Blackhawk School District

CURRICULUM

Course Title:	**Science**
Grade Level(s):	**Sixth**
Length of Course:	**Daily (45 minutes)**
Faculty Author(s):	**John Yaria**
Date:	**Fall 2008/ Revised May 2009 and October 2012**

MISSION STATEMENT:
The goal of science education is to develop within students an understanding of the world around us by fostering curiosity, developing inquiry skills, and creating an excitement for learning science.

COURSE DESCRIPTION:
Sixth grade science emphasizes the application of scientific investigation and problem solving to the study of Physical and Earth Sciences.

Note to Teacher:
Scientific Investigation and problem solving skills best learned through hands on application. There are a variety of lab activities that effective in understanding the concepts found within this curriculum.

Text: *Holt Science and Technology,* Holt, Rinehart, and Winston, 2005.

PA Common Core Standards for Reading and Writing in Science and Technical Subjects:
Pennsylvania Department of Education has released standards that describe what students in the science and technical subjects' classrooms should know and be able to do with the English language in reading and writing, grade 6 through 12. The standards provide the targets for instruction and student learning essentials for success in all academic areas, not just language arts classrooms. Although the standards are not a curriculum or a prescribed series of activities, Blackhawk School District has used them to develop this science curriculum.
The standards for Reading are available at:
http://static.pdesas.org/content/documents/PA_Common_Core_Standards_for_Reading_in_Science_And_Technical_Subjects_8-7-12.pdf

The standards for Writing are available at:
http://static.pdesas.org/content/documents/PA_Common_Core_Standards_for_Writing_in_Science_and_Technical_Subjects_8-7-12_rev_2.pdf

ESSENTIAL QUESTIONS:

Essential questions are the heart of the curriculum. Essential questions are conceptual commitments that teachers will use to guide instructional decision-making. In addition, they are kid friendly so that students can easily understand them. Essential questions are meant to be shared with students in either discussion or posting in the classroom. Essential questions provide the focus for teaching and learning. The following are the Essential Questions for this class:

1. **How can you study everything?**
2. **What happens when we are done with this planet?**
3. **Why are you wearing that?**
4. **Where are we going in such a hurry and why don't we seem to be moving?**

Assessing Essential questions is key to a robust curriculum. If Essential Questions are the focal point of learning, how then do we assess students? The following is an overview of recommended assessments to the Essential Questions. In addition, Differentiated learning opportunities are embedded as well (noted by DI)

Matter
EQ: How can you study everything?
DI and EQ Assessment: Classification lab and/or listing activity and/or graphic organizer

Earth
EQ: What happens when we are done with this planet?
DI and EQ Assessment: Listing activity in regards to daily actions to conserve our natural resources; time-line describing tectonic plate movement including future movement.

Weather
EQ: Why are you wearing that?
DI and EQ Assessment: Prepare and present a weather forecast; chart the accuracy of the local weather forecast, draw and illustrate a weather map

Astronomy
EQ: Where are we going in such a hurry and why don't we seem to be moving?
DI and EQ Assessment: Design a power point presentation of a mission to a planet, make a model of the solar system, design a poster showing examples of different celestial bodies found in the solar system (e.g. moon, asteroids, comets, meteors, etc…) to include a written description of each.

ROBUST VOCABULARY:
Robust vocabulary words are Tier 2 words, meaning that they are complex, powerful, and generalizable. Robust vocabulary words support language development of both lower and high level learners. In addition, robust vocabulary instruction helps prepare students for SATs, upper level high school classes, and college. "Studies showed that robust instruction was quite effective not only for learning the meanings of words but also for affecting reading comprehension." (p. 2 *Bringing Words to Life*)

Teachers are asked to commit to teaching and students USING these words throughout the entire year. Using a variety of instructional strategies, students will learn the meaning of these words in a deep and meaningful way in this content and across other content areas.

The Robust Vocabulary for this class are: **Process, Observe, Classify, Characteristic, Properties, Demonstrate, Explain, Deduce, Analyze, Describe, and Identify**

The following outline provides a general overview of the course content, not a chronological timetable. The weeks denoted for each area provide an idea for the overall time spent working with a given topic throughout the school year.

COURSE OUTLINE and OBJECTIVES (PA Anchors)	**PROPOSED TIME**	**RESOURCES**	**LESSON REFLECTION (for future revisions)**
Investigation and Scientific Problem Solving S8.A.1.1.1 Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data/information may change existing theories and practices. S8.A.1.1.2 Explain how certain questions can be answered through scientific inquiry and/or technological design (such as computer, calculator, scientific instruments) s8.A.1.1.3 Use evidence, such as observations or experimental results, to support inferences about a relationship. S8.A.1.1.4 Develop descriptions, explanations, predictions, and models using evidence. S8.A.1.2.1 Describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments (e.g. air/space travel, genetic engineering, nuclear fission, fusion, artificial intelligence, lasers, and organ transplants). S8.A.1.2.2 Identify environmental issues and explain their potential long-term health effects (e.g. pollution, pest controls, and vaccinations). S8.A.1.2.3 Describe fundamental scientific or technological concepts that could solve practical problems (e.g. Newton's laws of Motion, Mendelian genetics) S8.A.1.2.4 Explain society's standard of living in terms of technological advancements and how these advancements impact on agriculture (e.g. transportation, processing, production, storage). S8.A.1.3.1 Use ratio to describe change (e.g. percents, parts per million, grams per cubic centimeter, mechanical advantage). S8.A.1.3.2 Use evidence, observations, or explanations to make inferences about change in systems over time (e.g. carrying capacity, succession, population dynamics, loss of mass in chemical reactions, indicator fossils in geologic time scale) and the variables affecting these changes. S8.A.1.3.3 Examine systems changing over time, identifying the possible variables causing change, and drawing inferences about how these variables affect this change. S8.A.1.3.4 Given a scenario, explain how a dynamically changing environment provides for the sustainability of living systems.	Throughout the year.	Holt Science and Technology Series: K, F, I , and J	

COURSE OUTLINE and OBJECTIVES (PA Anchors)	**PROPOSED TIME**	**RESOURCES**	**LESSON REFLECTION (for future revisions)**
S8.A.2.1.1 Use evidence, observations, or a variety of scales (e.g. mass, distance, volume, temperature) to describe relationships. S8.A.2.1.2 Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses. S8.A.2.1.3 Design a controlled experiment by specifying how the independent variables will be manipulated, how the dependent variable will be measured, and which variables will be held constant. S8.A.2.1.4 Interpret data/observations; develop relationships among variables based on data/observations to design models as solutions. S8.A.2.1.5 Use evidence from investigations to clearly communicate and support conclusions. S8.A.2.1.6 Identify a design flaw in a simple technological system and devise possible working solutions. S8.A.2.2.1 Describe the appropriate use of instruments and scales to accurately and safely measure time, mass, distance, volume, or temperature under a variety of conditions. S8.A.2.2.2 Apply appropriate measurement systems (e.g. time, mass, distance, volume, temperature) to record and interpret observations under varying conditions. S8.A.2.2.3 Describe ways technology (e.g. microscope, telescope, micrometer, hydraulics, and barometer) extends and enhances human abilities for specific purposes. S8.A.3.1.1 Describe a system (e.g. watershed, circulatory system, heating system, agricultural system) as a group of related parts with specific roles that work together to achieve an observed result. S8.A.3.1.2 Explain the concept of order in a system [e.g. (first to last: manufacturing steps, trophic levels); (simple to complex: cell, tissue, organ, organ system)]. S8.A.3.1.3 Distinguish among system inputs, system processes, system outputs, and feedback (e.g. physical, ecological, biological, informational). S8.A.3.1.4 Distinguish between open loop systems. S8.A.3.1.5 Explain how components of natural and human-made systems play different roles in a working system.			

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S8.A.3.2.1 Describe how scientists use models to explore relationships in natural systems (e.g. ecosystem, river system, the solar system). S8.A.3.2.3 Given a model showing simple cause-and-effect relationships in a natural system, predict results that can be used to test the assumptions in the model (e.g. photosynthesis, water cycle, diffusion, infiltration). S8.A.3.3.1 Identify and describe patterns as repeated processes or recurring elements in human-made systems (e.g. trusses, hub-and-spoke system in communications and transportation systems, feedback controls in regulated systems). S8.A.3.3.2 Describe repeating structure patterns in nature (e.g. veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g. daily, monthly, and annually).			
Matter S8.C.1.1.2 Use characteristic physical or chemical properties to distinguish one substance from another (e.g. density, thermal expansion/contraction, freezing/melting points, streak test). S8.C.3.1.1 Describe forces acting on objects (e.g. friction, gravity, balanced versus unbalanced). S8.C.1.1.1 Explain the differences among elements, compounds, and mixtures. S8.C.1.1.3 Identify and describe reactants and products of simple chemical reactions.	50 Days	Holt Science and Technology Series: Introduction to Matter (K)	
The Earth S8.C.2.2.2 Compare the time span of renewability for fossil fuels and the time span of renewability for alternative fuels. S8.C.2.2.3 Describe the waste (kind and quantity) derived from the use of renewable and nonrenewable resources and their potential impact on the environment. S8.D.1.1.2 Describe natural processes that change Earth's surface (e.g. landslides, volcanic eruptions, earthquakes, mountain building, new land being formed, weathering, erosion, sedimentation, soil formation). S8.B.3.3.2 Explain how renewable and nonrenewable resources provide for human needs (i.e. energy, food, water, clothing, and shelter). S8.B.3.3.4 Explain the long-term effects of using integrated pest management (e.g. herbicides, natural predators, biogenetics) on the environment.	30 Days	Holt Science and Technology Series: Inside the Restless Earth (F)	

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Weather S8.C.2.1.1 Distinguish among forms of energy (e.g. electrical, mechanical, chemical, light, sound, nuclear) and sources of energy (I.e. renewable and nonrenewable energy). S8.C.2.1.2 Explain how energy is transferred from one place to another through convection, conduction, or radiation. S8.C.2.1.3 Describe how one form of energy (e.g. electrical, mechanical, chemical, light, sound, nuclear) can be converted into a different form of energy. S8.C.2.2.1 Describe the Sun as the major sources of energy that impacts the environment. S8.D.1.3.1 Describe the water cycle and the physical processes on which it depends (i.e. evaporation, condensation, precipitation, transpiration, runoff, infiltration, energy inputs and phase changes). S8.D.2.1.1 Explain the impact of water systems on the local weather or the climate of a region (e.g. lake effect snow, land/ocean breezes). S8.D.2.1.2 Identify how global patterns of atmospheric movement influence regional weather and climate. S8.D.2.1.3 Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country.	40 Days	Holt Science and Technology Series: Weather and Climate (I)	
Astronomy S8.D.3.1.3 Compare and contrast characteristics of celestial bodies found in the solar system (e.g. moons, asteroids, comets, meteors, inner and outer planets). S8.D.3.1.1 Describe patterns of earth's movements (i.e. rotation and revolution) in relation to the moon and sun (I.e. phases, eclipses, and tides) S8.D.3.1.2 Describe the role of gravity as the force that governs the movement of the solar system and universe. S8.B.3.2.3 Describe the responses of organisms to environmental changes (e.g. changes in climate, hibernation, migration, coloration) and how those changes affect survival. (in social studies) S8.B.3.2.1 Use evidence to explain factors that affect changes in populations (e.g. deforestation, disease, land use, natural disaster, invasive species). S8.D.1.3.3 Distinguish among different water systems (e.g. wetland systems, ocean systems, river systems, watersheds) and describe relationships to each other as well as to landforms.	40 Days	Holt Science and Technology Series: Astronomy (J)	

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S4.D.1.2.1 Describe a product's transformation process from production to consumption (e.g. prospecting, propagating, growing, maintaining, adapting, treating, converting, distributing, disposing) and explain the process's potential impact on Earth's resources. S8 D.1.2.2 Describe potential impacts of human-made process (e.g. manufacturing, agriculture, transportation, and mining) on Earth's resources, both nonliving (i.e. air, water, or earth materials) and living (plants and animals). .	40 Days	Holt Science and Technology Series: Astronomy (J)	