5th Grade PLT #1-Scientific Process

Conduct scientific inquiry investigation, observing safety precautions and following procedural steps accurately over multiple trials. *(E – 11A.2)*

*Skills: Be able to **Do:***

- Understand the steps of the scientific process
- Follow safety procedures
- Follow procedural steps
- Understand multiple trials

*Concepts: Need to **know** about scientific process:*

- Understand the steps of the scientific process
- Understand safety procedures
- There are specific procedures and safety precautions of scientific inquiry.
- How do you develop a question for an investigation?
- Why do you follow certain procedures?
- Why do you follow safety precautions?
- What are the consequences of not following safety precautions and procedures?

Topics and contexts:

Addressed in all units	Follow procedures taught in middle and high school	

5th Grade PLT #2 – Analyzing Data

Analyze data to produce reasonable explanations, comparing and summarizing data from multiple trials, interpreting trends, or evaluating conflicting data, or determining sources of error. *(E – 11A.5)*

*Skills: Be able to **Do:***

- Analyze data and trends
- Explain data, trends, and sources of error
- Summarize results
- Evaluate and interpret results
- Understand multiple trials

*Concepts: Need to **know** about:*

- The collection, analysis, and use of data to explain results
- How do you decide what data to collect?
- How do you decide how to organize your data?
- Why is it important to conduct multiple trials?
- How does the data help you explain your results?

Topics and contexts:

Models and Design-Foss		

5th Grade PLT #3 – How Living Things Function, Adapt, and Change

Apply scientific inquiries or technological designs to explore the patterns of change and stability at the micro- and macroscopic levels of organisms (including humans), comparing the stages of simple life cycles and energy requirements, or identifying structures and their functions in cells, tissues, organs, systems and organisms (including humans). *(E – 12A.1)*

*Skills: Be able to **Do:***

- Apply scientific inquiry
- Explore and compare patterns of change and stability
- Identify micro/macro levels of organisms, life cycles, and energy requirements
- Identify the structures of cells, tissues, and organs

*Concepts: Need to **know** about:*

- Scientific inquiry
- Patterns of change and stability
- Micro/macro levels of organisms
- Life cycles and energy requirements
- Cell, tissue, and organ structure
- Understand the structures and the life cycle of organisms
- Why do different organisms have different life cycles?
- How do different parts of organisms develop?

Topics and contexts:

Microscopes	Robert Crown Health Center	

5th Grade PLT #4 – Categorizing Organisms

Apply scientific inquiries or technological designs to categorize organisms (including humans) by their energy relationships in their environments, classifying organisms by their position in a food web, or grouping organisms according to their adaptive internal and/or external features, or contrasting food webs within and among different biomes, or identifying the biotic and abiotic factors associated with specific habitats, or making simple inferences to the closed systems of other planets. *(E – 12B.1)*

*Skills: Be able to **Do:***

- Apply scientific inquiry and technological designs to categorize organisms
- Categorize organisms
- Classify organisms by their position in a food web
- Group organisms according to their adaptive internal and/or external features
- Contrast food webs within and among different biomes
- Identify the biotic and abiotic factors associated with specific habitats
- Make simple inferences to the closed systems of other planets

*Concepts: Need to **know** about:*

- Scientific process and technological design
- Categories of organisms
- Relationships of organisms in their environments and position in food web
- Understand the internal and external features of organisms
- Understand food webs, biomes, and habitats
- Organisms and habitats are interrelated
- How does a habitat affect an organism?
- How and why do changes in the habitat affect the organisms?
- Is it possible to duplicate a habitat on another planet?
- How would organisms need to change to survive in a different habitat or biome?

Topics and contexts:

Mars Project-IMSA PBL	Rearranged food web	Bio-dome-Arizona project

5th Grade PLT #5 – Energy

Apply scientific inquiries or technological designs to explore energy, demonstrating how mirrors, prisms, diffraction gratings and filters direct light patterns, or diagramming how electricity can be produced from different sources of energy, or explaining how electrical energy can be converted to light, heat, sound, and magnetic energy, or analyzing common examples of potential and kinetic energy, or comparing insulation, conduction, convection, and radiation of heat. *(E – 12C.1)*

*Skills: Be able to **Do:***

- Apply scientific inquiries or technological designs to explore energy
- Explore energy
- Demonstrate how mirrors, prisms, gratings, and filters direct light patterns
- Diagram sources of electrical energy
- Explain how electrical energy can be converted
- Analyze examples of potential and kinetic energy
- Compare insulation, conduction, convection, and radiation of heat

*Concepts: Need to **know** about:*

- Scientific inquiry and technological design
- Energy
- Light patterns
- Electrical energy
- Potential and kinetic energy
- Insulation, conduction, convection, and radiation of heat
- There are multiple forms of energy
- People are able to convert energy for their own use
- Where does energy come from?
- How can people use energy for multiple purposes?
- How are the types of energy different?

Topics and contexts:

Solar Power unit-IBC class, PBL		

5th Grade PLT #6 – Motion

Apply scientific inquiries or technological designs to explore constant, variable and periodic motion, tracing and measuring motion of vehicles (e.g., cars, bicycles, skates) in terms of position, direction, acceleration and speed in straight line, circular and inclined paths, or introducing the concepts of harmonic and oscillating motion in everyday examples, or applying the concepts of natural frequency. *(E – 12D.1)*

*Skills: Be able to **Do:***

- Apply scientific inquiries or technological designs to explore motion
- Measure types of motion
- Understand harmonic and oscillating motion in everyday life.

*Concepts: Need to **know** about:*

- Scientific process and technological design
- Understand terminology of motion
    - Constant
    - Variable
    - Periodic
    - Tracing
    - Measuring motion
    - Position
    - Direction
    - Acceleration
    - Speed
    - Circular path
    - Inclined path
    - Harmonic motion
    - Oscillating motion
    - Frequency
- Know what constant, variable, and periodic motion is and how to measure vehicle motion
- How do the variables affect the pattern and speed of motion of a vehicle?
- How does design affect the motion of a vehicle?

Topics and contexts:

Models and Design-Foss	Levers and Pulleys	Vehicle data
Roller Coaster Tycoon	K'Nex Roller Coaster	

5th Grade PLT #7 – Global Topographic Features

Apply scientific inquiries or technological designs to analyze global topographic features modeling the effect of glaciation on a surface with applications to Illinois topography, or using satellite pictures, various topographic and thematic maps to indicate demographic, economic and weather patterns, and/or their interrelationships to each other. *(E – 12E.1)*

*Skills: Be able to **Do:***

- Apply scientific inquiries or technological designs to explore topographical features
- Analyze topographical features
- Model the effects of glaciations
- Use satellite images and maps to indicate demographic, economic, and weather patterns
- Understand interrelationships

*Concepts: Need to **know** about:*

- Scientific process and technological design
- Global topographic features
- Effects of glaciations on Illinois topography
- Satellite imaging and various types of maps used to explore topographic features and weather patterns

Topics and contexts:

Social Studies demographic maps	Websites of satellite pictures	Nature's Fury-Reading
Tall Tales-Great Lakes-Reading		

5th Grade PLT #8 – Solar Systems

Apply scientific inquiries or technological designs to introduce concepts that explain planetary, interplanetary and stellar characteristics and cycles, generalizing the composition and features of the inner and outer planets, asteroids, comets, and different star types, or applying orbital concepts for seasonal positions of constellations, or applying apparent motions in the sky to use the sky as a clock, compass or calendar, or explaining how the planets change their position in the sky relative to the stars over time using varying astronomic images.
(E – 12F.1)

*Skills: Be able to **Do:***

- Apply scientific inquiries or technological designs to explore solar systems
- Understand planetary, interplanetary and stellar characteristics and cycles
- Understand the composition and features of the inner and outer planets, asteroids, comets, and different star types
- Understand and apply orbital concepts for seasonal positions of constellations
- Use the sky as a clock, compass, or calendar
- Explain how planets change their positions in the sky over time

*Concepts: Need to **know** about:*

- Stellar characteristics and cycles
- Composition and features of the inner and outer planets, asteroids, comets, and different star types
- Different star types, positions, and constellations
- Using the sky as a clock, compass, or calendar
- Changing positions of celestial bodies
- Astronomic images

Topics and contexts:

Star Lab	Create a sundial	Social Studies-Early Explorers
Mars Project-IMSA-PBL		

5th Grade PLT #9 – Scientific Habits of Mind

Apply scientific habits of mind, explaining why similar investigations should but may not produce similar results, or identifying circumstances which distort how variables interact, or labeling accurate observations fully and carefully, or generating questions and strategies to test science concepts using critical and creative thinking. *(E – 13A.2)*

*Skills: Be able to **Do:***

- Apply scientific inquiries or technological designs to various investigations
- Explain why similar investigations may not produce similar results
- Identify circumstances which affect variables
- Label observations accurately
- Generate questions to test scientific concepts

*Concepts: Need to **know** about:*

- Similar investigations with variable results
- Causes of results
- Controls and variables

Topics and contexts:

Science Fair	Food and Nutrition	

5th Grade PLT #10 – Social Issues in Science and Technology

Investigate the interactions of societal decisions in science and technology innovations and discoveries, exploring the family, local, national, or global impact of them, or examining conceptual, mathematical and policy implications of energy conservation programs for classrooms, schools, homes and communities, or describing the changes in tools, careers, resource use and productivity over the centuries. *(E – 13B.3)*

*Skills: Be able to **Do:***

- Understand the interaction of society with innovations in science and technology
- Understand the impact that science and technology have locally, nationally, globally, and on the family
- Explore energy conservation programs for classrooms, school, homes, and communities and their implications
- Understand the changes in tools, careers, resources, and productivity over the centuries

*Concepts: Need to **know** about:*

- The impact of science and technology on society
- Energy conservation programs and their impact
- Changes brought about by science and technology over time

Topics and contexts:

Current Events	State of the Union address, national funding, policy and laws	Recycling programs in schools
New housing technologies	Kane County Recycling Center-Gary Meilke	Friends of the Fox
United Streaming topics		