3rd Grade STEM Outclass Overview 2022 - 202

This document is designed to provide parents/guardians/community an overview of the curriculum taught in the FBISD classroom. This document supports families in understanding the learning goals for the course, and how students will demonstrate what they know and are able to do. The overview offers suggestions or possibilities to reinforce learning at home.

Included at the end of this document, you will find:

- A glossary of curriculum components
- The content area instructional model
- Parent resources for this content area

To advance to a particular grading period, click on a link below.

- Grading Period 1
- Grading Period 2
- Grading Period 3
- Grading Period 4

Process Standards

The process standards describe ways in which students are expected to engage in the content. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use knowledge learned efficiently and effectively in daily life.

TA1.A create original products using a variety of resources
TA4.B collect, analyze, and represent data to solve problems using tools such as word processing, databases, spreadsheets, graphic organizers, charts, multimedia, simulations, models, and programming languages;
TA5.A adhere to acceptable use policies reflecting positive social behavior in the digital environment
TA5.C abide by copyright law and the Fair Use Guidelines for Educational Multimedia
TA5.D protect and honor the individual privacy of oneself and others
TA5.E follow the rules of digital etiquette
TA5.F practice safe, legal, and responsible use of information and technology
TA5.G comply with fair use guidelines and digital safety rules
M3.1A- apply mathematics to problems arising in everyday life, society, and the workplace
M3.1B- use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution
M3.1C- select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems
M3.1D- communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate
S3.2E: demonstrate that repeated investigations may increase the reliability of results
3.5A: measure, test, and record physical properties of matter including temperature, mass, magnetism, and the ability to sink or float

M3.8A- summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals

Grading Period 1

Unit 1: Introduction to the STEM Lab

Estimated Date Range: August 10 – October 7
Estimated Time Frame: 4 Class Periods

Unit Overview:
In this unit, students will be introduced to STEM Outclass. They will learn and practice classroom routines, procedures, and safety guidelines. In-person, they will review proper use of iPads and how to log-on to the district network. Virtually, they will review proper use of devices and how to log-on to the district resources, as well as learn how to navigate through a variety of online resources that will be utilized for at home / online learning. Such resources include accessing the district's Learning Management System, Schoology and adding content to a Discussion Board in Schoology. They will practice skills that allow them to own their learning. Digital Citizenship, internet safety, and lab safety are taught in context with each lesson as requires.

At home connections:

- Discuss ways your child can practice good digital citizenship when online at home.
- Have your child demonstrate how they upload items such as pictures or text to a discussion board in Schoology.

Concepts within Unit #1 Link to TEKS	Success Criteria for this concept
Concept #1: Routines, Procedures and Safety SK.1A	• Determine what safety practices must be followed in a variety of situations. • Follow the safety rules when conducting an investigation

Unit 2: Fundamentals of Computational Thinking

Estimated Date Range: August 10 – October 7
Estimated Time Frame: 4 Class Periods

Unit Overview:

In this unit students continue practicing computational thinking with two types of iterations (“for loops” and “do loops”) using algorithms to solve problems.

Algorithms are a sequence of steps used to accomplish a task and solve problems. Students learn the fundamental skills of following directions using algorithms that are applied in everyday life, engineering design projects, coding and programming projects, as well as digital media. In this unit, students will engage with various online resources that promote using algorithms to solve problems.

Third graders continue to practice two types of iterations. Iteration or loops are a sequence of events that are repeated until conditions are met (or goal is reached). The three types of loops are;

- For loops – used for a predetermined sequence of events; the initial value is performed once and a count is taken after each iteration (example: move forward 2, repeat 6 times)
- Do loops – used to repeat a sequence until a known condition is met
- While loops – used in situations where we do not know how many times the loop is repeated beforehand.

Students will apply their knowledge of algorithms to computer programming and the engineering design process to solve problems with a culminating project that allows students to solve a problem by engineering a solution. The math and science concepts of Science 3.5A and data collection Math 3.1A are embedded in the project.

At home connections:

• Have your child create a set of directions from one place to another. For example: Start in the kitchen – take 5 steps forward – turn right – enter the living room. • Have students contribute solutions to a variety of problems around home. Talk about whether or not the proposed solutions would work or not. If the solution does not work, talk about why / why not.

Concepts within Unit # 2 **Link to TEKS**	**Success Criteria for this concept**
Concept #1: Using Algorithms to Solve Problems TAK.4A, TA4.B, S3.2E	• Identify a problem in an algorithm and modify it to solve the errors. • Use a variety of programming blocks to create an algorithm.

Grading Period 2

Unit 3: Applying Computational Thinking with Algorithms

Estimated Date Range: October 11 – December 16
Estimated Time Frame: 8 Class Periods

Unit Overview:

Students will continue to develop the skills of following directions using algorithms that are applied in everyday life, engineering design projects, coding and programming projects as well as digital media.

3rd grade students will continue to build on computational thinking to solve problems and create sequences, but in this grading period, students will be able to use algorithms to solve multi-step problems. Multi-step problems in coding / computer science are problems that will require more than one solution (coding block, algorithms, etc.) for it to function. In this unit, students will also apply the concept of decomposition (breaking down a problem into smaller, more manageable parts) within creating algorithms and the Engineering Design Process. A common way of decomposing problems regardless of whether they are coding-based or not, is to start with the end in mind and work backwards on the smaller tasks that make up the larger problem. Students will also be able to explain how a program (coding or EDP) functions by interpreting their algorithms both to peers and teacher.

3rd graders will continue to practice iterations. As mentioned from the previous unit, iterations are loops which are a sequence of events that are repeated until conditions are met, or the goal is reached. Examples of "for loop" blocks that will be explored in this unit are:

- Repeat - an action in which a sprite moves a fixed number of times.
  - Ex: A ball moves a certain number of times within the use of a repeat block in Scratch.
  - Ex: Creating an algorithm for Dash to make a square where all sides are equal.
- Forever - an action in which a sprite's action continues forever
  - Ex: A ball rolling back and forth within an animation in Scratch.

In this unit, students will also be introduced to a new concept "Event Handling" which is a routine that deals with the event which allows a programmer to write code that will be executed when a specific event happens. Examples of event handling include:

- When Green Flag Clicked
- When () Key Pressed
- When () Clicked
- When I receive ()
- Broadcast ()
- Broadcast () and wait

In addition to the coding concepts, the idea of algorithms to solve multi-step problems is used in the Engineering Design Process. For example, the steps of the EDP can be thought of as individual algorithms. In this unit students will build structures that solve real-life problems.

Throughout the course of this unit, students will conduct observational investigations. Students will demonstrate and observe how position and motion are changed by comparing patterns of movement of objects such as sliding, rolling and spinning objects using the EDP. Students will have to identify information regarding a problem and explain the steps they will take towards solving the problem. As a reminder, the EDP is our reinforcement of following steps to solve a problem. (ie: algorithms)

The science concept of Science 2.6C- *trace and compare patterns of movement of objects such as sliding, rolling, and spinning over time* and Math 3.8A- *summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph* is the context in which the EDP will be used.

At home connections:

- Engage in fun at home "If/then" activities such as:
  -When parent snaps their fingers; students clap their hands.
  -When parent whistles, students snap their fingers.
- Find a variety of items at home that can be rolled, slid, or spun and compare the differences in how each item looks when moved.

Concepts within Unit # 3 **Link to TEKS**	**Success Criteria for this concept**
Concept #1: Building and Testing Structures TA4.A, S2.6C	• Students can determine the number of turns that a rubber band car can make by creating and modifying their design.
Concept #2: Using Algorithms to Solve Multi-Step Problems. TA4.A, S2.6C	• Students can create algorithms that can solve multi-step problems. • Students can create algorithms that control a variety of sprites on a platform.

Glossary of Curriculum Components

Overview– The content in this document provides an overview of the pacing and concepts covered in a subject for the year.

TEKS – Texas Essential Knowledge and Skills (TEKS) are the state standards for what students should know and be able to do.

Unit Overview – The unit overview provides a brief description of the concepts covered in each unit.

Concept – A subtopic of the main topic of the unit.

Success Criteria—a description of what it looks like to be successful in this concept.

Competency—Standards-Based Grading communicates students' understanding of the Texas Essentials Knowledge and Skills (TEKS). Using the TEKS, teachers developed grade-level competencies to communicate student progress in the Standards-Based gradebook. The competencies are the same for each grade-level content area (i.e. 1st grade math) across the district. Teachers report students' progress on the competencies using learning progressions.

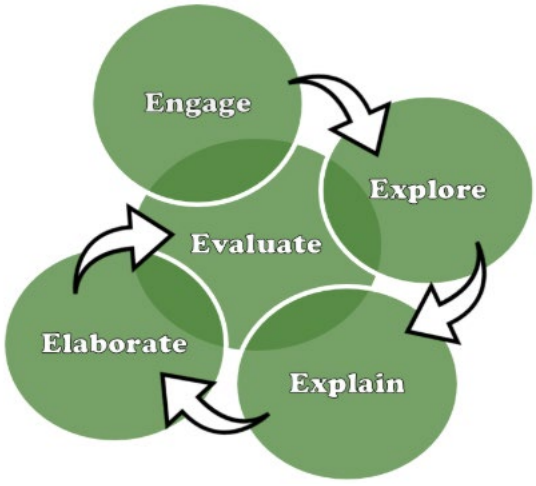
Parent Resources

The following resources provide parents with ideas to support students' understanding. For sites that are password protected, your child will receive log-in information through their campus.

Resource	How it supports parents and students
Code.org Course D	Code.org is a resource that students use throughout the year. This specific course is geared for 3rd Graders. Click on the link to access the lessons.
Scratch	Scratch is a coding / computer science platform that helps students learn to think critically and creatively while also creating interactive media such as stories, games and a variety of animations.
Engineering Design Process	Students will engage in using the Engineering Design Process when solving problems and working through building and testing structures. The link provided shares information on the various stages of the Engineering Design Process.

Instructional Model

The structures, guidelines or model in which students engage in a particular content that ensures understanding of that content.



STEM Outclass uses the 5E Instructional model.

Engage: Teachers start the learning process by involving students in making connections between their past and present learning experience.

Explore: The teacher guides students as they perform hand-on investigations where scientific practices and process skills are used to ask questions, observe, predict, illustrate, and record.
Explain: The teacher guides students as they discuss the discoveries, they made during the Explore activity. Students will also make explicit connections between the Engage and Explore activities as well as the learning intentions of the concept.
Elaborate: Students apply what they have learned so far to new experiences in order to develop, extend, connect, and deepen their understanding. Students will also engage in alternative explorations and contrast new facts with prior knowledge.
Evaluate: Students reflect on the evidence provided of the new understandings of the concepts.

Grading Period 3

Unit 4: Exploring Patterns

Estimated Date Range: January 5 – March 10
Estimated Time Frame: 8 Class Periods

Unit Overview:

In this unit, third grade students will continue to develop their skills of using algorithms. However, in addition to solving multi-step problems with algorithms, students will now observe and identify patterns within their algorithms. Patterns in algorithms can either be seen physically based on the movement of the sprite or it can be observed by the types of algorithms that are being used. Students will be able to look for patterns in addition to solving multi-step problems by interacting with Scratch, Dash Robot/Blockly and Lego WeDo.

The specific programming skill that students will be learning while working with algorithms is Parallelism. Parallelism is when algorithms are written that allow for multiple events happening at the same time.

Examples of Parallelism Include:

- A sound happening at the same time as a sprite (character) moving
- Two sprites moving at different directions at the same time.
- A sprite engaging in one action while a different sprite is engaging in a different action.

As students continue to engage with using a variety of tools, they will need to be exposed to a variety of ways on how to draft, edit and publish products in different media both individually and in groups. Examples of publishing products could include using tools such as Word, PowerPoint, Scratch or WeVideo.

As the unit progresses, students will transition their learning from observing patterns in algorithms to observing the patterns in weather. Students will have opportunities to measure, record, graph and present weather information while identifying the patterns in the data. Students will engage in the Engineering Design Process to address solutions to problems that various types of weather might bring.
The science concept of Science 2.8A- measure, record, and graph weather information, including temperature, wind conditions, precipitation, and cloud coverage, in order to identify patterns in the data and Math 3.8A- summarize a data set with multiple

categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals will be the context that we use the Engineering Design Process in this unit

At home connections:

- Provide opportunities for your child to observe and record daily weather conditions
- Have your child make predictions about patterns that occur in our world?

Concepts within Unit # 4 Link to TEKS	Success Criteria for this concept
Concept #1: Patterns in Our World TA2.A, S2.8A	• Students can create a PowerPoint or other media presentation (ie: WeVideo, Scratch, Choice Board) that compares the weather in 3 cities on the same day. • Students can program Dash to move in different directions and change speed.
Concept #2: Making Predictions Using Patterns TA2.A, S2.8A	• Students can create a WeVideo predicts the weather.

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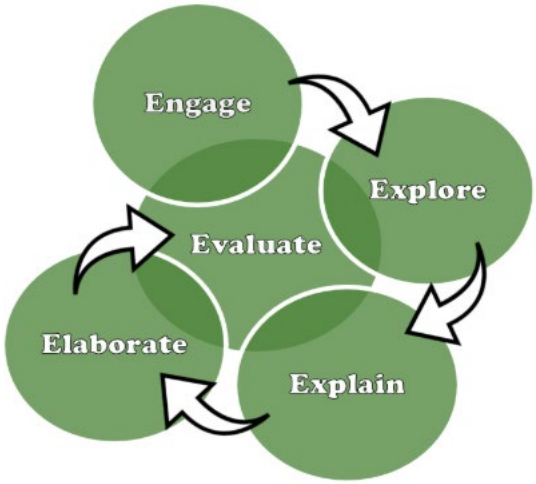

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Elaborate: Students apply what they have learned so far to new experiences in order to develop, extend, connect, and deepen their understanding. Students will also engage in alternative explorations and contrast new facts with prior knowledge.

Evaluate: Students reflect on the evidence provided of the new understandings of the concepts.

Grading Period 4

Unit 5: Designing and Building Original Products

Estimated Date Range: March 20 – May 25
Estimated Time Frame: 7 Class Periods

Unit Overview:

In this unit, third grade students will continue to develop their skills of using algorithms. Up until now, students have learned how to explain how programs work, create a variety of animations, and even include how to have multiple sprites interacting at the same time.

The specific programming skills that students will be learning while working with algorithms are conditional statements. A conditional statement is telling a program to perform different actions depending on whether a condition is true or false. For many, these are also known as "if/then statements"

Examples of Conditional Statements Include:

- If a sprite touches the edge of the screen, then it will turn around and walk the other way.
- If a dog is clicked, then it will make a barking sound.
- If the space bar is pressed, then the Scratch Cat will jump.
- If a number rolled is greater than 5, then the robot will move forward.
- When a sprite receives a message, it responds with a sound.
-

As students continue to engage with Scratch, the priority is to provide opportunities for students to engage in peer feedback / peer review. Teachers can engage in student-to-student feedback using a variety of tools such as Flipgrid, Schoology Discussion Board, etc.

As the unit progresses, students will have the opportunity investigate the following science concepts under Science 2.9B - identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things. As well as Science 2.9C - compare the ways living organisms depend on each other and on their environment, such as thru food chains

- Environmental factors that can affect the growth and behavior of living things.
- Dormancy in plants can be caused by decreased rainfall, temperature changes, or changes in daylight hours.
- Migration and dormancy, or hibernation, in animals can be caused by changes in temperature, precipitation, or daylight hours.
- Living organisms depend on other living organisms and the environment in order to survive.

Students will utilize the Engineering Design Process during this unit to solve environmental issues that occur in the natural world.

At home connections:

- Provide opportunities for your child to observe factors that affect living organisms.
- Have your child recognize algorithms and how they are used in the world around them?

Concepts within Unit # 4 Link to TEKS	Success Criteria for this concept
Concept #1 Environmental Solutions TA4.C, S2.9B	• Students can utilize the Engineering Design Process to solve an environmental issue facing the natural world.

Concept #2: Creating Original Programs TA4.C, S2.9B	• Students create a program using online programming tools to demonstrate ways living organisms depend upon each other.

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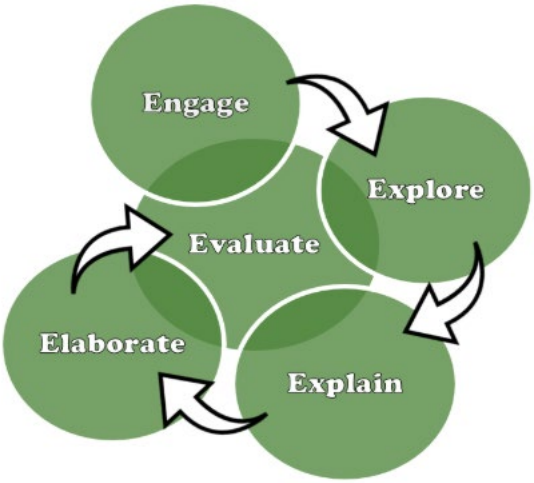

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