

Class: 8	Subject: Mathematics	Topic: Exponents and Powers
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SUMMARY SHEET		
Learner Previous Knowledge	• Introduction of exponents through large numbers (upto 999) • Exponents related to negative numbers • Relate exponential notation with respect to numeric and algebraic term • Laws of exponents • $a^m \times a^n = a^{m+n}$ • $a^m \div a^n = a^{m-n}$ • $(am)^n = a^{mn}$ • $a^m \times b^m = (ab)^m$ • $\frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$ • $a^0 = 1$ (where a not equal to 0)	
Target Knowledge for this Topic	Powers with negative exponents. • $a^{-m} = \frac{1}{a^m}$ • $a^m = \frac{1}{a^{-m}}$ • Laws of exponents • Decimal number system and writing large numbers in scientific notation • Know when to use exponential notation and when to use scientific notation	
Learning Goals		Taxonomy Level
<i>More Complex Learning Goal- Students will be able to solve complex problems on exponents and powers.</i>		Generalizing
<i>Target Learning Goal- Students will be able to solve questions of exponents having negative powers</i>		Executing
<i>Simpler Learning Goal- Students will be able to recapitulate laws of exponents</i>		Recalling
Period No.	Lesson Objectives	Teaching Learning Materials Required
1 and 2	• Recall laws of exponents & other concepts of exponents	• Pre assessment Quiz: Worksheet-1 (1 per student); Projector (1 per class)

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Period 1 and 2

Lesson Objectives

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

- Recall laws of exponents & other concepts of exponents.

Teaching Learning Materials required

- Pre assessment Quiz: Worksheet-1** (1 per student); Projector (1 per class)

Details of Teaching Learning Experience

Seating Arrangement: - In groups of 4 to 6

Lesson Beginning <u>Time:</u> 20 min <u>Purpose:</u> Activate the prior knowledge Pre-assessment	<u>Pre-assessment Quiz/Groups</u> - Distribute a pre-assessment quiz Worksheet-1 to each student and ask them to read & attempt the exercise by discussing with their group members. - Give them 20 minutes to complete the Exercise. <i>Note: The students can discuss with their group members but work in their individual sheets.</i>
Lesson Middle <u>Time:</u> 35 min <u>Purpose:</u> Recapitulation Develop the conceptual understanding	<u>Whole Class – Discussion</u> - Project Worksheet-1. - Ask a few students at random to share the answers. - Build a class 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. The intent here is to revisit all the concepts studied in previous grade.</i> <u>Powers with Negative exponents</u> Teacher will explain this concept with and discuss questions on pg 197-Exercise 12.2 of NCERT Textbook Teacher will discuss their doubts, if any

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

Lesson EndTime: 15 minPurpose:

Finish up

Use of exponents to express small numbers in standard form

Teacher will take some facts and explain how to write large numbers in standard form.

What is the use of exponents in real world?

How is exponents related to expressing large distances?

Home Assignment

- Tell the students to practice questions on pg 200- Exercise 12.2 of NCERT Textbook.

Name: _____

Worksheet-1**Skill: Problem Solving****Pre-assessment Quiz**

Directions: Read the statements and answer the questions:

1. In 10^5 the power is _____ and the base is _____
2. 10,000 can be written in exponent form as _____
3. 125 in exponent form (with base 5) can be written as _____
4. 729 as power of 3 can be written as _____
5. $100^2 =$ _____
6. Which number is greater 2^3 or 3^2 ? _____
7. Express 64 in exponential form with base 8 as _____
8. When we take 3 as base to express the number 243, what will be the power?

9. What is the value of $(-2)^4$? _____

10. Express $a \times a \times a \times a \times b \times b \times b \times c \times c \times c \times c$ in exponential form.

11. Complete the laws of exponent

- $a^m \times a^n = a$
- $a^m \div a^n = a$
- $(a^m)^n = a$
- $a^m \times b^m = (ab)$
- $a^0 =$ _____
- $(-1)^{\text{even number}} =$ _____
- $(-1)^{\text{odd number}} =$ _____

12. Express 54672 in exponential form using powers of 10.

13. Express 54672 in scientific notation.

14. Using the laws of exponents, simplify & write the answer in exponential form

(a) $3^2 \times 3^4 \times 3^8$

(b) $6^{15} \div 6^{10}$

(c) $(5^2)^3 \div 5^3$

(d) $a^4 \times b^4$

15. Simplify:

$$\frac{(2^{10}) \times 7^3}{8^3 \times 7}$$

a)

$$\frac{3^5 \times 10^5 \times 25}{5^7 \times 6^5}$$

(b)

16. Express the numbers in exponential form using power of 10

a) 47561=

b) 104278 =

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