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: *03/23 - 03/27/2015* ***Lesson:*** *Electrostatics & Electric Force*

Defining Success

LESSON OBJECTIVE: What will your students be able to do by the end of the class?

Students will investigate electrical and magnetic forces and the relationship between the two. Students will calculate the electric force between objects and investigate the relationship between electric and magnetic forces in everyday applications.

ESSENTIAL UNDERSTANDING/GUIDING QUESTIONS:

1. **What are charges?**
2. **What is electric current?**
3. **How does energy change in electric circuits?**
4. **What is OHM's Law?**
5. **How are power, circuit, potential difference and resistance mathematically related?**

STANDARDS ADDRESSED: TEKS, ELPs and CCRS's.	**MISCELLANEOUS INFORMATION** Marzano's Strategies, key concepts or questions

READINESS AND SUPPORTING STANDARDS

Ⓢ **PHYS.5C** Describe and calculate how the magnitude of the electrical force between two objects depends on their charges and the distance between them.

Ⓢ **PHYS.5D** Identify examples of electric and magnetic forces in nature.

Ⓢ **PHYS.5G** Investigate and describe the relationship between electric and magnetic fields in applications such as generators, motors, and transformers.

Ⓢ **PHYS.5E** Characterize materials as conductors or insulators based on their electrical properties.

Ⓡ **PHYS.5F** Design, construct, and calculate in terms of current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations.

PROCESS SKILLS

Ⓟⓢ **PHYS.3B** Communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles and marketing materials.

Ⓟⓢ **PHYS.3C** Draw inferences based on data related to promotional materials for products and services.

Ⓟⓢ **PHYS.3F** Express and interpret relationships symbolically in accordance with accepted theories to make predictions and solve problems mathematically including problems requiring proportional reasoning and graphical vector addition.

Ⓟⓢ **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, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

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.)

Checks for Understanding		
Oral / Written Debrief	Connect Correct Collect	Student Leadership

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)

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Checks for Understanding		
Oral / Written Debrief	Guiding / Essential Questions	Student Leadership

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.

MATERIALS

HUB
- Resources
- Activities

SmartBoard™

Meter sticks

Stopwatches

Masking tape

Graph paper

Camera

Tennis ball

Logger Pro™

PPT

Whiteboards

Dry Erase Marker

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

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

Date: *03/30 -04/03/2015* ***Lesson:*** *Electric Force & Magnetism*

Defining Success

LESSON OBJECTIVE: What will your students be able to do by the end of the class?

The focus of this unit is on investigating characteristics and behaviors of longitudinal waves such as sound waves.

ESSENTIAL UNDERSTANDING / GUIDING QUESTIONS:

1. **What are charges?**
2. **What is electric current?**
3. **How does energy change in electric circuits?**
4. **What is OHM's Law?**
5. **How are power, circuit, potential difference and resistance mathematically related?**

STANDARDS ADDRESSED: TEKS, ELPs and CCRS's.	**MISCELLANEOUS INFORMATION** Marzano's Strategies, key concepts or questions

READINESS AND SUPPORTING STANDARDS

Ⓢ **PHYS.5C** Describe and calculate how the magnitude of the electrical force between two objects depends on their charges and the distance between them.

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Ⓢ **PHYS.5G** Investigate and describe the relationship between electric and magnetic fields in applications such as generators, motors, and transformers.

Ⓢ **PHYS.5E** Characterize materials as conductors or insulators based on their electrical properties.

Ⓡ **PHYS.5F** Design, construct, and calculate in terms of current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations.

PROCESS SKILLS

Ⓟⓢ **PHYS.3B** Communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles and marketing materials.

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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)

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MATERIALS

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- Activities

Meter sticks

Stopwatches

Masking tape

Graph paper

Camera

Logger Pro™

Multimedia

Whiteboards

Dry Erase Marker

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

Date: *04/06 -10/2015* ***Lesson: Electric*** *Circuits*

Defining Success

LESSON OBJECTIVE: What will your students be able to do by the end of the class?

Students will design, construct, and analyze series and parallel circuits using calculations for potential difference, resistance, and power by electric circuit elements.

ESSENTIAL UNDERSTANDING / GUIDING QUESTIONS:

1. What are the characteristics of series and parallel circuits?
2. How are currents, potential differences and equivalent resistances in series circuits related?
3. How are currents, potential differences and equivalent resistances in parallel circuits related?

STANDARDS ADDRESSED: TEKS, ELPs and CCRS's.	**MISCELLANEOUS INFORMATION** Marzano's Strategies, key concepts or questions

READINESS AND SUPPORTING STANDARDS

Ⓢ **PHYS.5E** Characterize materials as conductors or insulators based on their electrical properties.

Ⓡ **PHYS.5F** Design, construct, and calculate in terms of current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations.

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.

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Student Products	Connect Correct Collect	Student Leadership

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

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

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