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LEGO Robotics Club

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NEBRASKA HONORS PROGRAM
CLC EXPANDED LEARNING OPPORTUNITY CLUBS
INFORMATION SHEET

Name of Club: Lego Robotics Club

Age/Grade Level: 4th -6th

Number of Attendees: (ideal number) 10-15

Goal of the Club: (learning objectives/outcomes)

To spark interest in STEM and develop important 21st century skills through interactive activities involving Lego Mindstorms.

Content Areas: (check all that apply)

- Arts (Visual, Music, Theater & Performance)
- Literacy
- STEM (Science, Technology, Engineering & Math)
- Social Science
- Wellness (Physical Education, Health, Nutrition & Character Education)

Outputs or final products: (Does the club have a final product/project to showcase to community?)

Students will practice critical thinking and use creativity to figure out solutions for obstacles and challenges. Students will get an introduction to basic programming concepts such as variables, loops, and counters, and to basic robot functions such as motors, sensors, and controls.

Introducing your Club/Activities:

Start the class by first introducing yourself and having an icebreaker. A suggestion for an introduction is to ask the class what the future will look like and lead into a short one minute video about how anyone can code. After that, proceed with the structure of the day, which will be at the beginning on other days, and talk about the key programming concept will be taught that today. Start with an interactive demo that will take about 10 minutes before letting the students work on their challenge of the day.

General Directions:

After the interactive demo, ask for any questions as a whole group before they split into smaller groups. They will work in pairs and start with the overall challenge of the day. It is recommended that you walk around and observe each group to see if they are struggling or need help. Instead of offering a quick solution, try to assist students to come their own conclusion and suggest alternatives ways of solving things. End the class 15 minutes early to clean up and to discuss key takeaways from that day.

Tips/Tricks:

Always have multiple challenges in the event students finish earlier than expected. The goal is to keep the students busy and to constantly solve problems.

Be flexible and acknowledge that students will be at different pace throughout the class time. Assist those that are behind while pushing all students to reach their limits while having fun.

Students will have their laptops put on the table and when needed, and will bring the robot back the computer to code rather than carry the laptops around.

Try to encourage students who are taking active role in coding to allow their partner to code and participate equally with them.

LESSON PLAN

Lesson Activity Name: Tape Shapes

Length of Activity: 1 hour

Supplies: Masking Tape, Lego Mindstorms Kit, an open space on the ground

Directions:

There will be a couple of obstacles on the ground ranging from a zig zap pathway to a curvy pathway. Student are expected to work with basic moving block codes to navigate the robot through the obstacle. Students who complete it early will be challenged to think of faster ways program the robot.

Conclusion of the activity:

Students will grasp a basic understanding of moving block codes and how to manipulate variables on the computer to move the robot.

LESSON PLAN

Lesson Activity Name: Loop to Repeat

Length of Activity: 1:30 hour

Supplies: Masking Tape, Lego Mindstorms Kit, an open space on the ground

Directions:

Using similar obstacles with noticeable patterns, students will be challenged to write a program that incorporate loop functions. Challenge students to write the shortest program possible. We will also have a discussion about how else we can use loop functions to solve problems.

Ask: How do you repeat something if there is a pattern already?

Conclusion of the activity: Student will use loops functions to be more efficient with coding.

LESSON PLAN

Lesson Activity Name: Sensors on Robots

Length of Activity: 1:30 hour

Supplies: Masking Tape, Lego Mindstorms Kit, an open space on the ground

Directions:

Students will be introduced to ultrasonic sensors, light sensors and learned how a robot feels and senses. Student will be task with multiple challenges such as finding a the right color ball, pushing a robot away with the ultrasonic sensors.

Conclusion of the activity: Student will begin to incorporate sensors to enhance the robots movement.

LESSON PLAN

Lesson Activity Name: Tell a robot to make a decision

Length of Activity: 1:30 hour

Supplies: Masking Tape, Lego Mindstorms Kit, an open space on the ground

Directions:

Work with if then functions and learn about how a robot make decisions. Have demo of a robot moving around a block but ask what happens if you remove the block? Will the robot still perform the action? If so, how do we take this into account and create a code where a robot keeps going unless it sees a block?

Conclusion of the activity:

Students will start to think about how a robot thinks and how to create a code that will allow a robot to make decisions.

LESSON PLAN

Lesson Activity Name: Line Follower Program

Length of Activity: 1:30 hour

Supplies: Black Masking Tape, notecards, Lego Mindstorms Kit, an open space on the ground

Directions:

Students will task with a difficult challenge of figuring out how to create a program that makes a robot follow a line. Student will use all of the previous programming lessons and learn to break a problem down into smaller components. We will use the think-pair-share method of coming up with a solution.

Conclusion of the activity:

Student will walk away with an understanding of line follower program and contextualizes all the skills gained throughout the week.