

LESSON PLAN
MATHEMATICS VIII
CH 12 EXPONENTS AND POWERS

Unit	Powers and Exponents (Chapter 12: Exponents and powers)
Class Transaction	Total: 4 periods (approx. 40 min each)
Pre-requisite for the course	This lesson requires 1. Basic knowledge of concept of exponents. 2. Knowledge of basic laws of exponents. 3. Knowledge of exponents.
Assessment of qualifying knowledge	1. Written test 2. Lab activity 3. HW notebook
Objective	Students would be able to identify the difference between various types of laws and develop skills of applying various laws of exponents, thereby inculcating competencies like collaboration, critical thinking and creativity
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will develop the ability to understand</i> • Compare very small and very large numbers • Use exponents to express small numbers in standard form • The laws of exponents. • Apply the laws of exponents for evaluating positive and negative components. SKILLS and COMPETENCIES- <i>Students would be able to</i> • Develop the ability to analyze and differentiate between various laws of exponents. • Perform numerical skills like simplifications using laws and develop critical thinking and collaboration in the process.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies used- Inductive deductive reasoning, Muddiest point of discussion, think pair share, graphic organizer, brain storming Dimensions of learning- D1, D3 Transaction would proceed in the following manner- Brain Storming-The class would start with a discussion on what the students have already learnt in the previous classes and hence what is it that they would learn now. They would also be told the significance of the topic that they would be studying. <i>Introduction of the topic</i>- ppt and Digital Content would be shared

	<i>Guided practice followed by Independent Practice-</i> NCERT questions to be discussed in the classroom. Techniques to be used: Quiz Daily Practice Problem MCQ Peer Assessment Case Studies Lab Activities Any Other						
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar						
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks . H.W. notebooks to be marked as per the given plan: <i>Assessment Parameters:</i> The total marks for the activity is 5 marks On time submission.....1 mark Presentation/ Neatness.....1 mark Content.....3 marks It is also advised that the students come to the class with proper background knowledge of the topic under discussion. They can refer to the resources stated above.						
Assessments	Through Pen Paper Test Students will be assessed creatively and critically <table> <tr> <td>4 UNIT TESTS</td> <td>20 Marks each</td> </tr> <tr> <td>HALF YEARLY EXAMINATION</td> <td>80 Marks</td> </tr> <tr> <td>ANNUAL BOARD EXAMINATION</td> <td>80 Marks</td> </tr> </table> INTERNAL ASSESSMENT 10 Marks - Note Book Submission 05 Marks - Lab Practical (Subject Enrichment) 05 Marks Through lab Practical Students are assessed for Collaboration, Character building, Character Building	4 UNIT TESTS	20 Marks each	HALF YEARLY EXAMINATION	80 Marks	ANNUAL BOARD EXAMINATION	80 Marks
4 UNIT TESTS	20 Marks each						
HALF YEARLY EXAMINATION	80 Marks						
ANNUAL BOARD EXAMINATION	80 Marks						
Addressing Classroom Diversity	Due to various social backgrounds and multiple intelligences, the classroom might be a diverse arena. The following techniques can be used for various groups:						

	<i>For gifted students:</i> • HOTS questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes and formulae, if not written • Call parents at regular intervals • Provide grade-up classes • Encourage and motivate them at every level.
Marks	The weightage would be given by CBSE.

ASSESSMENT QUESTIONS

1. Find the value of $5^{-3} * 1/5^3$.
2. Simplify $2^5 / 2^{-6}$.
3. Express 4^{-3} as a power with base 2.
4. Simplify and write the answer in exponential form: $(2^5 / 2^8)^5 * 2^{-5}$.
5. Find 'm' so that $(-3)^{m+1} * (-3)^5 = (-3)^7$.
6. Find the value of $(2/3)^{-2}$.

DAY	ONE
Objective	To illustrate the difference between negative exponents and positive exponents, laws of exponents.
Assessment of qualifying knowledge	knowledge testing on negative and positive exponents.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will know and identify positive and negative exponents <u>SKILLS</u> and <u>COMPETENCIES</u> Students would be able to Reason effectively and critically apply laws of exponents.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies used- Inductive deductive reasoning, Muddiest point of discussion, brain storming Dimensions of learning- D1, D3 Transaction would proceed in the following manner- Anticipatory Set: 10 min Facilitator will ask few questions to introduce the topic • What is a base? • What is power? • What are exponents? • What are laws? • What is the Difference between negative and positive exponents? • How to compare two exponents? • How to express very large/ small numbers in powers? Discussion of topic through Collaborative Learning: 15 min <u>Inquiry based learning</u> (Critical Thinking and Problem Solving) Students would be asked to write different laws of exponents and identify base and power in an exponent. The facilitator would take rounds and ensure that each learner is engaged. Guided practice: 10 min The students will solve the questions from NCERT book, solved examples before Ex 12.1 in their notebook in the class with the help of their facilitator. The facilitator would take rounds and help the students in solving the questions. Independent Practice: Students will go through the solved examples before Ex 12.1 of NCERT text book. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home	Independent Practice: Students would do the given questions in their H.W.

Work, Assignments	notebooks.
Assessments	Oral Test (5 minutes)
DAY	TWO
Objective	Recapitulation of laws of exponents through Smart class module: Law of multiplication, law of division, the law of power of a power in communicative and collaborative manner .
Assessment of qualifying knowledge	Written questions on laws of exponents.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will know and Demonstrate the ability to find numbers between any two given numbers <u>SKILLS and COMPETENCIES</u>- Students will be able to differentiate and classify various laws of exponents in collaboration with each other.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies used- Inductive deductive reasoning, Muddiest point of discussion Dimensions of learning- D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Brainstorming on the previously taught concept would be done. Discussion of topic through Collaborative Learning: 15 min (Critical Thinking, Collaboration) An quick quiz will be taken and students will be asked to write laws of exponents Guided practice: 15 min The students, with the help of the facilitator, will solve the questions from NCERT book of Exercise – 12.1 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts of Exercise 12.1 in their Math HW notebook. Students who would difficulty in solving the problem would solve with the help of their buddies. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks
Assessments	Oral quiz (5 minutes)
DAY	THREE
Objective	To enable students to express large numbers in standard form and make them able to do comparison of very small and very large numbers to be explained

	using practical and real life examples.
Assessment of qualifying knowledge	Written questions and home work notebooks.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will develop the ability to understand the relationship between laws of exponents and powers. <u>SKILLS and COMPETENCIES</u> - Students would be able to critically apply the laws and concepts in various real life situations and collaboratively realize the fact that very small and large numbers can be easily compared using powers.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies used- Inductive deductive reasoning, think pair share Dimensions of learning- D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exercise 12.2 would be discussed and students would solve different questions per group and then the questions would be crosschecked. Digital content would be used. The facilitator would take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise – 12.2 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher’s guidance. Independent Practice: Students will complete the remaining HW parts of Exercise 12.2 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks
Assessments	MCQ (5 minutes)
DAY	FOUR
Objective	To solve the questions from NCERT book of Exercise – 12.2
Assessment of qualifying knowledge	Written test on powers.

Learning Outcomes	<u>KNOWLEDGE</u>- Students will develop the ability to understand the relationship between laws of exponents and powers. <u>SKILLS and COMPETENCIES</u> - Students would be able to critically apply the laws and concepts in various real life situations and collaboratively realize the fact that very small and large numbers can be easily compared using powers.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies used- Inductive deductive reasoning, Muddiest point of discussion, think pair share Dimensions of learning- D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Warming session would be taken. Discussion of topic through Collaborative Learning: 15 min (Critical thinking, communication) Solved examples from the book would be taken up. Brainstorming on classification of real number as rational and irrational would be done. Guided Practice: 20 min The students will solve the questions from NCERT book of Exercise – 12.2 in their notebook in the class with the help of their facilitator. The facilitator would explain the questions from Ex 12.2 with a collaborative approach towards them. Independent Practice: Students will complete the remaining HW parts of Exercise 12.2 in their Math HW notebook. Closure: 5 min Summarization, preferably by a student, would be taken to check proper assimilation of the topic discussed. .
Resources	Text Book: NCERT text book for Mathematics Reference Book CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks
Assessments	Written test (5 minutes)