

# APPENDICES

**APPENDIX- I**  
**LESSON PLANS USING**  
**WEB 2.0 TOOLS**

LESSON PLAN # 1

CLASS: IX

DATE:

SUBJECT: PHYSICS

TIMING:35 MIN

TOPIC: WORK AND ENERGY – INTRODUCTION

TEACHING METHOD: Using Web 2.0 Tools

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SPECIFIC OBJECTIVES

1. Learners will be able to define the term ‘work’ in scientific sense.
2. Learners will be able to differentiate between ‘work’ and ‘no work’ as per the scientific conception.
3. Learners will be able to cite examples from their daily lives as to what is work and what isn’t work.

TEACHING AIDS : Computer with internet connection.

PREVIOUS KNOWLEDGE : Meaning of ‘work’ in general sense; causes of motion; Force; Displacement

Sl. No.	Teaching Points	Teaching Strategy
1	Life processes of living beings	Ask the students to search for various kinds of pictures on ‘Google Images’ for ‘work’ and compile them in a slide
2	General definition of ‘work’	Based on the pictures they collected, ask the students to give a general definition of the term ‘work’
3	‘No work done’ as per science	<ul style="list-style-type: none"> <li>• Make one student try and move the wall. She won’t be able to. Say ‘ no work done according to science’</li> <li>• Make another student push a light table. She will be able to do it. Say ‘work is done according to science’</li> </ul>

		<ul style="list-style-type: none"> <li>• Ask a student to lift a heavy book for some time and not move. Say ‘ no work is done according to science’</li> <li>• Give similar examples if need be.</li> </ul>
4.	Work = Force + Motion	<ul style="list-style-type: none"> <li>• Ask the students to make slides listing points of differences in the above activities.</li> <li>• Probe questions till the terms ‘Force’ and Displacement come up.</li> </ul>
5	Scientific conception of work	<ul style="list-style-type: none"> <li>• Ask students to define the term ‘Work’ in their own words but including the terms ‘Force’ and ‘Displacement’</li> </ul>

#### RECAPITULATION:

- Ask each group of students to define ‘Work’ in their own words.
- Ask other groups to agree or disagree with the other group’s definitions.

#### EVALUATION

Give examples of work being done to learners. For each activity, ask the learners to reason out the responses.

- If the work is done, which is the force acting on the object?
- What is the object on which the work is done?
- What happens to the object on which the work is done?

## LESSON PLAN # 2

CLASS: IX

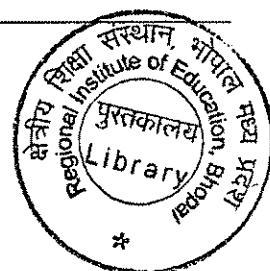
DATE:

SUBJECT: PHYSICS

TIMING:35 MIN

TOPIC: WORK AND ENERGY –WORK DONE BY A CONSTANT FORCE

TEACHING METHOD: Using Web 2.0 Tools



SPECIFIC OBJECTIVES

1. Learners will be able to understand work done.
2. Learners will be able calculate work done on an object given the force acting on it and displacement caused.
3. Learners will able to cite examples from their daily lives negative and positive work.

TEACHING AIDS : Computer with internet connection.

PREVIOUS KNOWLEDGE : Scientific conception of the term Work, negative and positive displacement

Sl. No.	Teaching Points	Teaching Strategy
1	Work done by a force	<ul style="list-style-type: none"><li>• “Work can be done in different ways”. Ask the students how.</li><li>• Ask the students to collect videos from YouTube with the title ‘same work, different forces’.</li></ul>
2	$W = F \times S$	<ul style="list-style-type: none"><li>• Inform the students “work is the product of force applied and displacement resultant.”</li><li>• Ask the students to apply this formula to different numerical values and interpret the results.</li></ul>
3	‘no work means no force or	<ul style="list-style-type: none"><li>• Ask the students to apply the formula to</li></ul>

	displacement or both'	<p>situations in which <math>F = 0</math> and <math>S = 0</math>. Interpret the results</p> <ul style="list-style-type: none"> <li>• Ask the students to cite examples from their daily lives where such a case is applicable.</li> </ul>
4	Unit of Work	<p>"The unit of work is <i>joule</i>". Ask the students to put numerical values of force and displacement such the one can define <i>joule</i> in terms of the units of force and displacement. They must add it to their slide.</p>
5	Negative and Positive Work Done	<ul style="list-style-type: none"> <li>• Ask the students to imagine a situation in which the displacement occurs opposite to the force. Here the displacement is negative.</li> <li>• Ask the students to put fictitious numerical values and find the work done.</li> <li>• The result thus obtained will have negative value. This is called negative work done.</li> <li>• Similarly, ask the students to find situations for positive work done.</li> <li>• Ask the students to define negative and positive work done, and give examples. "Illustrate using 'Google Images' search and add it to your slide"</li> </ul>

## RECAPITULATION

- Ask each of the groups to present their own summary of today's lesson.
- Ask other groups to agree or disagree with definitions.

## EVALUATION

- In how many ways can 18 J of work be done?
- Write an expression for the work done when a force is acting on an object in the direction of its displacement.



## LESSON PLAN #3

CLASS: IX

DATE:

SUBJECT: PHYSICS

TIMING:35 MIN

TOPIC: WORK AND ENERGY - ENERGY

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TEACHING METHOD: Using Web 2.0 Tools

### SPECIFIC OBJECTIVES

1. Learners will be able to define the term 'Energy'.
2. Learners will be able to explain how and object possessed with energy does work.

TEACHING AIDS : Computer with internet connection.

PREVIOUS KNOWLEDGE : Meaning of 'work' in general sense; causes of motion;  
Force; Displacement

Sl. No.	Teaching Points	Teaching Strategy
1	Sources of Energy	<ul style="list-style-type: none"><li>• Ask students to list different ways in which we obtain energy.</li><li>• Discuss and reason out how these sources are related to Sun. Add it to your slide</li></ul>
2	Energy does Work	<ul style="list-style-type: none"><li>• List different ways to in which an object possessing energy causes displacement.</li><li>• Also list ways in which work is not done even when an object possesses energy.</li></ul>
3	How does energy do work?	Students must observe activities compiled by the teacher from YouTube such as <ul style="list-style-type: none"><li>• a fast moving cricket ball hitting the stumps</li><li>• an object raised to a certain height does</li></ul>



		<p>work</p> <ul style="list-style-type: none"> <li>winding a toy car and pacing it on the floor, it moves</li> <li>balloon filled with air, when pressed gently, comes back to its shape, pressed harder, it bursts</li> </ul>
4	Definition of energy	<ul style="list-style-type: none"> <li>In all the activities that the students observed, ask them to put in words as to what was common.</li> <li>Probe till they say, “work is being done”.</li> <li>Hence ask the learners to define Energy</li> </ul>
5	Work is done by transfer of energy from one form to another	Using animations from YouTube, and accompanying explanation by the teacher, the students are made to understand that when we exert force, we in fact transfer our energy to that object, causing changes in it, which results in force.
6	Unit of Energy	<ul style="list-style-type: none"> <li>Inform the students that energy has been transferred and converted to work</li> <li>Hence the unit of energy is the same as that of work i.e. <i>joule</i></li> <li>Sometimes larger units of energy are used, called kilo joule (kJ)</li> </ul>

#### RECAPITULATION:

- Ask each group of students to define ‘Energy’ in their own words.
- Ask other groups to agree or disagree with the other group’s definitions.
- Ask each group to explain in fewest words the process of energy doing work.

#### EVALUATION

- How do you know that some entity is a form of energy?
- Are there sources of energy not due to the Sun?

## LESSON PLAN # 4

CLASS: IX

DATE:

SUBJECT: PHYSICS

TIMING: 35

MIN

TOPIC: WORK AND ENERGY – FORMS OF ENERGY

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TEACHING METHOD: Using Web 2.0 Tools

### SPECIFIC OBJECTIVES

1. Learners will be able to define the term Kinetic Energy.
2. Learners will be able cite examples of object possessing kinetic energy.
3. Learners will able to calculate the Kinetic Energy possessed by an object.

TEACHING AIDS : Computer with internet connection.

PREVIOUS KNOWLEDGE : Meaning of 'Energy', 'Motion', causes of displacement.

Sl. No.	Teaching Points	Teaching Strategy
1	Forms of Energy	Ask the students to discuss among the different forms of energy that they observe in their daily life.
2	Moving Energy	Show various compiled animations and videos from YouTube of moving objects <ul style="list-style-type: none"><li>• A rotating wheel</li><li>• A windmill</li><li>• A bullet piercing the target</li> <li>• A heavy ball falling on wet sand.</li><li>• A heavier ball falling on the same wet</li></ul>

		<p>sand.</p> <p>Ask the students “which depression is deeper?”</p>
3	More motion, more work	<p>Point to the students- faster moving objects can do more work.</p> <ul style="list-style-type: none"> <li>• Ask them to cite examples in support of the above statement</li> <li>• When convinced, ask them to add it to their slides, along with the examples.</li> </ul>
4	Definition of Kinetic Energy	In light of the above statement, ask each of the groups to come up with a definition of their own as to what they think is Kinetic Energy.
5	Work done by and object possessing Kinetic Energy	Guide the students to the derivation of the formula used to calculate the kinetic energy possessed by an object using a blackboard.

#### RECAPITULATION:

- Ask each group of students to define ‘Kinetic Energy’ in their own words.
- Ask other groups to agree or disagree with the other group’s definitions.

#### EVALUATION

- Give example of situations when an object does not possess kinetic energy.
- An object of mass 15 kg is moving with a uniform velocity of  $20 \text{ m s}^{-1}$ . What is the kinetic energy possessed by the object?

## LESSON PLAN #5

CLASS: IX

DATE:

SUBJECT: PHYSICS

TIMING: 35 MIN

TOPIC: WORK AND ENERGY- POTENTIAL ENERGY

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TEACHING METHOD: Using Web 2.0 Tools

### SPECIFIC OBJECTIVES

1. Learners will be able to define the term 'Potential Energy'.
2. Learners will be able to explain how and object possessed with potential energy does work.
3. Learners will be able to calculate the potential energy possessed by an object.
4. Learners will be able to cite examples of objects possessing potential energy from their daily lives.

TEACHING AIDS : Computer with internet connection.

PREVIOUS KNOWLEDGE : Meaning of the term 'Work' , 'Energy' and different forms of energy.

Sl. No.	Teaching Points	Teaching Strategy
1	Examples of Stored energy	Give examples of various situations compiled from YouTube when an object is not moving and still it is said to possess some energy. <ul style="list-style-type: none"><li>• Stretched slinky</li><li>• A stretched bow-string</li><li>• Wound toy-car.</li></ul>

2	Explanation of energy stored in an object	<ul style="list-style-type: none"> <li>• Ask students to identify the energy source in the above examples</li> <li>• Explain to them that energy is transferred from the source to the object which is 'about to' move.</li> <li>• Hence the object is initial stationary</li> </ul>
3	Definition of potential energy	<ul style="list-style-type: none"> <li>• Ask the students to define potential energy in their own words.</li> </ul>
4	Calculation of potential energy at a height	<ul style="list-style-type: none"> <li>• Ask students to search 'potential energy at a height'</li> <li>• Ask them to compile their search in the previous chapter's slides</li> </ul>

#### RECAPITULATION:

- Ask each group of students to define 'Potential Energy' in their own words.
- Ask other groups to agree or disagree with the other group's definitions.
- Ask each group to explain in fewest words the process of potential energy doing work.

#### EVALUATION

- From where does an object at a height get its energy?
- Find the potential energy possessed by an object of mass 5 kg and kept at a height of 5 meters above ground.



**APPENDIX II**  
**ACHIEVEMENT TEST**

## ACHIEVEMENT TEST

Maximum Marks: 25

Class: IX

Date:

Time: 35minutes

Roll. No.

All questions are compulsory.

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1. Which of the following activities are classifiable as 'work'? (1 x 5 = 5)

- Suma is swimming in a pond.
- A donkey s carrying a load on its back.
- A wind mill is lifting water from the well
- An engine is pulling the train.
- A man is standing with a heavy fruit basket on his head.

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2. Answer the following questions briefly (1 x 5 = 5)

- When do we say that work is done?
- Define 1 J of work.
- Write an expression for potential energy possessed by an object.
- A lamp consumes 1000J of electrical energy in 10 s. What is its power?
- State the law of conservation of energy.

3. Answer the following questions in short. (2 x 5 = 10)

- What are the various energy transformations that occur when you are riding a bicycle?
- Can there be any displacement of an object in the absence of any force acting on it? Explain your answer.
- An object of mass 12 kg is at a certain height above the ground. If the potential energy of the object is 480 J, find the height at which the object is with respect to the ground. Given  $g = 10\text{ms}^{-2}$ .
- An object of mass 15 kg is moving with a uniform velocity of  $4\text{ms}^{-1}$ .  
What is the kinetic energy possessed by the object?
- Give instances each of an object from your daily life possessing kinetic energy and potential energy.

4. Derive an expression for the kinetic energy possessed by an object of mass  $m$ , moving with a uniform velocity  $v$ . (5 x 1 = 5)



**APPENDIX III**  
**AWARENESS**  
**QUESTIONNAIRE**

## AWARENESS OF WEB 2.0 TOOLS AND THEIR USE

Dear students,

In the items below are certain questions which related to web 2.0 technology. Check with a tick mark, those which you use in your daily life, and please explain how you use it. If no, please proceed to the next item. You must finish this test within 30 minutes.

Sl. No.	Web 2.0 Tool	Yes	No	If yes, then how?
1	Facebook			
2	Wikipedia			
3	Youtube			
4	Twitter			
5	Pinterest			
6	Slideshare			
7	Dropbox			
8	Blogger			
9	Wordpress			
10	Edublog			

- If you use any other web 2.0 tool, please mention the name and its use:

