac{2,800 \times 3 \times R}{100}$$

$$R = \frac{240 \times 100}{2,800 \times 3}$$

$$R = \frac{24,000}{8,400} = 2.85\% \text{ (approx)}$$

The interest rate on the borrowed loan is 2.85%(approx.)

- 3) Given $P = \text{Rs.}6,360$

Interest $I = \text{Rs.}1378$

$T = 2$ years 6 months = 2.5 years

$$I = \frac{P \times R \times T}{100}$$

$$1378 = \frac{6360 \times R \times 2.5}{100}$$

$$\text{Rate of Interest } R = (1378 \times 100) / (6360 \times 2.5) \\ = 8.66 \%$$

Hence, the Simple Interest Rate is 8.66 %

4) Let P be the Principal. In 16 years, P becomes 3 P

Which means that Interest $I = 3P - P = 2P$

But we know $I = PRT / 100$

$$2P = P \times R \times 16 / 100$$

$$R = 2 \times 100 / 16$$

$$R = 200 / 16 = 12.5 \%$$

Hence, the Principal will triple in 16 years at a simple interest of 12.5%.

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Questions to Assess	Comparing Quantities	

MS_Discount

In big shops we see price tags of the articles. Do you know how we call them? This is called Market price or list price of the article.



Market price: The Market price is the current price at which an asset can be sold.

The retailer is supposed to sell the item, at this price. This Market price is also called List price or Catalog price.

Discount: Sometimes to increase the sale or to clear the old stock, the retailer offers a certain percent of discount on the Market price.

The percentage of discount is calculated on the Market price.

Selling price: The amount, the purchaser actually pay for the article at the time of purchase is called selling price of the article.

Thus, Selling price = Market price – Discount

For example,

1) Shamitha went to a shop to buy a dress. Market price of the dress is Rs 1,250. But shop owner gave her a discount of 8%. How much amount does Shamitha pay to buy the dress?

Discount is always given on the printed price (Market price).

$$\text{Thus, Discount} = 8\% \text{ of } 1,250 = 1250 \times \frac{8}{100} = 100$$

Selling price = Market price – Discount

$$= 1250 - 100 = 1,150$$

Shamitha paid Rs 1,150 to buy the dress.

2) A dress costing Rs 5,600 is being sold for Rs 4800. Find the discount and discount percentage.



Discount is calculated on Market price. So we take Market price as base.

Discount = Rs 5,600 – Rs4, 800 = Rs 800

Let discount percent be x.

On the Market price of Rs 5,600, discount is Rs. 800

On the Market price of Rs 100, discount is Rs. x

$$5600:800 = 100:x$$

$$5600x = 800 \times 100 = 80,000$$

$$x = \frac{80000}{5600} = 14.3$$

The discount is Rs 800 and discount percent is 14.3.

Successive Discount: Assume that an article has been discounted by 20% and then again discounted by 10%. It is called successive discount. Is it equivalent to a discount of 30%?

No.

Let us consider one example.

Two successive discounts 15% and 10% are given on the purchase of a bag. If the market price of the bag is Rs 2,500, Find a) Its selling price b) Find the single discount percentage equivalent to these two discounts

Solution:

a) Market price of the bag is Rs 2,500.

First discount = 15% of Rs 2,500 = $\text{Rs } \left(\frac{15}{100}\right) \times 2500 = \text{Rs } 375$

Price after the first discount = $\text{Rs } 2,500 - \text{Rs } 375 = \text{Rs } 2,125$.

Second discount = 10% of Rs 2,125 = $\text{Rs } \left(\frac{10}{100}\right) \times 2125 = \text{Rs } 212.50$

Price after second discount = $\text{Rs } 2,125 - \text{Rs } 212.50 = \text{Rs } 1,912.50$

Net selling price = Rs 1,912.50.

b) Single discount equivalent to these discounts = $\text{Rs } 2,500 - \text{Rs } 1,912.50 = \text{Rs } 587.50$

Let x be the percentage discount corresponding to these two successive discounts.

Then, $100 : x = 2500 : 587.50$

$587.50 \times 100 = 2500 \times x$

$x = \frac{587.50 \times 100}{2500} = 23.5$

Percentage discount equivalent to the given two successive discounts of 15% and 10% is 23.5%. It's not $15 + 10 = 25\%$

Image Source: Original Contribution by saithri@yahoo.co.in

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Main Script	Comparing Quantities	Cost price and Selling price

QA_Find the discount

1) Fill in the blanks

- a) A table marked at Rs. 15,000 is available for Rs. 14,400. The discount and discount percentage are respectively Rs. ____ and ____
- b) An article marked Rs. 900 is sold for Rs. 765. The percentage of discount is ____
- c) An Almirah is sold at Rs. 5,225 after allowing a discount of 5%. Its Market price is ____
- d) Sonam bought a mobile phone for Rs. 5,100, after getting a discount of 15%. Its Market price was ____

Solutions:

- a) Rs. 600 and 4%
- b) 15
- c) Rs. 5,500
- d) Rs. 6000

2) A shop gives 20% discount. Find the selling price of each item listed and the total bill

Item	Market price in Rs	Selling price in Rs
A dress	1200	
A pair of shoes	1500	
A bag	800	

Solution:

$$\text{Selling Price of the dress after 20\% discount } 1200 \times \frac{80}{100} = \text{Rs } 960$$

Similarly, Selling Price of the pair of shoes = Rs 1200 and selling price of the bag = Rs 640

Total: $960 + 1200 + 640 = \text{Rs. } 2800$

Item	Market price in Rs	Selling price in Rs
A dress	1200	960
A pair of shoes	1500	1200
A bag	800	640
Total bill:		2800

3) Swathi went to a shop to buy a dress. It's Market price is Rs. 2000. Shop owner gives 10% discount on it. On further insistence, he gives 5% more discount. What will be the final discount and discount percentage she obtained? Will it be equal to a single discount of 15%?

Solution:

$$10\% \text{ of Rs. } 2000 = \text{Rs. } \left(\frac{10}{100}\right) \times 2000 = \text{Rs. } 200$$

After 10% discount,

$$\text{Market price} = \text{Rs. } 2,000 - \text{Rs. } 200 = \text{Rs. } 1,800$$

$$5\% \text{ of Rs } 1800 = \text{Rs. } \left(\frac{5}{100}\right) \times 1800 = \text{Rs. } 90$$

After the second discount,

$$\text{Market price} = \text{Rs } 1800 - \text{Rs. } 90 = \text{Rs. } 1,710$$

$$\text{Total discount} = \text{Rs } 2,000 - \text{Rs. } 1,710 = \text{Rs. } 290$$

(Or another way of calculating total discount = Rs. 200+ Rs. 90= Rs 290)

Let the discount percentage equivalent to these two successive discounts be x.

When Market price is Rs. 2,000, discount is Rs. 290.

When Market price is Rs. 100, discount is Rs. x.

Thus, 100: x = 2,000: 290

$$2000 \times x = 290 \times 100$$

$$x = \frac{290 \times 100}{2000} = \frac{29000}{2000} = 14.5$$

The discount percentage equivalent to two successive discounts is 14.5.

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Questions to Assess	Comparing Quantities	Discounts

VC_Value from a Percentage

We have just learnt that a way of comparing quantities is percentage. Percentages are numerators of fractions with denominator 100. Percentage is also used for increase or decrease of a certain quantity or to estimate the profit or loss in certain transactions in terms of percentage in daily life. We use it widely on a daily basis.

Children, let me tell you a story:

There were two brothers. One was a honest, nice and kind man. He devoted 50% of his waking time in his business treating his customers well with love and respect; 25% quality time with his family and friends with love and affection. And the balance 25% of his waking time in reading good books, prayers, helping the needy and other miscellaneous jobs. He became a very successful businessman.

The other was totally different person. 50% of his waking time was spent in gambling. With the result, 25% was spent in drinking, and the rest of the 25% was spent with bad company, roaming around the streets with them. He never did anything useful. He was looked down upon by all.

For everybody it was a surprise that two brothers born to the same parents turned out to be so different in character. When asked, they gave the following answers:

The first one replied, "I became like this due to my childhood. When I was a little boy, I used to see my dad drunk and doing all the wrong things. I decided that that is not what I wanted to be".

The second brother replied, "I became like this due to my childhood. When I was a little boy, I used to see my dad drunk and doing all the wrong things. So I became like this".

The teacher can start a discussion on this:

1. What percentage of time, out of 24 hours was utilised by each brother, to channelise their emotions so that it translates into Good behaviour?
2. If you were in those boys' position, what would have been your reaction?

Let the children come out with their views.

The teacher can summarise:

- Children! It is not the situation that determines our life, but how we respond to it.
- What happens to us is just 10% of life. How we respond to the situation decides 90% of our life.
- We have no control over 10% of what happens to us. However, we have control over the other 90%. We can always choose how we respond. This is called 90-10

principle.

1. So irrespective of your circumstances, the parents you are born to, the neighborhood you grow in, etc, strive hard to become a good human being first and then accomplish success in your chosen line of career.

1. Never allow your circumstances to defeat you or turn you into a negative person.

Time to teach	Asset type	Value	Sub Value
3 minutes	Value Content	Right Action	Good Behaviour

Master Lesson Plan

Seven Asset Methodology for MLP

What is the purpose of this Master lesson Plan?	This Master Lesson Plan (MLP) prepared by Sri Sathya Sai Vidya Vahini (SSSVV), covers the entire chapter for the given board. The MLP for the chapter given in the textbook is broken down into smaller modules known as assets. Any chapter can be taught using the 7 asset types in SSSVV methodology. Several different assets together complete the entire chapter. Depending on the requirement, each asset is supported by teaching aids such as animated presentation, audio, video, and learning aids such as worksheets. The MLP is for the teacher's preparation and the teaching aids are for use in the classroom.
How to use it?	You can prepare for your class with this MLP by following 3 simple steps: 1. Read your textbook; 2. Go through the information given in the assets (document & multimedia); 3. Prepare your teaching notes. Great! Now you are ready to transact the chapter.
Duration	Kindly note the duration given for each asset. Due care has been taken in planning the assets, to ensure the chapter is completed within the time specified by the Board. Note: Preparation time is not included in the asset duration. The teaching time depends on the duration of the teaching aids and is not impacted by the length of the MLP.
What is a 'Main Script' (MS) Asset?	The Main Script asset is there for explaining the main concepts of the chapter clearly. The information given in the textbook is simplified, organised and structured to give more clarity. Additionally, you may find a video or mnemonics or a graphic organiser to deepen the understanding of the concept.
How to teach using the MS asset?	Please use the blackboard, slides and interaction to develop the concept.
What is an 'Inquisitive Questions' (IQ) asset?	The Inquisitive Questions asset uses questions to promote higher order thinking like the n^{th} why, what-if, new perspectives, cause-effect, and others, creating curiosity.
How to teach using the IQ asset?	You may use the questions to connect with the students, encourage exploration to engage them in the learning process. You may allow multiple responses and instead of rejecting any of the responses, ask why, before revealing the suggested answer or hints.
What is a 'Day to day Relevance' (DD) Asset?	The Day to Day Relevance asset helps students understand the practical relevance of every topic, making them eager participants in the classroom. If students connect the concepts to their environment, they would learn meaningfully without dislike or simply memorizing for exams.

How to teach using the DD asset?	You may use the asset by asking questions about their experience and use it to establish why they are learning the topic. If necessary you may substitute with a recent or local example.
What is an 'Interesting Aside' (IA) asset?	The Interesting Aside asset uses attention grabbing titbits or anecdotes to bring joy and satisfy the child's hunger to know more. This is a quick/short asset intended to bring attention back to the main concept being taught.
How to teach using the IA asset?	You may use this asset to give a piece of interesting information relevant to the topic, without prolonged explanation/discussion. You may suggest appropriate books for further reading.
What is a 'Suggested Activity' (SA) Asset?	The Suggested Activity asset provides a detailed step by step procedure for the teacher to conduct a hands-on activity. This promotes Activity Based Learning.
How to teach using the SA asset?	You may use this asset to energise your students to learn by doing simple, fun-filled activities based on the topic. The asset includes - preparation, activity, and follow-up. You may engage the students in the preparation and follow-up stages to develop collaboration and responsibility. You could try it once, yourself, before the actual delivery to be more comfortable with it. Note: The duration mentioned in the asset is usually for the activity part only.
What is a 'Value Content' (VC) Asset?	The Value Content asset integrates Universal Human Values (such as empathy, inclusivity, respect for nature that translates into responsible behaviour) seamlessly into the curriculum, as the "End of education is character".
How to teach using the VC asset?	You may use this asset to engage with the students to bring out their innate values and connect with the intrinsic values in the topic/concept. The asset includes pointers on the specific pedagogical technique followed.
What is a 'Questions to Assess' (QA) asset?	The Questions to Assess asset uses an interactive approach to check learning of different types of learners, and provides feedback to the teacher for appropriate action. The questions cater to all the levels of Bloom's Taxonomy. Questions from 'Apply' level and above enable students to reflect on their learning.
How to teach using the QA asset?	You may go through the slides to understand its flow and know when to click for the answer (slides include suggested answers). While presenting in the class, you may display the question and encourage multiple responses, before revealing the answer. In some cases, this asset may include extra questions/worksheet that can be given as homework.