BLACKHAWK SCHOOL DISTRICT

Course: **STEAM**
Grades: **3**
Periods per week: One
Authors: **Barb Brown**
Date: **2015-2016**

MISSION STATEMENT:

The goal of STEAM education is to develop within students an interest in STEAM subjects at an early age. This should be beneficial to them when they enter the jobs market, and in turn it should benefit the greater economy.

COURSE DESCRIPTION:

STEAM is designed to introduce basic science, technology, engineering, arts, and math concepts for problem solving and everyday use. This course challenges students to use the design process, Ask, Imagine, Plan, Create and Test, and Improve to think/create beyond the first possible solution, to persevere in their process and to create an end product that goes beyond the bare minimum.

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 3 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.

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:

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.

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.

Standard Category_____ Standards: Anchor	Essential questions [EQ?] Essential Question Assessment.{EQA]	Proposed labs Including examples with the understanding the projects will change but projects will continue to meet the standards.	Resources / Materials
Science Technology and Engineering **Grade 3** **3.1.A: Organisms and Cells** 3.1.3.A: GRADE 3 3.1.3.A1 **Describe characteristics of living things that help to identify and classify them.** 3.1.3.A2 **Describe the basic needs of living things and their dependence on light, food, air, water, and shelter.** 3.1.3.A3 **Illustrate how plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death.** 3.1.3.A5 **Identify the structures in plants that are responsible for food production, support, water transport, reproduction, growth, and protection.** 3.1.3.A9 **• Distinguish between scientific fact and opinion. • Ask questions about objects, organisms, and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and**	[EQ] How does the variation among individuals affect their survival? [EQ] How does the variation among individuals affect their survival? [EQ] How do human wants and needs affect the products you use?	Invasive Species- Cane Toad Horticulture Project – Nature Trail Plant and Animal Unit- Including but not limited to: Germination/Planting/Pollination Butterflies	Engineering is Elementary Seeds/Containers/Growing medium/Caterpillars and assorted equipment.

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compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists. **3.1.B: Genetics** 3.1.3.B1 **Understand that plants and animals closely resemble their parents.** 3.1.3.B5 PATTERNS Identify characteristics that appear in both parents and offspring. 3.1.3.B6 • **Distinguish between scientific fact and opinion.** • **Ask questions about objects, organisms, and events.** • **Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known.** • **Plan and conduct a simple investigation and understand that different questions require different kinds of investigations.** • **Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information.** • **Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and**	[EQ] How does the variation among individuals affect their survival?	Horticulture Project Plant and Animal Unit- Including but not limited to: Germination/Planting/Pollination Butterflies	Seeds/Containers/Growing medium/Caterpillars and assorted equipment

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compare them with their current scientific knowledge. • **Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.** **3.1.C: Evolution** 3.1.3.C2 **Describe animal characteristics that are necessary for survival.** 3.2.3.B2 Explore energy's ability to cause motion or create change. Explore how energy can be found in moving objects, light, sound, and heat. 3.2.3.B3 **Explore temperature changes that result from the addition or removal of heat.** 3.2.3.B4 Identify and classify objects and materials that are conductors or insulators of electricity. Identify and classify objects and materials as magnetic or non-magnetic. 3.2.3.B5 **Recognize that light travels in a straight line until it strikes an object or travels from one material to another** 3.2.3.B6 ENERGY Recognize that light from the sun is an important source of energy for living and nonliving systems and some source of energy is needed for all organisms to stay alive and grow.	[EQ] How does the variation among individuals affect their survival? [EQ] What is the evidence that magnets and electricity produce forces?	Electricity Experiments Recording Lab Results and discussion	Engineering is Elementary Assortment of Matter to manipulate and test for conductivity and Circuit Boards Recording Sheet

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3.2.3.B7 • **Distinguish between scientific fact and opinion.** • **Ask questions about objects, organisms, and events.** • **Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known.** • **Plan and conduct a simple investigation and understand that different questions require different kinds of investigations.** • **Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information.** • **Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge.** • **Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.** 3.1.3.C1 Recognize that plants survive through adaptations, such as stem growth towards light and root growth downward in response to gravity.	[EQ] How does the variation among individuals affect their survival?	What is Technology? Horticulture Project Plant and Animal Unit- Including but not limited to: Germination/Planting/Pollination Butterflies	Engineering is Elementary

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Recognize that many plants and animals can survive harsh environments because of seasonal behaviors (e.g. hibernation, migration, trees shedding leaves). 3.2.A: Chemistry 3.2.3.A1 Differentiate between properties of objects such as size, shape, and weight and properties of materials that make up the objects such as color, texture, and hardness. Differentiate between the three states of matter, classifying a substance as a solid, liquid, or gas. 3.2.3.A2 **Recognize that all objects and materials in the world are made of matter.** 3.2.3.A3 **Demonstrate how heating and cooling may cause changes in the properties of materials including phase changes.** 3.2.3.A4 **Use basic reactions to demonstrate observable changes in properties of matter (e.g., burning, cooking).** 3.2.3.A5 <u>CONSTANCY AND CHANGE</u> Recognize that everything is made of matter. 3.2.3.A6 • **Distinguish between scientific fact and opinion.** • **Ask questions about objects, organisms, and events.** • **Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known.**	[EQ] none available	Physical Property Observation/Exploration Lab Recording Lab Results and discussion of results for this lab.	Recording Sheet and discussion

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• **Plan and conduct a simple investigation and understand that different questions require different kinds of investigations.** • **Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information.** • **Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge.** • **Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.** **3.2.B: Physics** 3.2.3.B1 **Explain how movement can be described in many ways.** 3.2.3.B2 Explore energy's ability to cause motion or create change. Explore how energy can be found in moving objects, light, sound, and heat. 3.2.3.B3 **Explore temperature changes that result from the addition or removal of heat.** 3.2.3.B4 Identify and classify objects and materials that are conductors or insulators of electricity.	[EQ] How could you demonstrate that a force can change an object's motion (speed or direction)? [EQ] none available [EQ]What is the evidence that magnets and electricity produce forces?	Motion – Playground Experimentation- How and why things move, may also include indoor experimentation regarding inertia and motion properties. Physical Property Observation/Exploration Lab Electricity Experiments	Grounds at BIS and assorted indoor materials Assortment of Matter to manipulate and test including both magnetic and nonmagnetic items. Assortment of Matter to manipulate and test and Circuit Boards On grounds at BIS-Seeds, growing medium, and containers Assorted seeds and medium for growing.

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Identify and classify objects and materials as magnetic or non-magnetic. 3.2.3.B5 **Recognize that light travels in a straight line until it strikes an object or travels from one material to another** 3.2.3.B6 ENERGY Recognize that light from the sun is an important source of energy for living and nonliving systems and some source of energy is needed for all organisms to stay alive and grow. 3.2.3.B6 ENERGY Recognize that light from the sun is an important source of energy for living and nonliving systems and some source of energy is needed for all organisms to stay alive and grow. **3.3: Earth and Space Sciences** 3.3.A: Earth Structure, Processes and Cycles 3.3.3.A1 Explain and give examples of the ways in which **soil** is formed. 3.3.3.A2 **Identify the physical properties of minerals and demonstrate how minerals can be tested for these different physical properties.** 3.3.3.A4 **Connect the various forms of precipitation to the weather in a particular place and time.** 3.3.3.A5 **Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.** 3.3.3.A7	[EQ]What is the evidence that the earth's systems change? [EQ]What predictable patterns of change can be observed on and from earth?	Horticulture Unit – Seed Growing Included in Third Grade Classroom Instruction	Seeds and planting medium

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• **Distinguish between scientific fact and opinion.** • **Ask questions about objects, organisms, and events.** • **Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known.** • **Plan and conduct a simple investigation and understand that different questions require different kinds of investigations.** • **Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information.** • **Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge.** • **Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.** **3.3.B: Origin and Evolution of the Universe** .3.3.B1 Relate the rotation of the earth and day/night, to the apparent movement of the sun, moon, and stars across the sky.		Astronomy Lab -Monthly Shapes of the Moon	Moon Phase activities.

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Describe the changes that occur in the observable shape of the moon over the course of a month. 3.3.3.B3 • **Distinguish between scientific fact and opinion.** • **Ask questions about objects, organisms, and events.** • **Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known.** • **Plan and conduct a simple investigation and understand that different questions require different kinds of investigations.** • **Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information.** • **Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge.** • **Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.** 3.4: Technology and Engineering Education 3.4.A: The Scope of Technology 3.4.3.A1	[EQ] What are different areas of technology?	Credentialed Login for Network and District provided programs and materials.	Computer Lab

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Identify how the natural made world and the human made world are different. 3.4.3.A2 **Identify that some systems are found in nature and some systems are made by humans.** 3.4.3.A3 **Identify how the study of technology uses many of the same ideas and skills as many other subjects.** 3.4.B: Technology and Society 3.4.3.B1 Describe how using **technology** can be good or bad. 3.4.3.B2 **Explain how materials are re-used or recycled.** 3.4.3.B2 **Explain how materials are re-used or recycled.** 3.4.3.B4 **Illustrate how people have made tools to provide food, clothing, and shelter.** 3.4.C: Technology and Engineering Design 3.4.3.C1 Recognize **design** is a creative process and everyone can design solutions to problems. 3.4.3.C2 Explain why the **design** process requires creativity and consideration of all ideas. 3.4.3.C3 Recognize that all products and **systems** are subject to failure; many products and systems can be fixed.	[EQ]What is technology? [EQ] How do the structures and functions of living things allow them to meet their needs? [EQ] How does technological design help create inventions and innovations?	Basic online navigation What is Technology? Recycling Project- Green Car Engineered Construction – Marble Maze Math/Art cross-curricular activity-Banner based on works of Auguste Herbin (French Artist) Engineering Project- Marble Maze	Engineering is Elementary -Recycled materials -assorted tape-clay Frugal Fun for Boys Engineering Design Model Math Art-O-Facts by Kuhns Frugal Fun for Boys

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3.4.D: Abilities for a Technological World 3.4.3.D2 Observe, analyze and document how simple **systems** work. 3.4.3.D3 **Collect information about everyday products and systems by asking questions.** 3.4.E: The Designed World 3.4.3.E2 **Identify some processes used in agriculture that require different procedures, products, or systems.** 3.4.3.E3 **Recognize that tools, machines, products, and systems use energy in order to do work.** .4.3.E4 **Recognize that information and communication technology is the transfer of messages among people and/or machines over distances through the use of technology.** 3.4.3.E5 **Understand that transportation has many parts that work together to help people travel.** 3.4.3.E6 **Explain how manufacturing systems design and produce products in quantity.** 3.4.3.E7 **Recognize that people live, work, and go to school in buildings which are different types of structures.** 4.1: Ecology 4.1.3.C **Identify sources of energy.** 4.1.3.E Identify changes in the **environment** over time. 4	[EQ] In what ways do humans create, use, and modify technologies? [EQ] How does the variation	Horticulture Unit – Nature Trail/Plant and Animal growth and transformation.	Growing plants and insects, including but not limited to, seed, milkweed, butterflies, and/or trees.

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4.2: Watersheds and Wetlands 4.2.3.B Identify plants and animals found in a **wetland.** 4.2.3.C Identify plants and animals that live in lakes, ponds, streams, and **wetlands.** 4.4: Agriculture and Society 4.4.3.C **Use scientific inquiry to investigate what animals and plants need to grow.** 4.4.3.D Identify **technology** used in **agriculture**. • **Identify tools and machinery used in agricultural processes.** 4.5: Humans and the Environment 4.5.3.A Identify resources humans take from the **environment** for their survival.	among individuals affect their survival? [EQ] How do the structures and functions of living things allow them to meet their needs?	Invasive Species – Cane Toad Horticulture Unit – Nature Trail/Plant and Animal growth and transformation. Recycling Project – Green Car	Engineering is Elementary Growing plants and insects, including but not limited to, seed, milkweed, butterflies, and/or trees. Engineering is Elementary