GZ STEM Starter Kit Student's Invention Log

Your Name:

Your teacher's name:

Your Grade:

Pretest about STEM:

- How many electronics do you have or did you use? Can you write done their names and their function?

- What is circuit? What function does the circuit have?

  Please write some feature or membership you have known about the circuit.

- What benefit are the electronics for our life or your study?

- What is program on computer? Did you like program?

The first challenges: sound visualize

Objectives*:*

(After the class, you should be able to reach the below objectives. if you think you have reached, you can make a mark in front of the options.)

- ☐ Create a circuit which can detect the sound level.
- ☐ Finish the construction of sound visualizer.
- ☐ Use the Module Matcher software and Microsoft MakeCode programming.
- ☐ Share and talk about the progress of invention about your classmates.

Learning progress:

PLAY: connect your first circuit with GZ modules

(Before you start your formal invention journey, don't confused about the sensors, follow with teacher's guiding, play the modules as the way you like, figure out the function of the modules by yourself.)

a. Which module can be used to perceive the sound around us?

Your answer:

b. If I want to describe the form and size of the noisy that has been perceived, what are you want to do?

Your answer:

c. Please write down what modules did you choice from the GZ STEM Starter Kits, and how about your first circuit?

Your answer:

CREATE: invent a structure for your circuit.

(Use the materials to create a structure for your circuit that will make it be a product producing by yourself. the materials include cardboard, write paper, color-pen, scissors, glue, double-side adhesive tape.)

Can you describe about your thoughts and plan about the structure? Write or draw out. Your answer:

TINKER: learn the Module Matcher software.

(Try to use the Module Matcher software to change the originally program on mainboard, then you will learn more knowledge about the input and output.)

After matching your modules, please write down the logic of the program: "I want my circuit could complete the function: the input (_____module) detect sound level around us , the out(_____module) will display some figure as reactions for the sound level." "When is the sound level is _____; the output will display_____ ; When is the sound level is _____; the output will display_____;"
After your first exploration about the software, please follow the below question to do more deeply exploration. a. What is the difference between the Event and the Data? b. How to change the expression that LED matrix displays? c. What is the meaning of "for **milliseconds", why need it in the program? d. How to know the detail threshold of sound level?

UPGRADE: learn the Microsoft MakeCode programming.

(Try to use the MakeCode programming to control your circuit. After writing down your first program, remember to write down your answer.)

Follow the below question, learn how to write your first program.

a. Which block areas can you find the sound levels and the LED matrix?

b. How to connect the blocks together?

c. How to download your program to the mainboard?

d. How to save your program to your computer? And when you want to open your first program next time, how to do that?

SHARE: tell others about your experience.

(At last 5mins of the class, please share the invention and exploration of yourself and your group. you can write down your thoughts about this class, that maybe some advice to your teachers teaching skill or maybe your groupmates, or anything about your invention journey.)

The second challenge: thermometer

Objectives*:*

(After the class, you should be able to reach the below objectives. if you think you have reached, you can make a mark in front of the options.)

- ☐ Create a circuit containing a temperature sensor, a led matrix, a mainboard, and power.
- ☐ Finish the construction of thermometer.
- ☐ Use the Module Matcher and Microsoft MakeCode programming to remix the prototype.
- ☐ Share and talk about your progress of invention to classmates.

Learning progress:

PLAY: connect your first circuit with GZ modules

(Before you start your formal invention journey, don't confused about the sensors, follow with teacher's guiding, play the modules as the way you like, figure out the function of the modules by yourself.)

a. How did you get the weather information? What tools do you need to detect the climate?

Your answer:

b. Do you know about how human body feel the climate?

Your answer:

c. Which sensor will be use if we want to know the specific temperature today?

Your answer:

CREATE: invent a structure for your circuit.

(Use the template and tools to create a structure for your circuit that will make it more like a product producing by yourself, you can use color-pen to invent your own thermometer.)

After the template connected, what kind of appearance do you want to draw on the template?
Your answer:

UPGRADE: learn the Microsoft MakeCode programming.

(Try to use the MakeCode programming to control your circuit. After writing down your first program, remember to write down your answer.)

After matching your modules, please write down the logic of the program:
"I want my circuit could complete the function: the input (_____module) detect temperature around us , the out(_____module) will display some figure as reactions for the temperature level."
"when is temperature level is _____; the output will display_____;
when is temperature level is _____; the output will display_____;"

After your first exploration about the software, please follow the below question to do more deeply exploration.

a. How to know the detail threshold of temperature level?

b. Can you control the led matrix to show the detail number of temperature?

UPGRADE: learn the Microsoft MakeCode programming.

(Try to use the MakeCode programming software to control your circuit. After writing down your first program, remember to write down your answer.)

Follow the below question, learn how to write your first program.

a. Which block areas can you find the temperature and the LED matrix?

b. Why need to add the delay modules in the program, and which area can you find the delay modules?

SHARE: tell others about your experience.

(At last 5mins of the class, please share the invention and exploration of yourself and your group to your teacher and classmate. Or you can write down your thoughts about this class, that maybe some advice to your teachers teaching skill or maybe your groupmates, or anything about your invention journey.)

The third challenges: One-eyed Ghost

Objectives*:*

(After the class, you should be able to reach the below objectives. if you think you have reached, you can make a mark in front of the options.)

- ☐ Create a circuit including a light sensor, a led matrix, a mainboard.
- ☐ Finish the construction of one-eyed ghost, design a special exterior for the ghost.
- ☐ Use the Module Matcher and Make Code software to remix your prototype.
- ☐ Share and talk about the progress of your invention journey.

Learning progress:

PLAY: connect your first circuit with GZ modules

(Before you start your formal invention journey, don't confused about the sensors, follow with teacher's guiding, play the modules as the way you like, figure out the function of the modules by yourself.)

a. How does human prefect the light of environment?

Your answer:

b. Is there something in real life that controlled by the light?

Your answer:

c. What do you think about why people need the intelligent machine to help us prefect the environment?

Your answer:

CREATE: invent a structure for your circuit.

(Use the template and tools to create a structure for your circuit that will make it more like a product producing by yourself, you can use color-pen to design the appearance of the one-eyed ghost.)

Can you describe about your thoughts and plan about the structure? Please write down. Your answer:

TINKER: learn the Module Matcher software.

(Try to use the Module Matcher software to change the originally program on mainboard, then you will learn more knowledge about the modules.)

After matching your modules, please write down the logic of the program: "I want my circuit could complete the function: the input (_____module) detect light level around the ghost , the out(_____module) will display some figure as reactions for the light level." "when is the light level is _____; the output will display_____ ; when is the light level is _____; the output will display_____ ;"
After your first exploration about the software, please follow the below question to do more deeply exploration. a. How to display the detail number of the light level? b. How to complete this application that the ghost could make some noise when it's awake?

UPGRADE: learn the Microsoft MakeCode programming.

(Try to use the MakeCode programming to control your circuit. After writing down your first program, remember to write down your answer.)

Follow the below question, try to explore the software deeply.

a. What's the meaning of the module, "do forever"?

b. Is the delay module needed to complete the ghost's program? Why?

c. This is a module in the "BASIC "module area, named "on start", do you know what is the meaning and how to use it in your invention?

SHARE: tell others about your experience.

(At last 5mins of the class, please share the invention and exploration of yourself and your group to your teacher and classmate. Or you can write down your thoughts about this class, that maybe some advice to your teachers teaching skill or maybe your groupmates, or anything about your invention journey.)

The four challenges: Angular Guitar

Objectives*:*

(After the class, you should be able to reach the below objectives. if you think you have reached, you can make a mark in front of the options.)

- ☐ Create a circuit containing a IMU 9-Dof, a Buzzer, a mainboard, and power.
- ☐ Finish the construction of angular guitar and design a special exterior for the guitar.
- ☐ Use the Module Matcher and Make Code software to remix your prototype
- ☐ Share and talk about the progress of invention to your classmates.

Learning progress:

PLAY: connect your first circuit with GZ modules

(Before you start your formal invention journey, don't confused about the sensors, follow with teacher's guiding, play the modules as the way you like, figure out the function of the modules by yourself.)

a. Which music instruments do you like best and why? Can you recognize the different music instrument through listening?

Your answer:

b. Do you know some knowledge about music, such as what is tone?

Your answer:

c. If we want to create a music instrument, do you know which module is must be used, and why?

Your answer:

CREATE: invent a structure for your circuit.

(Use the template and tools to create a structure for your circuit that will make it more like a product producing by yourself, you can use color-pen to design the appearance of the one-eyed ghost.)

Can you describe about your thoughts and plan about the structure? Please write down. Your answer:

TINKER: learn the Module Matcher software.

(Try to use the Module Matcher software to change the originally program on mainboard, then you will learn more knowledge about the modules.)

After matching your modules, please write down the logic of the program: "I want my circuit could complete the function: the input (_____module) detect the sensor's speed, orientation and rotation, the out(_____module) will reflect the sensor's different situation through different tones." "when the sensor is shaking; the output will ring the Middle C for 1 beat; when the sensor is face up; the output will _____; when the sensor is _____ ; the output will _____; when the sensor is _____; the output will _____;"
After your first exploration about the software, please follow the below question to do more deeply exploration. a. How many situations the IMU 9-Dof have? But when you use the Module Matcher software to design the program, the most kind of situation can you design? b. How to reflect the X-axis's speed, orientation and rotations using the buzzer?

UPGRADE: learn the Microsoft MakeCode programming.

(Try to use the MakeCode programming to control your circuit. After writing down your first program, remember to write down your answer.)

Follow the below question, learn how to write your first program.

a. Which block areas can you find the IMU 9-Dof and buzzer?

b. There is not only one module can you set the reaction of the buzzer. can you try to figure out the functions by using all of them?

SHARE: tell others about your experience.

(at last 5mins of the class, please share the invention and exploration of yourself and your group to your teacher and classmate. Or you can write down your thoughts about this class, that maybe some advice to your teachers teaching skill or maybe your groupmates, or anything about your invention journey.)

The fifth challenges: worm bot

Objectives*:*

(After the class, you should be able to reach the below objectives. if you think you have reached, you can make a mark in front of the options.)

- ☐ Create a circuit containing a twin button, a led matrix, a mainboard.
- ☐ Grasp the three modes of twin button, “click” “double click” “hold”.
- ☐ Design a special exterior for your invention with color-pen and any other materials.
- ☐ Use the Module Matcher and MakeCode programming to remix your prototype
- ☐ Share and talk about the progress of invention to your classmates.

Learning progress:

PLAY: connect your first circuit with GZ modules

(Before you start your formal invention journey, don’t confused about the sensors, follow with teacher’s guiding, play the modules as the way you like, figure out the function of the modules by yourself.)

a. Is there any robot in your home? What can your robot do?

Your answer:

b. Is there any change for your family life after robot came to your home?

Your answer:

c. What is the function of the switches in circuit? Where could you find switch in your home?

Your answer:

CREATE: invent a structure for your circuit.

(Use the materials to create a structure for your circuit that will make it more like a product producing by yourself. the materials include cardboard, write paper, color-pen, scissors, glue, double-side adhesive tape.)

Can you describe about your thoughts and plan about the structure? Write down.
Your answer:

TINKER: learn the Module Matcher software.

(Try to use the Module Matcher software to change the originally program on mainboard, then you will learn more knowledge about the modules.)

After matching your modules, please write down the logic of the program:
"I want my circuit could complete the function:"
"when the button A is _____; the output(_____module) will display_____;
when the button B is _____; the output will display_____ ;
when the button A+B is _____; the output will display_____ ;
when the button A or B is double click; the output will display_____ ;

UPGRADE: learn the Microsoft MakeCode programming.

(Try to use the MakeCode programming to control your circuit. After writing down your first program, remember to write down your answer.)

Follow the below question, learn how to write your first program.

a. If we add a buzzer module, can you redesign the program?

b. Why need to add the delay module on each block program?

SHARE: tell others about your experience.

(At last 5mins of the class, please share the invention and exploration of yourself and your group to your teacher and classmate. Or you can write down your thoughts about this class, that maybe some advice to your teachers teaching skill or maybe your groupmates, or anything about your invention journey.)

The sixth challenges: arm bot

Objectives*:*

(After the class, you should be able to reach the below objectives. if you think you have reached, you can make a mark in front of the options.)

- ☐ Create a circuit containing two inputs and two outputs.
- ☐ Finish the construction of arm bot.
- ☐ Use the two kinds of different software to design the program for arm bot.
- ☐ Design a special exterior for your invention.
- ☐ Share and talk about the progress of invention to your classmates.

Learning progress:

PLAY: connect your first circuit with GZ modules

(Before you start your formal invention journey, don't confused about the sensors, follow with teacher's guiding, play the modules as the way you like, figure out the function of the modules by yourself.)

a. If you want to invent a robot that you can shake hands with it, which modules do you want to use?

Your answer:

b. Do you think how to build a circuit include two or more input and two or more output?

Your answer:

CREATE: invent a structure for your circuit.

(Use the materials to create a structure for your circuit that will make it more like a product producing by yourself. the materials include cardboard, write paper, color-pen, scissors, glue, double-side adhesive tape.)

Can you describe about your thoughts and plan about the structure? Write down.
Your answer:

TINKER: learn the Module Matcher software.

(Try to use the Module Matcher software to change the originally program on mainboard, then you will learn more knowledge about the modules.)

After matching your modules, please write down the logic of the program:
"I want my circuit could complete the function:
the input (_____module) and the output(module) are matched that represent one arm of the bot;
the input (_____module) and the output(module) are matched that represent the other arm of the bot;
"when shaking hands with the bot, it will display _____ ;
when speaking to the bot, it will ring _____ ;"

After your first exploration about the software, please follow the below question to do more deeply exploration.

a. How to download two programs to the mainboard?

UPGRADE: learn the Microsoft MakeCode programming.

(Try to use the MakeCode programming to control your circuit. After writing down your first program, remember to write down your answer.)

Follow the below question, learn how to write your first program.

a. How to define the threshold of the sound sensor?

b. If the sound sensor could control the led matrix and the buzzer at same time? (in the other words, when you speak to the arm bot, it will make some noise and display a special appearance.)

SHARE: tell others about your experience.

(At last 5mins of the class, please share the invention and exploration of yourself and your group to your teacher and classmate. Or you can write down your thoughts about this class, that maybe some advice to your teachers teaching skill or maybe your groupmates, or anything about your invention journey.)