STEAM/SmartLab (Grade 2)

Course Description:

The curriculum for this course is developed from the Next Generation Science Standards and ISTE Standards. The 2nd grade SmartLab experience is based on the principles of science, technology, engineering, art and design, and mathematics (STEAM). Students in 2nd grade attend STEAM two times per week for 45 minutes. This course approaches STEAM education from a real-world perspective. In addition to the STEAM disciplines, this course emphasizes skills like critical thinking, collaboration, communication, and creativity through cross-curricular integration and performance based assessment. Higher-order thinking is engaged in this project/problem based course as students are given the choice of how they will demonstrate their learning on a given concept/unit of study with an emphasis on application of knowledge and skills.

Essential Understandings:

1. Problems are solved by asking questions, making observations, gathering information, and developing new tools. (K-2-ETS1-1)
2. A simple sketch, drawing or model is developed to illustrate the solution to a given problem. (K-2-ETS1-2)
3. The tests of two objects designed to solve the same problem are analyzed to compare strengths and weaknesses. (K-1-ETS1-3)
4. The tools, styles, formats, and digital media used to meet goals are clearly and creatively communicated to show understanding and growth. (ISTE.6-Creative Communication)

Unit	Description of Unit and Learning Targets
Mechanics and Structures • How can we use a design process to create structures to solve our problems? • What careers utilize mechanics and structures?	This unit is comprised of activities that require the manipulation of physical materials. At the end of the day students create a tangible product. Learning becomes especially valuable when natural phenomena such as gravity, wind, and structural soundness (or lack of) challenge students expectations and goals. By engaging in hands-on work students are exposed to fundamentals of physics, mechanics, and employ science and mathematics to solve relevant challenges. In this system of technology students design, build, and test constructed objects such as bridges, simple machines, and their own incredible creations. Learning Targets: • I can solve problems by asking questions. • I can solve problems by gathering information and making observations. • I can make a plan to show a solution to a problem. • I can solve problems by developing new tools. • I can compare the strengths and weaknesses of two solutions to a problem. • I can communicate how I solved a problem to show my understanding and growth.
Digital Communications • Why is a digital world important? • What careers utilize Digital communications?	The virtual and digital world engages students and provides an outlet for their natural need to socialize and communicate. The digital communications unit provides students with opportunities to learn and demonstrate the principles involved and the methods needed to effectively communicate in a digital environment.

	Learning Targets: ● I can solve problems by asking questions. ● I can solve problems by gathering information and making observations. ● I can sketch and draw to develop a plan to a given problem. ● I can solve problems by developing new tools. ● I can compare the strengths and weaknesses of two solutions to a problem. ● I can communicate how I solved a problem to show my understanding and growth.
Robotics & Control Technology ● How can we use a design process to create robots to solve our problems? ● What careers utilize robotics?	In this unit, students will be exposed to, building, programing, and testing robots. The Robotics and Control Technology challenges support learning for all ages and abilities. Young learners begin with simple design and programming challenges using structured and supported resources. Learning Targets: ● I can solve problems by asking questions. ● I can solve problems by gathering information and making observations. ● I can sketch and draw to develop a plan to a given problem. ● I can make a model to show a solution to a problem. ● I can compare the strengths and weaknesses of two solutions to a problem. ● I can communicate how I solved a problem to show my understanding and growth.
Computer Programing and Software Engineering ● How can we use a design process to create programs to solve our problems? ● What careers utilize computer programming and software engineering?	In this system of technology, learners explore the fundamentals of computer programming using engaging, easy to use programming tools. Students create games, animations, and simulations by snapping together blocks of code. Once created, they program the behavior of characters or objects. Learning Targets: ● I can solve problems by asking questions. ● I can solve problems by gathering information and making observations. ● I can make a plan to show a solution to a problem. ● I can solve problems by developing new tools. ● I can compare the strengths and weaknesses of two solutions to a problem. ● I can communicate how I solved a problem to show my understanding and growth.
Scientific Data & Analysis ● Why is it important to collect data? ● Why do we analyze the data we collect? ● What careers utilize scientific data and analysis?	Data collection and analysis underlies this suite of topics. Students use a variety of sensors, instruments, simulations, and software to collect, organize, and interpret data. Learning Targets: ● I can solve problems by asking questions. ● I can solve problems by gathering information and making observations. ● I can make a plan to show a solution to a problem. ● I can solve problems by developing new tools. ● I can compare the strengths and weaknesses of two solutions to a problem.

	● I can communicate how I solved a problem to show my understanding and growth.
Circuitry ● How does creating a circuit help us in the real world? ● What careers utilize computer programming and software engineering?	Students explore a variety of circuits important in industrial processes and human constructed environments. Students develop an understanding of the scientific and technological principles underlying electricity and learn to apply their knowledge to a variety of creative projects. <u>Learning Targets:</u> ● I can solve problems by asking questions. ● I can solve problems by gathering information and making observations. ● I can make a plan to show a solution to a problem. ● I can make a model to show a solution to a problem. ● I can compare the strengths and weaknesses of two solutions to a problem. ● I can communicate how I solved a problem to show my understanding and growth.