# Westbury High School
## Science Department Lesson Plan

***A merger of Madeline Hunter's Lesson Cycle and the 5-E Method of Instruction***

***Teacher:*** *C. Williams* ***Subject:*** *Physics*

***Date:*** *12/01 -05/2014* ***Lesson:*** *Momentum & Impulse*

| Defining Success | | |
|---|---|---|
| | **LESSON OBJECTIVE:** What will your students be able to do by the end of the class? | |
| | *Students will be able to* calculate momentum, power, mechanical energy, and apply the impulse-momentum theorem in physical systems | |
| | **STANDARDS ADDRESSED:** TEKS, ELPs and CCRS's. | **MISCELLANEOUS INFORMATION** Marzano's Strategies, key concepts or questions |

*READINESS AND SUPPORTING STANDARDS*

® **PHYS.6C** Calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system.

*PROCESS SKILLS*

**PHYS.2E** Design and implement investigative procedures including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness.

**PHYS.2H** Make measurements with accuracy and precision and record data using scientific notation and International System (SI) units.

**PHYS.2J** Organize and evaluate data and make inferences from data including the use of tables, charts, and graphs.

**PHYS.2K** Communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

**PHYS.2L** Express and manipulate relationships among physical variables quantitatively including the use of graphs, charts, and equations.

**PHYS.3E** Research and describe the connections between physics and future careers.

*ENGLISH LANGUAGE PROFICIENCY STANDARDS*

*** ELPS C.1.b** Monitor oral and written language production and employ self-corrective techniques or other resources.

*** ELPS C.4.e** Read linguistically accommodated content area material with a decreasing need for linguistic accommodations as more English is learned.

*** ELPS C.5.e** Employ increasingly complex grammatical structures in content area writing commensurate with grade-level expectations, such as (i) using correct verbs, tenses, and pronouns/antecedents, (ii) using possessive case (apostrophe s) correctly, and (iii) using negatives and contractions correctly.

*COLLEGE AND CAREER READINESS STANDARDS*

*** CCRS VIII.C.3** Understand the concept of momentum.

Collaborative Grouping

Making hypothesizes

How do I measure physical quantities to be able to calculate the distance traveled, displacement, speed and velocity of a moving object?

| Lesson Cycle | | MATERIALS |
|---|---|---|
| | **ANTICIPATORY SET:** ***(ENGAGE):*** A "hook" to get the students interest and attention. *(A question, picture, 2-3 minute long video clip, a demonstration).* | |
| | **M/T:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)<br>**W/Th:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)<br>**Fr:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.) | SmartBoard™<br>Constant velocity cars (Tumble Buggies)<br>Meter sticks<br>Stopwatches<br>Masking tape<br>Graph paper<br>Camera<br>Tennis ball<br>Logger Pro™<br>PPT<br>Whiteboards<br>Dry Erase Marker<br>Launcher<br>Water Balloons<br>Tape Measure |
| | **TEACHING/INSTRUCTIONAL PROCESS:** ***(EXPLORE/EXPLAIN)*****:** *Provide students with a common experience (Labs, hands on activities). Debrief activity, teach concept.* | |
| | **M/T:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)<br>**W/Th:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)<br>**Fr:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher) | |
| | **GUIDED PRACTICE AND MONITORING: (EXPLAIN).** Interactive discussions between teacher and students. Guide/help students as they solve problems and/or answer questions. Clarify misconceptions and check for understanding. | |
| | **M/T:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by multimedia, worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)<br>**W/Th:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by multimedia, worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)<br>**Fr:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by, multimedia. worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products) | |
| | **INDEPENDENT PRACTICE:** ***(ELABORATE)*** Students apply the information learned in the Explain to answer questions or solve problems. | |
| | **M/T:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning – products are informally/formally assessed by teacher)<br>**W/Th:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning – products are informally/formally assessed by teacher)<br>**Fr:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning. | |
| | **EVALUATE:** Assess student mastery. (Quizzes, Lab Reports, Unit tests) | |
| | **M/T:** **Assessment** - Students products are assessed for mastery informally and | |

| | | | |
|---|---|---|---|
| | | formally by teacher (Completion of activity sheet, presentation, and/or exit ticket)<br>**W/Th:** **Assessment** - Students products are assessed for mastery informally and formally by teacher (Completion of activity sheet, presentation, and/or exit ticket)<br>**Fr:** **Assessment** - Students products are assessed for mastery informally and formally by teacher (Completion of activity sheet, presentation, and/or exit ticket) | |

# Westbury High School
## Science Department Lesson Plan

***A merger of Madeline Hunter's Lesson Cycle and the 5-E Method of Instruction***

***Teacher:*** *C. Williams* ***Subject:*** *Physics*

***Date:*** *12/08 -12/2014* ***Lesson:*** *Work Energy Theorem & Energy Transformations*

| Defining Success | | |
|---|---|---|
| | **LESSON OBJECTIVE:** What will your students be able to do by the end of the class? | |
| | Students will investigate and calculate examples of the work- energy theorem and describe examples of energy transformations. | |
| | **STANDARDS ADDRESSED:** TEKS, ELPs and CCRS's. | **MISCELLANEOUS INFORMATION** Marzano's Strategies, key concepts or questions |

*READINESS AND SUPPORTING STANDARDS*

Ⓡ **PHYS.6A** Investigate and calculate with the work-energy theorem in various situations.

Ⓡ **PHYS.6B** Investigate examples of kinetic and potential energy and their transformations.

*PROCESS SKILLS*

**PHYS.2E** Design and implement investigative procedures including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness.

**PHYS.2F** Demonstrate the use of course apparatus, equipment, techniques, and procedures.

**PHYS.2G** Use a wide variety of additional course apparatuses, equipment, techniques, materials, and procedures as appropriate.

**PHYS.2H** Make measurements with accuracy and precision and record data using scientific notation and International System (SI) units.

**PHYS.2J** Organize and evaluate data and make inferences from data including the use of tables, charts, and graphs.

**PHYS.2K** Communicate valid conclusions supported by the data through various methods such as lab reports, PHYS.2E Design and implement investigative procedures including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness.

**PHYS.2L** Express and manipulate relationships among physical variables quantitatively including the use of graphs, charts, and equations.

*ENGLISH LANGUAGE PROFICIENCY STANDARDS*

*** ELPS C.1.a** Use prior knowledge and experiences to understand meanings in English.

*** ELPS C.2.f** Listen to and derive meaning from a variety of media such as audio, video, DVD, and CD-ROM to build and reinforce concept and language attainment.

*** ELPS C.3.f** Ask and give information ranging from using a very limited bank of high-frequency, high-need, concrete vocabulary, including key words and expressions needed for basic communication in academic and social contexts, to using abstract and content-based vocabulary during extended speaking assignments.

*COLLEGE AND CAREER READINESS STANDARDS*

*** CCRS VIII.D.1** Understand potential and kinetic energy.

*** CCRS VIII.D.2** Understand conservation of energy.

*** CCRS VIII.D.3** Understand the relationship of work and mechanical energy.

Collaborative Grouping

Making hypothesizes

How do I measure physical quantities to be able to calculate the distance traveled, displacement, speed and velocity of a moving object?

**Lesson Cycle**

**ANTICIPATORY SET:** ***(ENGAGE):*** A "hook" to get the students interest and attention. *(A question, picture, 2-3 minute long video clip, a demonstration).*

**M/T:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)

**W/Th:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)

**Fr:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)

**TEACHING/INSTRUCTIONAL PROCESS:** ***(EXPLORE/EXPLAIN)*****:** *Provide students with a common experience (Labs, hands on activities). Debrief activity, teach concept.*

**M/T:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)

**W/Th:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)

**Fr:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)

**GUIDED PRACTICE AND MONITORING: (EXPLAIN).** Interactive discussions between teacher and students. Guide/help students as they solve problems and/or answer questions. Clarify misconceptions and check for understanding.

**M/T:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by multimedia, worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)

**W/Th:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by multimedia, worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)

**Fr:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by, multimedia. worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)

**INDEPENDENT PRACTICE:** ***(ELABORATE)*** Students apply the information learned in the Explain to answer questions or solve problems.

**M/T:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning – products are informally/formally assessed by teacher)

**W/Th:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning – products are informally/formally assessed by teacher)

**Fr:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning.

**EVALUATE:** Assess student mastery. (Quizzes, Lab Reports, Unit tests)

**M/T:** **Assessment** - Students products are assessed for mastery informally and

**MATERIALS**

SmartBoard™

Constant velocity cars (Tumble Buggies)

Meter sticks

Stopwatches

Masking tape

Graph paper

Camera

Tennis ball

Logger Pro™

PPT

Whiteboards

Dry Erase Marker

Launcher
Water Balloons
Tape Measure

| | | | |
|---|---|---|---|
| | | formally by teacher (Completion of activity sheet, presentation, and/or exit ticket)<br>**W/Th:** **Assessment** - Students products are assessed for mastery informally and formally by teacher (Completion of activity sheet, presentation, and/or exit ticket)<br>**Fr:** **Assessment** - Students products are assessed for mastery informally and formally by teacher (Completion of activity sheet, presentation, and/or exit ticket) | |

# Westbury High School
## Science Department Lesson Plan

***A merger of Madeline Hunter's Lesson Cycle and the 5-E Method of Instruction***

***Teacher:*** *C. Williams* ***Subject:*** *Physics*

***Date:*** *12/15 -19/2014* ***Lesson:*** *Final Examination*

| Defining Success | | |
|---|---|---|
| | **LESSON OBJECTIVE:** What will your students be able to do by the end of the class? | |
| | *Students will demonstrate mastery of objectives associated with Measuring and Describing Motion, Analyzing Motion in One Dimension, Gravitational Force, Forces and Laws of Motion, Free – Body diagrams, Vectors and Motion in Two Dimensions, Momentum and Impulse and Work-Energy Theorem and Energy Transformation*. | |
| | **STANDARDS ADDRESSED:** TEKS, ELPs and CCRS's. | **MISCELLANEOUS INFORMATION** Marzano's Strategies, key concepts or questions |

*READINESS AND SUPPORTING STANDARDS*

Ⓡ **PHYS.6C** Calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system.

Other standards will be reviewed based on data and student need.

*PROCESS SKILLS*

**PHYS.2E** Design and implement investigative procedures including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness.

**PHYS.2H** Make measurements with accuracy and precision and record data using scientific notation and International System (SI) units.

**PHYS.2J** Organize and evaluate data and make inferences from data including the use of tables, charts, and graphs.

**PHYS.2K** Communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

**PHYS.2L** Express and manipulate relationships among physical variables quantitatively including the use of graphs, charts, and equations.

**PHYS.3E** Research and describe the connections between physics and future careers.

**Other standards will be reviewed based on data and student need.**

*ENGLISH LANGUAGE PROFICIENCY STANDARDS*

*** ELPS C.1.b** Monitor oral and written language production and employ self-corrective techniques or other resources.

*** ELPS C.4.e** Read linguistically accommodated content area material with a decreasing need for linguistic accommodations as more English is learned.

*** ELPS C.5.e** Employ increasingly complex grammatical structures in content area writing commensurate with grade-level expectations, such as (i) using correct verbs, tenses, and pronouns/antecedents, (ii) using possessive case (apostrophe s) correctly, and (iii) using negatives and contractions correctly.

**Other standards will be reviewed based on data and student need.**

*COLLEGE AND CAREER READINESS STANDARDS*

*** CCRS VIII.C.3** Understand the concept of momentum.

**Other standards will be reviewed based on data and student need.**

Collaborative Grouping

Making hypothesizes

How do I measure physical quantities to be able to calculate the distance traveled, displacement, speed and velocity of a moving object?

**Lesson Cycle**

**ANTICIPATORY SET:** ***(ENGAGE):*** A "hook" to get the students interest and attention. *(A question, picture, 2-3 minute long video clip, a demonstration).*

**M/T:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)

**W/Th:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)

**Fr:** **Do Now** (Connected to previous homework - designed to engage incoming students quickly with today's academic content.)

**TEACHING/INSTRUCTIONAL PROCESS:** ***(EXPLORE/EXPLAIN)*****:** *Provide students with a common experience (Labs, hands on activities). Debrief activity, teach concept.*

**M/T:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)

**W/Th:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)

**Fr:** **Activity** - Students begin to explore essential question (In pairs, triads and quads, students debrief/teach concept facilitated by teacher)

**GUIDED PRACTICE AND MONITORING: (EXPLAIN).** Interactive discussions between teacher and students. Guide/help students as they solve problems and/or answer questions. Clarify misconceptions and check for understanding.

**M/T:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by multimedia, worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)

**W/Th:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by multimedia, worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)

**Fr:** **Mini Lesson** – Interactive Teacher-Student *open discussion* (facilitated by, multimedia. worksheets, and educational technology tools) that validates student knowledge and skill and uncovers and clarifies misconceptions and misunderstandings. (Prepares students to produce products)

**INDEPENDENT PRACTICE:** ***(ELABORATE)*** Students apply the information learned in the Explain to answer questions or solve problems.

**M/T:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning – products are informally/formally assessed by teacher)

**W/Th:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning – products are informally/formally assessed by teacher)

**Fr:** **Student Product** - Students apply knowledge and skills to an authentic task. (In pairs, triads and quads, students support each others learning.

**EVALUATE:** Assess student mastery. (Quizzes, Lab Reports, Unit tests)

**M/T:** **Assessment** - Students products are assessed for mastery informally and

**MATERIALS**

SmartBoard™

Constant velocity cars (Tumble Buggies)

Meter sticks

Stopwatches

Masking tape

Graph paper

Camera

Tennis ball

Logger Pro™

PPT

Whiteboards

Dry Erase Marker

Launcher
Water Balloons
Tape Measure

| | | | |
|---|---|---|---|
| | | formally by teacher (Completion of activity sheet, presentation, and/or exit ticket)<br>**W/Th:** **Assessment** - Students products are assessed for mastery informally and formally by teacher (Completion of activity sheet, presentation, and/or exit ticket)<br>**Fr:** **Assessment** - Students products are assessed for mastery informally and formally by teacher (Completion of activity sheet, presentation, and/or exit ticket) | |