Integrated Unit 2- Physics (Physical Science)

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Belleville Public Schools

Curriculum Guide

Integrated Science - Unit 2

Physics

Belleville Board of Education

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Unit Overview

The understanding of motion and energy is a basic tenet of how Newton's First, Second and Third Laws of Motion operate in the natural world. Students will be able to calculate force, mass and acceleration through the understanding of these laws. They will also be able to calculate the amount of energy an object contains and determine the amount of work the object can perform. Temperature is the measure of the amount of kinetic energy in an object commonly referred to as heat energy. This energy is conserved when it is transferred from one substance to another. Students will be able to measure the amount of heat in an object using the substance's specific heat capacity.

Enduring Understanding

Unit Enduring Understandings

• When an object changes position in comparison to a stationary reference point, the object is in motion.

• Circular motion is acceleration because of the constant change of direction.

• An unbalanced force must be present to cause any change in an object's state of motion or rest.

• Inertia is the property of matter that resists change in motion.

• Gravitational force between two masses strengthens as the masses become more massive and rapidly weakens as the distance between them increases.

• When one object exerts an action force on a second object, the second object exerts a reaction force on the first object. Forces always occur in action-reaction pairs.

• Work is done when a force causes an object to move. This meaning is different from the everyday meaning of work.

• Power is the rate at which work is done.

• The mechanical advantage of a machine describes how much the machine multiplies force or increases distances.

• Energy is the ability to do work.

• Energy readily changes from one form to another.

• Absolute zero is the temperature at which the kinetic energy of a particle is at its lowest.

• One gram of iron will have a greater temperature change than the one gram of water because the specific heat capacity states that it takes 4186 J of heat to change the temperature of one kg of water by one degree while it takes only 449 J of heat to produce the same change in iron.

• Conduction, the transfer of heat through touch; convection, the transfer of heat by movement of a fluid and radiation, the transfer of heat by rays are the three ways heat can be transferred from one substance to another

Essential Questions

Unit Essential Questions

• Imagine that you could ride a baseball that is hit high enough and far enough for a home run. Using the baseball as a reference frame, what does the Earth appear to do?

• Joshua skates in a straight line at a constant sped for one minute, then begins going in circles at the same rate of speed, and then finally begins to increase speed. When is he accelerating?

• Describe a situation in which unbalanced forces are acting on an object. What is the net force on the object, and how does the net force change the motion of the object?

• Explain how the Law of Inertia relates to seat belt safety.

• Using Newton's second law explains why the gravitational acceleration of any object near Earth is the same no matter what the mass of the object is.

• Define momentum, and explain what the Law of Conservation of Momentum means.

• Determine if work is being done in these situations: a) lifting a spoonful of soup to your mouth; b) holding a stack of books motionless above your head; c) letting a pencil fall to the ground.

• Describe how a lever can increase the force without changing the amount of work being done.

• Water storage tanks are usually built on towers or placed on hilltops; why?

• Using the concepts of kinetic and potential energy explain why a child on a swing needs to push from time to time.

• Define absolute zero in terms of kinetic energy of particles.

• Which substance will have the greatest temperature change with the addition of 1000 J of heat: 1 kg of water or 1 kg of iron?

• Explain the three ways heat can be transferred from one substance to another.

Exit Skills

Explain the relationship between motion and a frame of reference.

Relate speed to distance and time.

Distinguish between speed and velocity.

Solve problems related to time, distance, displacement, speed and velocity.

Describe the concept of acceleration as a change in velocity.

Calculate acceleration as the rate at which velocity changes.

Graph acceleration on a velocity-time graph.

Explain the effects of unbalanced forces on the motion of objects.

Compare and contrast static and kinetic friction.

Describe how friction may be either harmful or helpful.

Identify ways in which friction can be reduced or increased.

Identify the law that says that objects change their motion only when a net force is applied.

Relate the First Law of Motion to important applications, such as seat belt safety issues.

Calculate force, mass and acceleration by using Newton's Second law.

Explain that gravitational force becomes stronger as the masses increase and rapidly becomes weaker as the distance between the masses increase, Fg = G (m1m2)/d2.

Evaluate the concept that free-fall acceleration near Earth's surface is independent of the mass of the falling object.

Demonstrate mathematically how free-fall acceleration relates to weight.

Explain that when one object exerts a force on a second object, the second object exerts a force equal in size and opposite in direction of the first object.

Show that all forces come in pairs commonly called action and reaction pairs.

Recognize that all moving objects have momentum.

Define work and power.

Calculate the work done on an object.

Use the concept or mechanical advantage to explain how machines make doing work easier.

Calculate the mechanical advantage of various machines.

Name and describe the six types of simple machines.

Discuss the mechanical advantage of different types of simple machines.

Recognize simple machines within compound machines.

Explain the relationship between energy and work.

Define potential energy and kinetic energy.

Calculate kinetic energy and gravitational potential energy.

Distinguish between mechanical and non-mechanical energy.

Identify and describe transformations of energy.

Explain the Law of Conservation of Energy.

Discuss where energy goes when it seems to disappear.

Analyze the efficiency of machines.

Define temperature in terms of the average kinetic energy of atoms or molecules.

Convert temperature readings between the Fahrenheit, Celsius and Kelvin scales.

Recognize heat as a form of energy transfer.

Investigate and demonstrate how energy is transferred by conduction, convection, and radiation.

identify and distinguish between conductors and insulators.

Solve problems involving the specific heat capacity of a substance.

Describe the concepts of different heating and cooling systems.

Compare different heating and cooling systems in terms of their transfer of usable energy.

Explain how a heat engine uses heat energy to do work.

New Jersey Student Learning Standards (NJSLS-S)

NextGen Science Standards

9-12.HS-PS2-2	Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
9-12.HS-PS2-4.1.1	students observe patterns in systems at different scales and cite patterns as empirical evidence for causality in supporting their explanations of phenomena. They recognize classifications or explanations used at one scale may not be useful or need revision using a different scale; thus requiring improved investigations and experiments. They use mathematical representations to identify certain patterns and analyze patterns of performance in order to reengineer and improve a designed system.
9-12.HS-PS2-1.2	Cause and effect: Mechanism and explanation.
9-12.HS-PS2-1.2.1	students understand that empirical evidence is required to differentiate between cause and correlation and to make claims about specific causes and effects. They suggest cause and effect relationships to explain and predict behaviors in complex natural and designed systems. They also propose causal relationships by examining what is known about smaller scale mechanisms within the system. They recognize changes in systems may have various causes that may not have equal effects.
9-12.HS-PS2-2.4.1	When investigating or describing a system, the boundaries and initial conditions of the system need to be defined.
9-12.HS-PS2-1.4.1	Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.
9-12.HS-PS2-2.5	Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
9-12.HS-PS2-2.5.1	Use mathematical representations of phenomena to describe explanations.
9-12.HS-PS2-4.5.1	Use mathematical representations of phenomena to describe explanations.
9-12.HS-PS2-2.PS2.A.1	Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object.
9-12.HS-PS2-1.PS2.A.1	Newton’s second law accurately predicts changes in the motion of macroscopic objects.
9-12.HS-PS2-2.PS2.A.2	If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system.

9-12.HS-PS2-1.PS2.B	Types of Interactions
9-12.HS-PS2-1.PS2.B.1	Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects.
9-12.HS-PS2-4.PS2.B.1	Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects.
9-12.HS-PS2-4.PS2.B.2	Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields.

Interdisciplinary Connections

MA.K-12.2	Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
MA.K-12.4	Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
MA.N-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
LA.RST.11-12.1	Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
LA.RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LA.WHST.11-12.7	Conduct short as well as more sustained research projects to answer a question (including

a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Learning Objectives

• Explain the relationship between motion and a frame of reference.

• Related speed to distance and time.

• Distinguish between speed and velocity.

• Solve problems related to time, distance, displacement, speed and velocity.

• Describe the concept of acceleration as a change in velocity.

• Explain why circular motion is continuous acceleration even when the speed does not change.

• Calculate acceleration as the rate at which velocity changes.

• Graph acceleration on a velocity-time graph.

• Explain the effects of unbalanced forces on the motion of objects.

• Compare and contrast static and kinetic friction.

• Describe how friction may be either harmful or helpful.

• Identify ways in which friction can be reduced or increased.

• Identify the law that says that objects change their motion only when a net force is applied.

• Relate the first law of motion to important applications, such as seat belt safety issues.

• Calculate force, mass and acceleration by using Newton's second law.

• Explain that gravitational force becomes stronger as the masses increase and rapidly becomes weaker as the distance between the masses increase, Fg = G (m1m2)/d2.

• Evaluate the concept that free-fall acceleration near Earth's surface is independent of the mass of the falling object.

• Demonstrate mathematically how free-fall acceleration relates to weight.

• Describe orbital motion as a combination of two motions.

• Explain that when one object exerts a force on a second object, the second object exerts a force equal in size and opposite in direction of the first object.

• Show that all forces come in pairs commonly called action and reaction pairs.

• Recognize that all moving objects have momentum.

• Define work and power.

• Calculate the work done on an object.

- Use the concept or mechanical advantage to explain how machines make doing work easier.

- Calculate the mechanical advantage of various machines.

- Name and describe the six types of simple machines.

- Discuss the mechanical advantage of different types of simple machines.

- Recognize simple machines within compound machines.

- Explain the relationship between energy and work.

- Define potential energy and kinetic energy.

- Calculate kinetic energy and gravitational potential energy.

- Distinguish between mechanical and non-mechanical energy.

- Identify and describe transformations of energy.

- Explain the Law of Conservation of Energy and how it applied.

- Discuss where energy goes when transferred.

- Analyze the efficiency of machines.

• Define temperature in terms of the average kinetic energy of atoms or molecules.

• Convert temperature readings between the Fahrenheit, Celsius and Kelvin scales.

• Recognize heat as a form of energy transfer.

• Investigate and demonstrate how energy is transferred by conduction, convection, and radiation.

• Identify and distinguish between conductors and insulators.

• Solve problems involving specific heat.

• Describe the concepts of different heating and cooling systems.

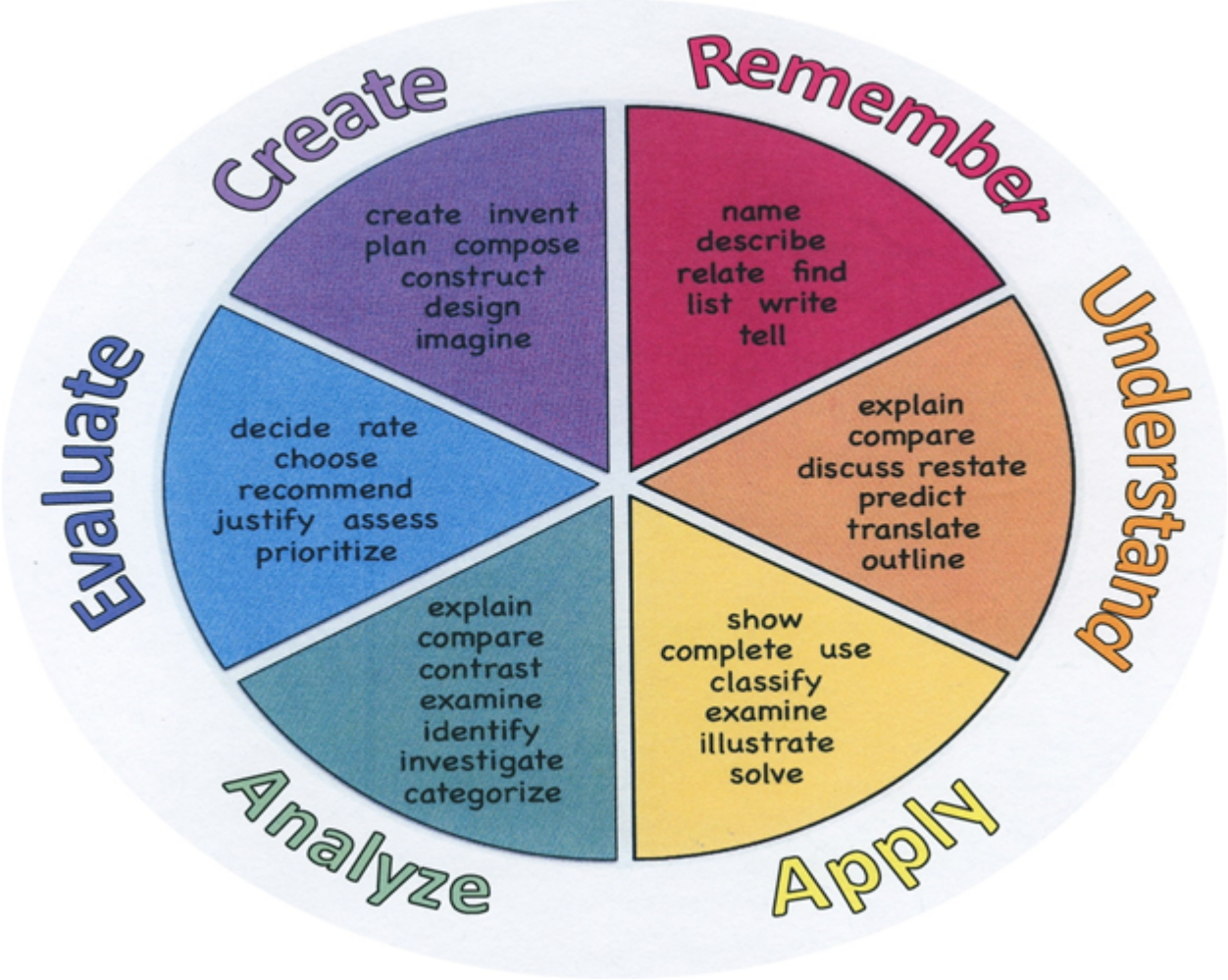
• Compare different heating and cooling systems in terms of their transfer of usable energy.

• Explain how a heat engine uses heat energy to do work

Action Verbs: Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive

Outline Point Quote Recall Recognize Repeat Reproduce	Represent Restate Rewrite Select Show Summarize Tell Translate Associate Compute Convert Discuss Estimate Extrapolate Generalize Predict	Calculate Change Classify Complete Compute Discover Divide Examine Graph Interpolate Manipulate Modify Operate Subtract	Diagram Discriminate Illustrate Outline Point out Separate	Support Test	Devise Generate Integrate Prescribe Propose Reconstruct Revise Rewrite Transform



Suggested Activities & Best Practices

1. Explore - Can you change one thing without changing another?

2. Explore- Can you pull a piece of paper out from beneath a coin?

3. Chapter 2 review and test

4. Explore - What effect does air resistance have on falling objects?

5. Chapter 3 review and test

6. Explore Can there be only one force in an interaction?

7. Chapter 4 review and test

9. Chapter 5 review and test

10. Explore- What happens when you do work on sand

11. PHET simulation- energy skate park

12. Chapter 6 review and test

13.Chapter 7 review and test

14. Density block lab

15.Chapter 8 review and test

Assessment Evidence - Checking for Understanding (CFU)

Chapter 1-8 quizzes (Summative)

Chapter 1-8 tests (Summative)

Lab journal (Alternate)

Assessments Generated using ExamView Test/Quiz Generator and Test Bank (Summative)

Common, Department Quarterly Benchmark #2/3 (Benchmark)

Oncourse Assessment Tools (Formative)

"Do Now/Exit Ticket" Activity (Formative)

- Admit Tickets
- Anticipation Guide
- Common Benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Learning Center Activities
- Multimedia Reports
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Surveys
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit review/Test prep
- Unit tests
- Web-Based Assessments
- Written Reports

Primary Resources & Materials

Integrated Science textbook and worksheet/lab CD (located in science service center)

Ancillary Resources

1. Teacher and Publisher supplied power points, notes, laboratory guides, and worksheets
2. Textbooks
3. Resource Manuals
4. Internet Resources
5. Computer and smartboard Activities

Technology Infusion

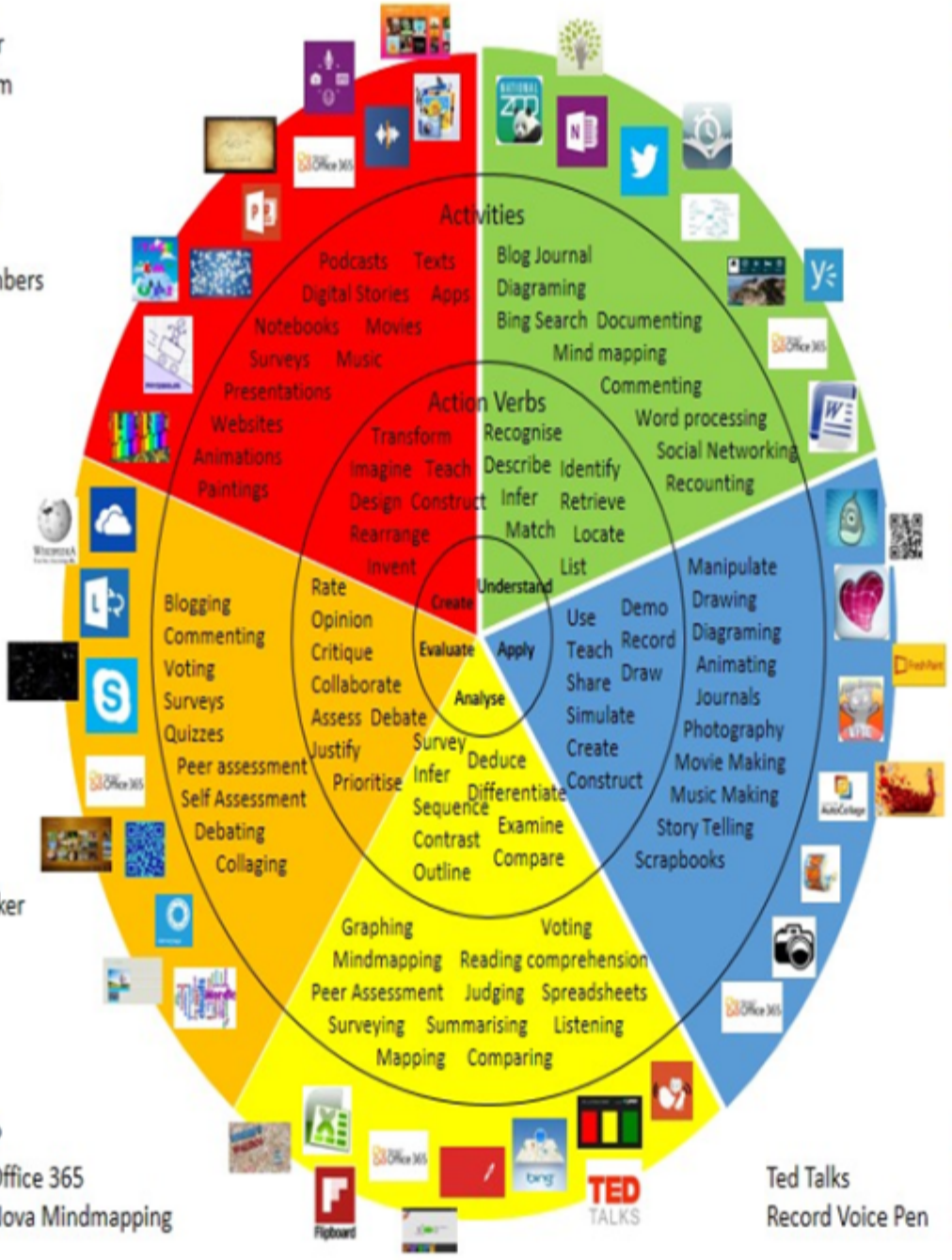
-Use excell to graph distance vs time to calculate speed.

-PHET online physics simulation in forces.

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
Photostory 3
Kid Story Builder
Music Maker Jam
Paint A Story
Office 365
MS PowerPoint
Stack 'Em Up
NqSquared Numbers
Physamajig
Xylophone 8

Wikipedia
Skydrive
Lync
SkyMap
Skype
Office 365
Puzzle Touch
Easy QR
Memorylage
Life Moments
Word Cloud Maker



Where's Waldo?
MS Excel Office 365
Flipboard Nova Mindmapping

Ted Talks
Record Voice Pen

Originally taken from http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Alignment to 21st Century Skills & Technology

CRP.K-12.CRP10.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.4	Analyze how economic conditions and societal changes influence employment trends and future education.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.
CAEP.9.2.12.C.6	Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.
CAEP.9.2.12.C.7	Examine the professional, legal, and ethical responsibilities for both employers and employees in the global workplace.
CAEP.9.2.12.C.8	Assess the impact of litigation and court decisions on employment laws and practices.
CAEP.9.2.12.C.9	Analyze the correlation between personal and financial behavior and employability.
TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

21st Century Skills/Interdisciplinary Themes

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Please list only the **21st Century/Interdisciplinary Themes** that will be incorporated into this unit.

- Communication and Collaboration
- Creativity and Innovation

- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

Upon completion of this section, please remove all remaining descriptions, notes, outlines, examples and/or illustrations that are not needed or used.

Please list only the **21st Century Skills** that will be incorporated into this unit.

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

Differentiation

- Small group explore lab groups

- Provide large print study guide for speed test.

- Schedule extra time for students during quiz.

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time

- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

Special Education Learning (IEP's & 504's)

- Pre- test study guides provided.

- Step by step speed equations.

- Provide force powerpoints on google classroom.

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multi-sensory presentation
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

English Language Learning (ELL)

- Provide spanish textbook.

- Peers translate notes.

- Provide both Spanish and English word problems on speed.

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

At Risk

-Provide modified tests.

-Provide tutoring times after school.

-Allow test correction for credit.

-Provide picture representation of different forces.

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.

- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

-Provide advanced work on force and speed calculations.

-Provide extra lab assignments.

- Allow student to work at faster pace.

- Above grade level placement option for qualified students
- Advanced problem-solving
- Allow students to work at a faster pace
- Cluster grouping
- Complete activities aligned with above grade level text using Benchmark results
- Create a blog or social media page about their unit
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Flexible skill grouping within a class or across grade level for rigor
- Higher order, critical & creative thinking skills, and discovery
- Multi-disciplinary unit and/or project
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge

Sample Lesson

Unit Name: Newtons Second Law of Motion- Force and Acceleration

NJSLS: 9-12.HS-PS2-1.PS2.A.1- Newton’s second law accurately predicts changes in the motion of macroscopic objects

Interdisciplinary Connection: WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS2-1),(HS-PS2-5)

Statement of Objective: Students will explore that an object will accelerate when a net force acts on it.

Anticipatory Set/Do Now: Chapter 3 guided reading

Learning Activity: Explore- What Effect Does Air Resistance Have on Falling Objects.

Student Assessment/CFU's: Lab Journal

Materials: Textbook, Paper

21st Century Themes and Skills: CRP.K-12.CRP11 - Use technology to enhance productivity.

Differentiation/Modifications: Small groups

Integration of Technology: You tube video on Newton Laws, Use Google classroom to facilitate lab, Use Google classroom for lab blog.