**Learning Objectives** – “Students can…”

<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>Assessment</th>
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</thead>
<tbody>
<tr>
<td>1. Analyze new concept vocabulary – Vocabulary Enhancement (BW)</td>
<td>• In-class completion of the notebook/bell work (f)</td>
</tr>
<tr>
<td>2. Welcome back – Classroom Review and Physics Lab 3 (PL3)</td>
<td>• Physics Lab 3 (PL3) Force, Mass and Friction (f)</td>
</tr>
</tbody>
</table>

**Homework**

1. Parent Signature CE Handout – 1/4

2. Complete vocabulary (3-1) – 1/4

**Reminders:** Do not copy

**Science Fair Projects** - All remaining projects can be presented for up to 50% credit before the end of the 3rd quarter.

**Homework**

1. Parent Signature CE Handout – 1/4

2. Complete vocabulary (3-1) – 1/4

**Reminders:** Do not copy

**Science Fair Projects** - All remaining projects can be presented for up to 50% credit before the end of the 3rd quarter.

**Bell work**

Using the vocabulary list provided at your seat complete today’s vocabulary enhancement by: **Choose One**

For each term on the list you may do **one** of the following:

- Copy
- Summarize
- Provide an example

Incomplete or incorrect vocabulary will be scored accordingly.

**No pictures – Text only**

**Vocabulary assignments must be complete prior to notebook assessments – please plan/prepare accordingly.**

**Linked Documents and Class Resource**

<table>
<thead>
<tr>
<th>Teacher's NB 1/2</th>
<th>Physics Lab 3 Handout ↓</th>
<th>Vocabulary 3-1 ↓</th>
</tr>
</thead>
<tbody>
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</table>

**District Content Descriptor:** Engineering Physics

**Cause and Effect / Stability and Change**

Patterns can be used to identify cause and effect relationships. (08-LS4-2)

Graphs, charts, and images can be used to identify patterns in data. (08-LS4-1), (08-LS4-3)

STEM – Problem solving using models and hands on investigation of the dynamics involved in forces and construction. Students will develop ideas, test their hypothesis, model scientific methods as a means to create and communicate scientific evidences through effective forms of media. These labs closely engage NGSS practices using high-interest lab science and hands on creative models.

**Fayette County 2016-17 District Content Map**

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**Week 20: January 2 – 6, 2017**
**Date:** January 3, 2017

**Learning Objectives** – “Students can...”

1. Analyze and respond to our weekly Science Article (BW)

2. Physics Lab 3 (PL3) Force, Mass and Friction (Testing Variables)

**Assessment**
- In-class completion of the notebook/bell work (f)
- Physics Lab 3 (PL3) Force, Mass and Friction (f)

**Homework**

1. Parent Signature CE Handout – 1/4

2. Complete vocabulary (3-1) – 1/4

**Reminders:** Do not copy

**Science Fair Projects** - All remaining projects can be presented for up to 50% credit before the end of the 3rd quarter.

**Homework**

1. Parent Signature CE Handout – 1/4

2. Complete vocabulary (3-1) – 1/4

**Bell work**

Using good-practice reading techniques, read this week’s science article. When you finish reading, complete the article focus questions below.

1. **Explain the problem** – What is the focus of this article?

2. **Who/What is responsible for this change?**

3. **What are the long-term impacts of this change?** Identify one positive and one negative.

4. **Does this article contain bias?** (A view based on personal opinion)

**Linked Documents and Class Resource**

- **Science Article:** Current Events #1 - Cheetah
- **Classroom Expectations:** Review
- **Teacher’s NB 1/3**
- **Physics Lab 3 Handout**
- **Vocabulary 3-1 ↓ @ Bottom**

**District Content Descriptor:** Engineering Physics

**Cause and Effect / Stability and Change**

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Learning Objectives – “Students can…”
1. Use critical thinking to solve a problem. (BW)
2. Physics Lab 3 (PL3) Force, Mass and Friction (Lab Write-Up & Data Collection)

Assessment
- In-class completion of the notebook/bell work (f)
- Physics Lab 3 (PL3) Force, Mass and Friction (f)

Homework
1. Complete PL3 Lab Write-Up – 1/5
2. Quiz 3-1 PL3 & Notebook Concepts – 1/6

Reminders: Do not copy
Science Fair Projects - All remaining projects can be presented for up to 50% credit before the end of the 3rd quarter.

Bell work
Complete today’s challenge question in the notebook. When you finish, record your answer on a small piece of paper and place it in the solutions chest at the front of the room.

Observe the acceleration below – Between which two points is the car moving fastest and report its speed in meters/second.

Linked Documents and Class Resource
Teacher’s NB 1/4
Physics Lab 3 Handout ↓

District Content Descriptor: Engineering Physics

Cause and Effect / Stability and Change
Patterns can be used to identify cause and effect relationships. (08-LS4-2) Graphs, charts, and images can be used to identify patterns in data. (08-LS4-1), (08-LS4-3) STEM – Problem solving using models and hands on investigation of the dynamics involved in forces and construction. Students will develop ideas, test their hypothesis, model scientific methods as a means to create and communicate scientific evidences through effective forms of media. These labs closely engage NGSS practices using high-interest lab science and hands on creative models.

Fayette County
2016-17
District Content Map
**Date:** January 5, 2017  

**School Day:** 088

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<tr>
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<tbody>
<tr>
<td>1. Analyze and respond to the YouTube - Q Review. (BW)</td>
<td>• In-class completion of the notebook/bell work (f)</td>
</tr>
<tr>
<td>2. Physics Lab 3 (PL3) Force, Mass and Friction (Graphing &amp; Conclusion)</td>
<td>• Physics Lab 3 (PL3) Force, Mass and Friction(f)</td>
</tr>
</tbody>
</table>

**Homework**

1. Complete PL3 Graphing & Conclusion – 1/9
2. Quiz 3-1 PL3 & Notebook Concepts – 1/6

**Reminders: Do not copy**

**Science Fair Projects** - All remaining projects can be presented for up to 50% credit before the end of the 3rd quarter.

**Bell work**

YouTube Science – Watch the video and respond to the questions on the handout.

Using the results from today’s YouTube video clip – Calculate the speed of second place in meters/second. Round all calculations to the nearest tenths place (0.0)

**YouTube Video Link**

**Linked Documents and Class Resource**

- Teacher’s NB 1/5
- YouTube Video Science: Usain Bolt @ 200m
- Physics Lab 3 Handout ↓

**District Content Descriptor: Engineering Physics**

**Cause and Effect / Stability and Change**
Patterns can be used to identify cause and effect relationships. (08-LS4-2)  
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**Week 20: January 2 – 6, 2017**
**Learning Objectives** – “Students can...”
1. Share ideas by writing a paragraph in their science journal. (BW)
2. Quiz 3-1 PL3 & Notebook Concepts

**Assessment**
- In-class completion of the notebook/bell work (f)
- Quiz 3-1 PL3 & Notebook Concepts (S)

**Homework**
1. Complete PL3 Graphing & Conclusion – 1/9
2. Notebook Assessment 3-1 (PR) – 1/12

**Reminders: Do not copy**

**Science Fair Projects** - All remaining projects can be presented for up to 50% credit before the end of the 3rd quarter.

**Bell work**
- Science Journal: Day 16
- Complete a paragraph containing no less than five additional sentences that continue the lead below.
  
  **My goal this quarter is to...**

**Linked Documents and Class Resource**

- Teacher’s NB 1/6
- Physics Lab 3 Handout ↓

**District Content Descriptor: Engineering Physics**

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Vocabulary Physics 4 | 3-1
*Terms marked are review and only need completed if you have not completed them yet.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Acceleration</td>
<td>The rate of change of velocity per unit of time.</td>
</tr>
<tr>
<td>Average Acceleration</td>
<td>Average acceleration is the change in velocity divided by an elapsed time. $\frac{\Delta V_f - V_i}{t}$</td>
</tr>
<tr>
<td>Constant Acceleration</td>
<td>When the rate of velocity remains the same per unit of time.</td>
</tr>
<tr>
<td>Negative Acceleration / Positive Acceleration</td>
<td>When an object is speeding up, the acceleration is in the same direction as the velocity. Thus, this object has a positive acceleration. Example: The object’s opposite or negative direction (i.e., has a negative velocity) and is slowing down - negative acceleration.</td>
</tr>
<tr>
<td>Power</td>
<td>Power is the rate of doing work. It is equivalent to an amount of energy consumed per unit time. $\frac{\text{Work}}{\text{Time}}$ (Watts)</td>
</tr>
<tr>
<td>Principle of Acceleration</td>
<td>When an object is speeding up, the acceleration is in the same direction as the velocity. Thus, this object has a positive acceleration. If an object is moving in the negative direction (i.e., has a negative velocity) and is slowing down. According to our general principle, when an object is slowing down, the acceleration is in the opposite direction as the velocity. Thus, this object also has a positive acceleration.</td>
</tr>
<tr>
<td>Speed</td>
<td>The rate at which an object moves over a distance in a given time. $\frac{\text{distance (d)}}{\text{time (t)}}$</td>
</tr>
<tr>
<td>Vector Quantity</td>
<td>A unit that includes both speed and direction or position (i.e. velocity)</td>
</tr>
<tr>
<td>Velocity</td>
<td>The speed of something in a given direction.</td>
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<tr>
<td>Work</td>
<td>A force is said to do work if, when acting on an object that object is moved in the direction of the force. Work = Force x Distance and work is measured in Joules.</td>
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</table>

*Terms marked are review and only need completed if you have not completed them yet.*
Objective: Small teams will use quantitative physics to observe and calculate the variation in accelerations of an object with mass on an incline.

The Acceleration of a Mass on an Incline?

Distance (meters)

(Object w/ Mass)

(kilograms)

Time (Seconds)

Speed (s) = \frac{distance (d)}{time (t)}

\[
\text{Velocity} = \frac{\Delta v_f - v_i}{t}
\]

Physics - the branch of science concerned with the nature and properties of matter and energy.

General Principle of Acceleration:

When an object is speeding up, the acceleration is in the same direction as the velocity. Thus, this object has a positive acceleration. If an object is moving in the negative direction (i.e., has a negative velocity) and is slowing down. According to our general principle, when an object is slowing down, the acceleration is in the opposite direction as the velocity. Thus, this object also has a positive acceleration.

ACCELERATION LAB (Activity 3-5)

As part of a team you must work together to collect, calculate and compare the data results of our physics observation.

Each test car will have slight variations that will affect aerodynamics, friction and result-consistency.

*We are looking for observable relationships between mass, acceleration and incline.

The race series competition will be based on your ability to look at an *UNKNOWN test car – compare its characteristics to test samples and create a plausible prediction based on prior test results.
**ACCELERATION LAB (Physics Activity 3-5)**

**Hypothesis:** Based on your understanding of acceleration and mass -

**Will a lighter or heavier mass produce greater or lesser accelerations?**

*Explain your reasoning for this relationship*

### (Part II.) Competition Predictions:
Once you have observed the (3) UNKNOWN test cars complete your finish predictions. In order from greatest positive acceleration to least positive acceleration on a 3 meter course.

### Testing / Data Collection

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*The graphing will require you to show changes in average acceleration, keep this in mind as you collect and calculate data.*
Graphing Results: This graph must show in an overlapping comparison the average accelerations of both test cars. This will be an overlapping line graph. Y axis = Acceleration Data / X axis = measured distance on the track (meters)
## Conclusion / Lab Summary

Complete the ACCELERATION LAB by writing a complete conclusion.

<table>
<thead>
<tr>
<th>Experimental Question: <strong>How do Mass and Incline Affect the Acceleration of an Object?</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Hypothesis:</strong></td>
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<tr>
<th>Report Data: <strong>Use data to support your response</strong></th>
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<tr>
<th>Confirm or Reject the Hypothesis: <strong>Based on the evidence provided above, were you correct?</strong></th>
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<tr>
<th>Lab Summary: <strong>Complete a statement that explains a relationship, this is what we learned</strong></th>
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**Example** – *The greater a mass and the greater an incline the greater the acceleration.*

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**Vocabulary – Physics 2**

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Usain Bolt 200m Time: 19.42s
His m/s acceleration was 0.8+ faster than second place.
Calculate the m/s acceleration of second place. Round all calculations to
the nearest tenths place (0.0).