



LOWER SCHOOL CURRICULUM SUMMARIES

STEM

The Lower School STEM program encourages students to ask questions and to identify those areas of personal interest that will launch them into a lifelong appreciation for science, technology, engineering, and math. For one student, it is finding organisms under rocks that takes her to a deeper understanding of ecology. For another, it is musing about the planets that stirs her fascination with the cosmos. Students apply science process skills by thinking innovatively, formulating hypotheses, designing experiments, drawing conclusions and taking risks. Science process skills are based on a series of discoveries. The core curriculum is a student-centered, problem-solving approach to learning. In STEM, working in a collaborative, cooperative manner is emphasized. Students understand that there are many solutions to any given challenge or problem, and all members of the group are encouraged to share their ideas.

Kindergarten

Stuart's Kindergarten STEM program utilizes and builds upon the strategies of the Think Math! program by incorporating the project based learning approach in math, science, engineering and technology. Working with calculators, cash registers, money, and banking insures real world application.

Working in our Kinder Garden is a theme throughout the year and includes rich experiences in nature, with water, insects, animals and working with the tools of the lab. Special focus is given to recording observations, scientific thinking, questioning, exploration and documentation.

Technology is seamlessly integrated throughout the day, reinforcing movement, cooperation, projects, information gathering, writing and digital citizenship. Students are expected to be comfortable using everything from cd players to ipads to the desktop and Smartboard.

Engineering is incorporated into the daily life of a Kindergartner though blocks, legos, manipulatives, and crafts. Special focus is given towards concepts of solving engineering challenges with focus on balance, scale and representational drawing.

Units of Study Include:

*Science

-seeds and gardening, working with lab tools, magnets, light, water, animals, nature
recording observations, scientific thinking, questioning, exploration

*Technology

-ipad integration, networked play, Music tech tools, reading symbols ie |>=play, robotics added (2012)

*Engineering

-blocks, legos, manipulatives, wheels, balance, scale, representational drawing

*Math Shop

-calculators, cash registers, counting, phones, money, banking, real world application

Grades 1-4

Life, earth, and physical science concepts are introduced utilizing a variety of resources including the program Engineering is Elementary. Engineering is integrated with science and math. Engineering units are correlated with science concepts and themes. Math is used to gather and analyze data. Engaging students in authentic experiences enriches math, science, engineering and technology content. The STEM curriculum in grades 1-4 fosters problem-solving skills and encompasses project-based learning. The inventor/maker mindset is an important component of the STEM program. Children are fascinated with building and taking things apart. The active learner is at the center of the learning process.

Units of Study Include: Grades 1-4

Science Process Skills

classify

communicate

compare/contrast

create models

gather and organize data

generalize

identify variables

make inferences

interpret data

manipulate materials

measuring to collect quantitative data

observe

predict

General Skills

follow safety procedures in the lab and field

safely and accurately used the following tools:

hand lens

ruler

balance

gram weights

thermometer

graduated cylinder

time piece

manipulate materials through teacher direction and free discovery

use information systems appropriately

plan, design, and implement a short-term or long-term investigation based on student or teacher posed problem

communicate conclusions and discoveries through oral, written, drawing or electronic presentations

Engineering- Analysis, Inquiry and design

apply the engineering design process:

ask

imagine

plan, design

create

improve

Process to develop technological solutions to problems with given constraints

describe objects, imaginary or real, that might be modeled or made differently and suggest ways in which the objects can be changed, fixed or improved
investigate prior solutions and ideas
generate ideas for possible solutions, individually and through group activity; apply age- appropriate mathematics and science skills
plan and build a model of the solution
discuss how to test the solution, perform the test; record and analyze results; suggest ways to improve design

General Topics (may vary year to year)

Grade 1- patterns in nature, living and nonliving parts of the environment, using our senses, recognizing attributes of materials, needs and characteristics of animals, density

Grade 2- simple machines, wind power, air and weather, mechanical engineering characteristics of insects, pollination, agricultural engineering

Grade 3- life cycles, metamorphosis, water cycle, water pollution, environmental engineering, magnetism, transportation engineering

Grade 4- ecosystems, food chain, habitats, environmental engineering, space technology, solar system, electricity, electrical engineering