

CLASS – X
LESSON PLAN
SOURCES OF ENERGY

Unit	SOURCES OF ENERGY
Class Transaction	Total: 6 periods (approx. 40 min each)
Pre-requisite for the course	Students will be able to recall different sources of energy and difference between conventional and non -conventional sources of energy.
Assessment of qualifying knowledge	1. Written test 2. Lab activity 3. Group Discussion 4. HW notebook 5. Subject enrichment activity
Objective	To develop scientific temper and inquisitiveness in students. Also students will be able to apply and relate learned concepts in their daily lives. Given the content (chapter) the learners will be able to describe different conventional and non-conventional sources of energy , ways of harnessing energy from them, their advantages and disadvantages by drawing compare contrast matrix in their notebook with 90% accuracy.
Learning Outcomes	<u>KNOWLEDGE-</u> Students will be able to • Students will be able to list characteristics of a good source of energy • Students will be able to compare various sources of energy • Students will understand the working of thermal and hydro power plants. • Students will understand the working of solar cooker, biogas plant and wind mills. • Students will recognize the need for using non-conventional energy resources. • Students will understand the working of energy from oceans, geothermal energy and nuclear power plants. • Students will be able to discuss ways of managing energy crisis. <u>SKILLS & COMPTENCIES-</u> <i>Students would be able to</i> • Critically analyse to list characteristics of a good source of energy • Collaborate in groups to compare various sources of energy • Appreciate the importance of using non-conventional energy resources. collaboratively • Design Creative methods to discuss ways of managing energy crisis , also built character amongst themselves by discussing /communicating the importance of using energy sources judiciously. • Answer knowledge, understanding, application and diagrammatic skill

	based questions based on the topic. <u>ATTITUDES AND BELIEFS-</u> <i>Students will be able to</i> Develop character by visualizing and observing ways of harnessing different sources of energy, their advantages and disadvantages collaborating with others in discussing details of different sources of energy and sensitizing others about the energy crisis and need of using energy sources judiciously.
DOL	D1,2,3
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- Active learning- The students will be shown a PPT and will be made aware of energy crisis and different sources of energy. (Critical thinking) Group learning: The students will be divided into eight groups. - The students will perform activity given in NCERT regarding listing about characteristics of a good source of energy. - Each group will be assigned one source of energy. Differentiation- The students will study one source of energy in expert group and then will teach it to peers by presentation and then revising all sources of energy using concept map. (Character, communication, Citizenship) Questioning- <i>Multiple level question-</i> Teacher will prepare a list of question about the topic and will ask these questions during discussions. (Critical thinking, Communication) <i>Brain Storming-</i>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, Exemplar, spiral questions to be discussed in the classroom. Techniques to be used: Set induction Class discussion' Quiz Daily Practice Problem MCQ Peer Assessment

	Case Studies Lab Activities Graphic Organizers for different terms Lesson progress using Smart Class Think Pair Share for solving numerical Mind Mapping for lesson summarization Muddiest Point and One Minute Paper for Closure Any Other
Resources	Text Book: NCERT text book for Science Reference Book NCERT Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the questions in their H.W notebooks as mentioned in the monthly planner. HW 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	3 UNIT TESTS (20, 30, 30).....80 Marks MID TERM EXAMINATION.....80 Marks HALF YEARLY EXAMINATION.....80 Marks PRE BOARD-I EXAMINATION80 Marks PRE BOARD-II EXAMINATION..... 80 Marks ANNUAL BOARD EXAMINATION.....80 Marks PERIODIC TEST By administering pen paper test we assess creativity and critical thinking. Average of the best two tests to be taken that will have a weightage of 10 marks. Best 2 Tests out of: Units tests, Midterm examination, Half Yearly examination. INTERNAL ASSESSMENT20 Marks Periodical Test 10 Marks By administering pen paper test we assess creativity and critical thinking. Subject Enrichment 05 Marks With the help of subject enrichment activities we assess communication ,collaboration, character building and citizenship(peer teaching /lab activity

	of drawing ray diagrams Note Book Submission 05 Marks By writing the answers of three levels of difficulty question we can assess their knowledge (remembering type questions) critical thinking(analytical questions), creativity(HOT questions)
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> • HOT questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Simple remembering type questions to be completed • 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
Marks	The weightage would be given by CBSE.
Questions	1. Give two characteristics of a good source of energy? 2. Which country is known as ‘Country of Winds’? 3. Give two examples of fossil fuels. 4. What are solar panels? Write three uses of solar panels. 5. Name four gases mainly present in bio gas.

Topic	DAY 1-Characteristics of a good source of energy
Class Transaction	40 min each
Pre-requisite for the course	Students will be able to recall different sources of energy and difference between conventional and non conventional sources of energy.
Assessment of qualifying knowledge	Facilitator asks the students to recall • What is energy? • Name different sources of energy? • Give examples of renewable and non-renewable sources of energy. • Give examples of conventional and non-conventional sources of energy. • Give examples of exhaustible and inexhaustible sources of energy.
Objective	Students will be able to

	Appreciate the role of energy and hence different sources of energy in our daily lives. Understand the characteristics of a good source of energy.
Learning Outcomes	KNOWLEDGE- <i>Students will know and understand</i> • The importance of energy. • Appreciate the role of source of energy and its features. SKILLS AND COMPETENCIES- <i>Students would be able to</i> • Critically analyse different sources of energy as conventional and non-conventional. • Appreciate the importance of using non-conventional sources of energy collaboratively. ATTITUDES AND BELIEFS- <i>Students will be able to</i> Develop Character by Collaborating in groups to study the terms associated with sources of energy and sensitizing others to use energy judiciously.
DOL	D1,2,3
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- • Differentiation- The students will be divided into eight groups. • The students will perform activity given in NCERT regarding listing about characteristics of a good source of energy. • Each group will be assigned one source of energy. • Each group will brain storm and discuss the energy source assigned to them. (Character, Collaboration) Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom. Techniques to be used: Peer Assessment Student -teacher interaction, Wipro- G.O.s(compare- contrast matrix), silent/ loud reading, collaborative learning
Resources	Text Book: NCERT text book for Science. Reference Book NCERT Exemplar
Closure	Involving students in summarizing by asking them to prepare questions based on the topic.
Self Study, Home Work, Assignments	Independent Practice: Different types of questions
Assessments	Assessment of work done by various groups on the basis of content, communication, collaboration, time management and message given by each group to sensitize others.
Addressing Classroom	Due to various social backgrounds and multiple intelligences, the classroom might be a diverse arena. The following techniques can be used

Diversity	for various groups: <i>For gifted students:</i> • HOT questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Simple remembering type of questions to be completed • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes. • Call parents at regular intervals • Provide grade-up classes
-----------	---

Topic	DAY 2 – Conventional Sources of energy
Class Transaction	40 min each
Pre-requisite for the course	This topic requires basic idea about features of a good source of energy which students had already learnt in previous class.
Assessment of qualifying knowledge	Facilitator asks the students to recall energy, calorific value, ecofriendly, easy to transport etc
Objective	Student will be able to discuss about conventional sources of energy like thermal energy and hydel energy.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> • The importance of using energy and fuels like coal, petroleum responsibly. • Appreciate the importance of using hydel energy and problems associated with big river valley projects. <u>SKILLS AND COMPETENCIES</u>- <i>Students would be able to</i> • Creatively draw the diagrams for different ways of harnessing energy. • Appreciate the importance of using hydel energy and problems associated with big river valley projects collaboratively. <u>ATTITUDES AND BELIEFS</u>- <i>Students will be able to</i> • Develop Character by Collaborating in group. and sensitizing others using energy and fuels like coal, petroleum responsibly.
DOL	D1,2,3
Transaction Methodology (The teacher can use the mentioned	Transaction would proceed in the following manner- Active learning- Each group of students will read the assigned source of energy in the class with the help of their teacher. They will draw out conclusions about ways

techniques, wherever applicable, and can use any other too.)	of harnessing given energy source, advantages and disadvantages in using it. Group dynamics and rules associated with group presentation and organization for science symposium /presentation will be explained and rubrics for assessment for group work will be discussed and formulated with the students. (Communication, Collaboration) Differentiation- The students will sit in their respective groups. Students will assign roles of leader, presenter, collector and time keeper. The students will prepare their group presentations and teacher will explain the use of talking stick, noise-meter on the board. First group will give their presentation. (Character, Citizenship) Guided practice followed by Independent Practice- Students will research and collect information on the topic assigned to their group. Techniques to be used: Peer Assessment Student -teacher interaction, Wipro- G.O.s(compare- contrast matrix), collaborative learning
Resources	Text Book: NCERT text book for Science. Reference Book NCERT Exemplar
Closure	Involving students in summarizing by asking them to prepare questions based on the topic.
Self Study, Home Work, Assignments	Independent Practice: Different types of questions
Assessments	Assessment of work done by various groups on the basis of content, communication, collaboration, time management and message given by each group to sensitize others.
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> • HOT questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Simple remembering type of questions to be completed

	• Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes. • Call parents at regular intervals • Provide grade-up classes
--	--

Topic	DAY 3 – Conventional Sources of energy contd..
Class Transaction	40 min each
Pre-requisite for the course	This topic requires basic idea about thermal energy which students had already learnt in previous class.
Assessment of qualifying knowledge	Facilitator asks the students to recall energy, calorific value, ecofriendly, easy to transport etc
Objective	Student will be able to discuss about conventional sources of energy like hydel energy.
Learning Outcomes	<u>KNOWLEDGE-</u> <i>Students will know and understand</i> • The importance of using energy and fuels like coal, petroleum responsibly. • Appreciate the importance of using hydel energy and problems associated with big river valley projects. <u>SKILLS AND COMPETENCIES-</u> <i>Students would be able to</i> • Creatively draw the diagrams for different ways of harnessing energy. • Appreciate the importance of using hydel energy and problems associated with big river valley projects collaboratively. <u>ATTITUDES AND BELIEFS-</u> <i>Students will be able to</i> • Develop Character by Collaborating in group. and sensitizing others using energy and fuels like coal, petroleum responsibly.
DOL	D1,2,3
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- Active learning- Each group of students will read the assigned source of energy in the class with the help of their teacher. They will draw out conclusions about ways of harnessing given energy source, advantages and disadvantages in using it. Group dynamics and rules associated with group presentation and organization for science symposium /presentation will be explained and rubrics for assessment for group work will be discussed and formulated with the students. (Communication, Collaboration)

	Differentiation- The students will sit in their respective groups. Students will assign roles of leader, presenter, collector and time keeper. The students will prepare their group presentations and teacher will explain the use of talking stick, noise-meter on the board. Second and third group will give their presentation. (Character, Citizenship) Guided practice followed by Independent Practice- Students will research and collect information on the topic assigned to their group. Techniques to be used: Peer Assessment Student -teacher interaction, Wipro- G.O.s(compare- contrast matrix), collaborative learning
Resources	Text Book: NCERT text book for Science. Reference Book NCERT Exemplar
Closure	Involving students in summarizing by asking them to prepare questions based on the topic.
Self Study, Home Work, Assignments	Independent Practice: Different types of questions
Assessments	Assessment of work done by various groups on the basis of content, communication, collaboration, time management and message given by each group to sensitize others.
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> • HOT questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Simple remembering type of questions to be completed • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes. • Call parents at regular intervals • Provide grade-up classes

Topic	DAY 4 – Non-Conventional Sources of energy Sun and Wind
Class Transaction	40 min each
Pre-requisite for the course	This topic requires basic idea about hydel energy and energy from biomass which students had already learnt in previous class.
Assessment of qualifying knowledge	Facilitator asks the students to recall hydel energy, charcoal as a fuel, biogas, manure etc
Objective	Student will be able to discuss about non-conventional sources of energy like solar energy and wind energy.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> • The importance of using solar energy • Appreciate the importance of using wind energy. <u>SKILLS AND COMPETENCIES</u>- <i>Students would be able to</i> • Creatively draw the diagrams for different ways of harnessing energy. • Appreciate the importance of using solar & wind energy and problems associated with harnessing both of them collaboratively. <u>ATTITUDES AND BELIEFS</u>- <i>Students will be able to</i> • Develop Character by Collaborating in group. and sensitizing others using solar energy, different solar energy devices and wind energy.
DOL	D1,2,3
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- Active learning- Each group of students will read the assigned source of energy in the class with the help of their teacher. They will draw out conclusions about ways of harnessing given energy source, advantages and disadvantages in using it. Group dynamics and rules associated with group presentation and organization for science symposium /presentation will be explained and rubrics for assessment for group work will be discussed and formulated with the students. (Communication, Collaboration) Differentiation- The students will sit in their respective groups. Students will assign roles of leader, presenter, collector and time keeper. The students will prepare their group presentations and teacher will explain the use of talking stick, noise-meter on the board. Fourth and Fifth group will give their presentation. (Character, Citizenship) Guided practice followed by Independent Practice- Students will research and collect information on the topic assigned to their group.

	Techniques to be used: Peer Assessment Student -teacher interaction, Wipro- G.O.s(compare- contrast matrix), collaborative learning
Resources	Text Book: NCERT text book for Science. Reference Book NCERT Exemplar
Closure	Involving students in summarizing by asking them to prepare questions based on the topic.
Self Study, Home Work, Assignments	Independent Practice: Different types of questions
Assessments	Assessment of work done by various groups on the basis of content, communication, collaboration, time management and message given by each group to sensitize others.
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> • HOT questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Simple remembering type of questions to be completed • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes. • Call parents at regular intervals • Provide grade-up classes

Topic	DAY 5 – Non-Conventional Sources of energy : Energy from oceans, geothermal energy
Class Transaction	40 min each
Pre-requisite for the course	This topic requires basic idea about solar energy and energy from wind which students had already learnt in previous class.
Assessment of	Facilitator asks the students to recall solar constant, green house effect, ,

qualifying knowledge	minimum wind speed required etc
Objective	Student will be able to discuss about non-conventional sources of energy like energy from ocean waves/tides/thermal and geothermal energy.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> • The importance of using ocean energy conversion system • Appreciate the importance of using geothermal energy. <u>SKILLS AND COMPETENCIES</u>- <i>Students would be able to</i> • Creatively draw the diagrams for different ways of harnessing energy. • Appreciate the importance of using OEC energy and problems associated with harnessing both of them collaboratively. <u>ATTITUDES AND BELIEFS</u>- <i>Students will be able to</i> • Develop Character by Collaborating in group. and sensitizing others using OEC energy, different OEC systems and geothermal energy.
DOL	D1,2,3
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- Active learning- Each group of students will read the assigned source of energy in the class with the help of their teacher. They will draw out conclusions about ways of harnessing given energy source, advantages and disadvantages in using it. Group dynamics and rules associated with group presentation and organization for science symposium /presentation will be explained and rubrics for assessment for group work will be discussed and formulated with the students. (Communication, Collaboration) Differentiation- The students will sit in their respective groups. Students will assign roles of leader, presenter, collector and time keeper. The students will prepare their group presentations and teacher will explain the use of talking stick, noise-meter on the board. Sixth and seventh group will give their presentation. (Character, Citizenship) Guided practice followed by Independent Practice- Students will research and collect information on the topic assigned to their group. Techniques to be used: Peer Assessment Student -teacher interaction, Wipro- G.O.s(compare- contrast matrix), collaborative learning
Resources	Text Book: NCERT text book for Science.

	Reference Book NCERT Exemplar
Closure	Involving students in summarizing by asking them to prepare questions based on the topic.
Self Study, Home Work, Assignments	Independent Practice: Different types of questions
Assessments	Assessment of work done by various groups on the basis of content, communication, collaboration, time management and message given by each group to sensitize others.
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> • HOT questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Simple remembering type of questions to be completed • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes. • Call parents at regular intervals • Provide grade-up classes

Topic	DAY 6 – Non-Conventional Sources of energy : Nuclear Energy ,energy crisis, concept map
Class Transaction	40 min each
Pre-requisite for the course	This topic requires basic idea about nuclear structure and nuclear reaction which students had already learnt in previous class.
Assessment of qualifying knowledge	Facilitator asks the students to recall different parts of an atom, difference between nuclear and chemical reaction etc
Objective	Student will be able to discuss about non-conventional sources of energy like energy from nuclear fission and fusion.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> • The importance of using nuclear energy • Appreciate the importance why fusion is better than fission.

	SKILLS AND COMPETENCIES- <i>Students would be able to</i> • Creatively draw the diagrams for different ways of harnessing energy. • Appreciate the importance of using nuclear energy in nuclear power plants and problems associated with using it in nuclear bomb collaboratively. ATTITUDES AND BELIEFS- <i>Students will be able to</i> • Develop Character by Collaborating in group. and sensitizing others about safety measures of using nuclear energy.
DOL	D1,2,3
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- Active learning- Each group of students will read the assigned source of energy in the class with the help of their teacher. They will draw out conclusions about ways of harnessing given energy source, advantages and disadvantages in using it. Group dynamics and rules associated with group presentation and organization for science symposium /presentation will be explained and rubrics for assessment for group work will be discussed and formulated with the students. (Communication, Collaboration) Differentiation- The students will sit in their respective groups. Students will assign roles of leader, presenter, collector and time keeper. The students will prepare their group presentations and teacher will explain the use of talking stick, noise-meter on the board. Eighth group will give their presentation. (Character, Citizenship) Guided practice followed by Independent Practice- Facilitator will draw blank concept map on board and will fill it, by taking clue/answers from students to summarise the complete topic. Techniques to be used: Peer Assessment Student -teacher interaction, Wipro- G.O.s(compare- contrast matrix), collaborative learning
Resources	Text Book: NCERT text book for Science. Reference Book NCERT Exemplar
Closure	Involving students in summarizing by asking them to prepare questions based on the topic.

Self Study, Home Work, Assignments	Independent Practice: Different types of questions
Assessments	Assessment of work done by various groups on the basis of content, communication, collaboration, time management and message given by each group to sensitize others.
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> • HOT questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Simple remembering type of questions to be completed • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes. • Call parents at regular intervals • Provide grade-up classes