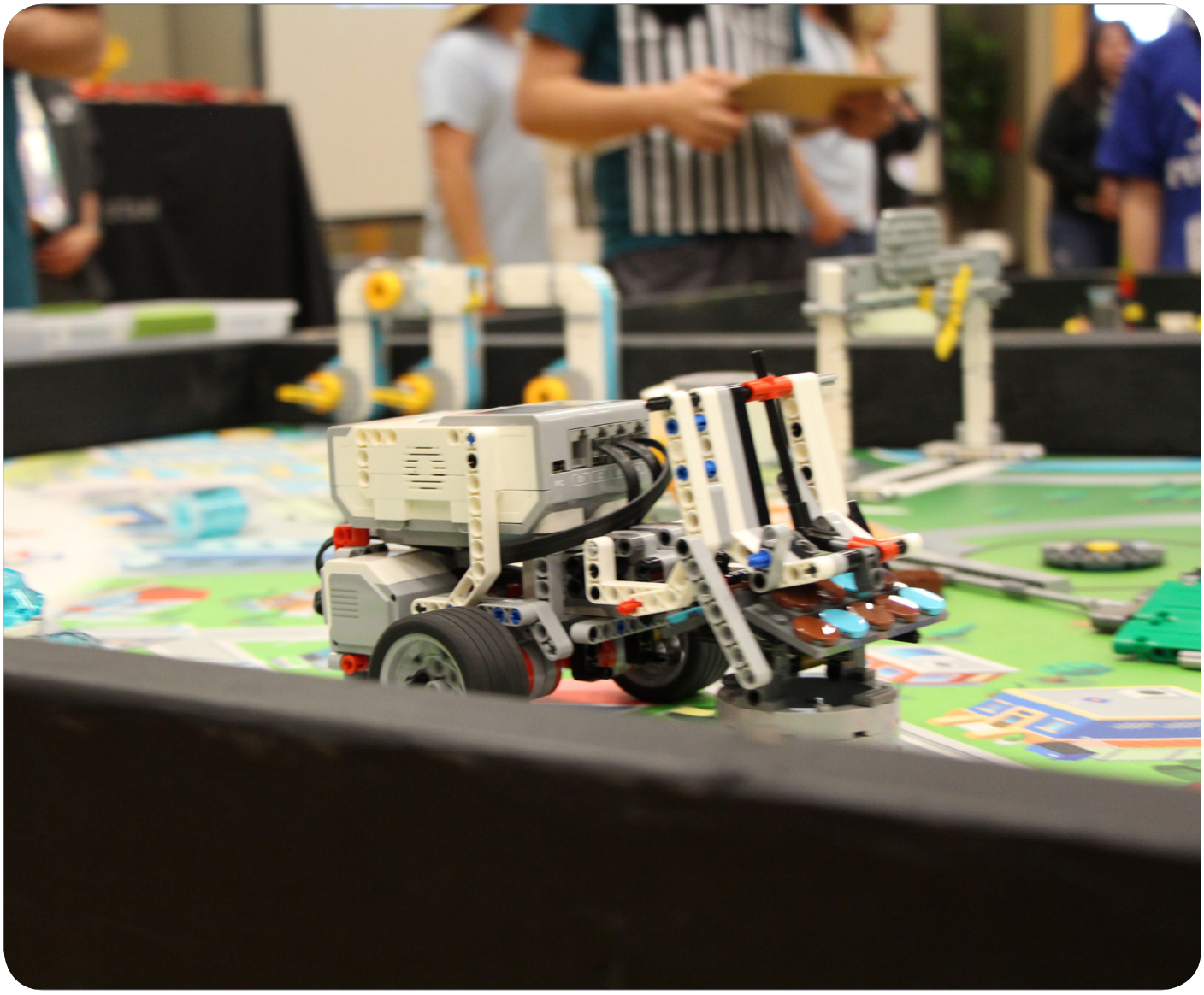
DISCOVER



4-H LEGO® EV3 ROBOTICS

EXTENSION
UtahStateUniversity

DISCOVER

Paul Hill | Mike Isom | Stacey MacArthur
Utah State University Extension

Description

The Discover 4-H Clubs series guides new 4-H volunteer leaders through the process of starting a 4-H club or provides a guideline for seasoned volunteer leaders to try a new project area. Each guide outlines everything needed to organize a club and hold the first six club meetings related to a specific project area.

Purpose

The purpose is to create an environment for families to come together and participate in learning activities while spending time together as a multi-family club. Members will experiment with new 4-H project areas.

What is 4-H?

4-H is one of the largest youth development organizations in the United States. 4-H is found in almost every county across the nation and enjoys a partnership between the U. S. Department of Agriculture (USDA), the state land-grant universities (e.g., Utah State University), and local county governments.

4-H is about youth and adults working together as partners in designing and implementing club and individual plans for activities and events. Positive youth development is the primary goal of 4-H. The project area serves as the vehicle for members to learn and master project-specific skills while developing basic life skills. All projects support the ultimate goal for the 4-H member to develop positive personal assets needed to live successfully in a diverse and changing world.

Participation in 4-H has shown many positive outcomes for youth. Specifically, 4-H participants have higher participation in civic contribution, higher grades, increased healthy habits, and higher participation in science than other youth (Lerner et al., 2005).

Updated September 2017

Utah 4-H

4-H is the youth development program of Utah State University Extension and has more than 90,000 youth participants and 8,600 adult volunteers. Each county (Daggett is covered by Uintah County) has a Utah State University Extension office that administers the 4-H program.

The 4-H Motto

"To Make the Best Better!"

The 4-H Pledge

I pledge: My HEAD to clearer thinking, my HEART to greater loyalty, my HANDS to larger service and my HEALTH to better living, for my club, my community, my country, and my world.

4-H Clubs

What is a 4-H Club? The club is the basic unit and foundation of 4-H. An organized club meets regularly (once a month, twice a month, weekly, etc.) under the guidance of one or more volunteer leaders. It elects its own officers, plans its own program, and participates in a variety of activities. Clubs may choose to meet during the school year, only for the summer, or both.

Club Enrollment

Enroll your club with your local Extension office. Each member will need to complete a Club Member Enrollment form, Medical History form, and a Code of Conduct/Photo Release form. (Print these from the www.utah4h.org website or get them from the county Extension office).

Club Officers

Elect club officers during one of your first club meetings. Depending on how many youth are in your club, you can decide how many officers you would like. This will typically include a president, vice president, pledge leader, and secretary. Other possible officers or committees are: song leader, activity facilitator, clean-up supervisor, recreation chair, scrapbook coordinator, contact committee (email, phone, etc.), field trip committee, club photographer, etc. Pairing older members with younger members as Sr. and Jr. officers may be an effective strategy to involve a greater number of youth in leadership roles and reinforce the leadership experience for all ages. Your club may decide the duration of officers (6 months, 1 year, etc.).

A Typical Club Meeting

Follow this outline for each club meeting:

- ☐ Call to order – President
- ☐ Pledge of Allegiance and 4-H Pledge – Pledge Leader (arranges for club members to give pledges)
- ☐ Song – Song Leader (leads or arranges for other club member to lead)
- ☐ Roll call – Secretary (may use an icebreaker or a "get acquainted" type of roll call to get the meeting started)
- ☐ Minutes of the last meeting – Secretary
- ☐ Business/Announcements – Vice President
- ☐ Club Activity – Activity Facilitator arranges this. It includes a project, lesson, service, etc. These are outlined by project area in the following pages.
- ☐ Refreshments – Refreshment coordinator
- ☐ Clean Up – Clean-up supervisor leads others in cleaning up

Essential Elements of 4-H Youth Development

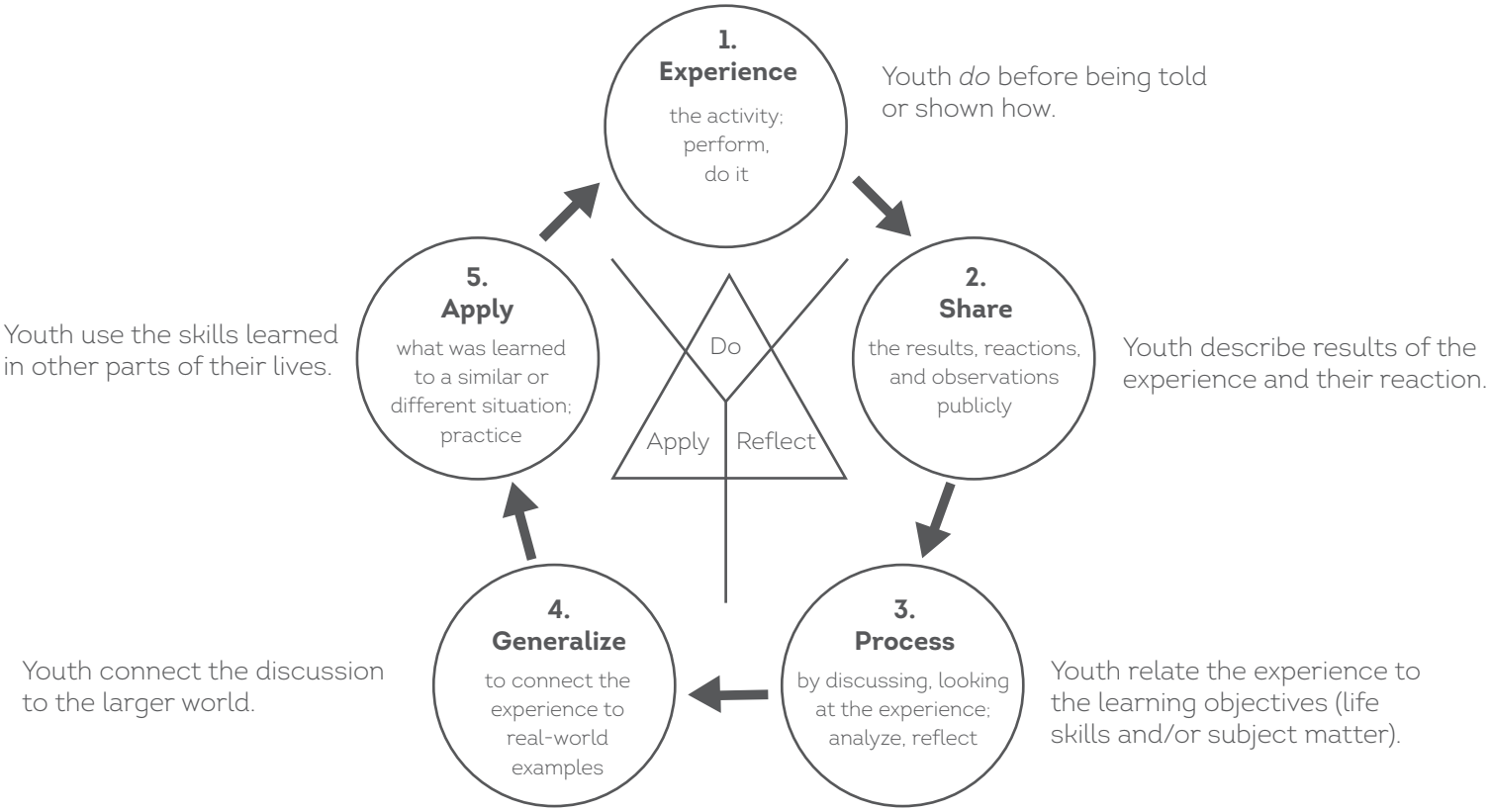
The essential elements are about healthy environments. Regardless of the project area, youth need to be in environments where the following elements are present in order to foster youth development.

1. **Belonging**: a positive relationship with a caring adult; an inclusive and safe environment.
2. **Mastery:** engagement in learning, opportunity for mastery.
3. **Independence:** opportunity to see oneself as an active participant in the future, opportunity to make choices.
4. **Generosity:** opportunity to value and practice service to others.

(Information retrieved from: http://www.4-h.org/resource-library/professional-development-learning/4-h-youth-development/youth-development/essential-elements/)

4-H "Learning by Doing" Learning Approach

The Do, Reflect, Apply learning approach allows youth to experience the learning process with minimal guidance from adults. This allows for discovery by youth that may not take place with exact instructions.



4-H Mission Mandates

The mission of 4-H is to provide meaningful opportunities for youth and adults to work together to create sustainable community change. This is accomplished within three primary content areas, or mission mandates - citizenship, healthy living, and science. These mandates reiterate the founding purposes of Extension (e.g., community leadership, quality of life, and technology transfer) in the context of 21st century challenges and opportunities. (Information retrieved from: http://www.csrees.usda.gov/nea/family/res/pdfs/Mission_Mandates.pdf)

1. **Citizenship:** connecting youth to their community, community leaders, and their role in civic affairs. This may include: civic engagement, service, civic education, and leadership.
2. **Healthy Living:** promoting healthy living to youth and their families. This includes: nutrition, fitness, social-emotional health, injury prevention, and prevention of tobacco, alcohol, and other drug use.
3. **Science:** preparing youth for science, engineering, and technology education. The core areas include: animal science and agriculture, applied mathematics, consumer science, engineering, environmental science and natural resources, life science, and technology.

Getting Started

1. Recruit one to three other families to form a club with you.
    a. Send 4-H registration form and medical/photo release form to each family (available at utah4h.org).
    b. Distribute the Discover 4-H Clubs curriculum to each family.
    c. Decide on a club name.
    d. Choose how often your club will meet (e.g., monthly, bi-monthly, etc.).
2. Enroll as a 4-H volunteer at the local county Extension office (invite other parents to do the same).
3. Enroll your club at the local county Extension office.
    a. Sign up to receive the county 4-H newsletter from your county Extension office to stay informed about 4-H related opportunities.
4. Identify which family/adult leader will be in charge of the first club meeting.
    a. Set a date for your first club meeting and invite the other participants.
5. Hold the first club meeting (if this is a newly formed club).
    a. See *A Typical Club Meeting* section above for a general outline.
        i. Your activity for this first club meeting will be to elect club officers and to schedule the six project area club meetings outlined in the remainder of this guide. You may also complete a-d under #1 above.
    b. At the end of the first club meeting, make a calendar outlining the adult leader in charge (in partnership with the club president) of each club meeting along with the dates, locations, and times of the remaining club meetings.
6. Hold the six project-specific club meetings outlined in this guide.
7. Continue with the same project area with the 4-H curriculum of your choice (can be obtained from the county Extension office) OR try another Discover 4-H Club project area.

Other Resources

Utah 4-H website: www.utah4-h.org

National 4-H website: www.4-h.org

4-H volunteer training:

To set up login:

http://utah4h.org/volunteers/training/

To start modules: (password = volunteer)

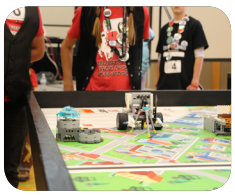
References

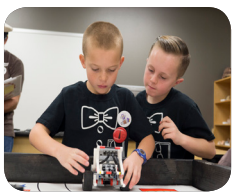
Information was taken from the Utah 4-H website (utah4h.org), the National 4-H website (4h.org), the Utah Volunteer Handbook, or as otherwise noted.

Lerner, R., M. et al. (2005). Positive youth development, participation in community youth development programs, and community contributions of fifth grade adolescents: Findings from the first wave of the 4-H Study of Positive Youth Development. Journal of Early Adolescence, 25(1), 17-71.

We would love feedback or suggestions on this guide; please go to the following link to take a short survey:
Go to https://goo.gl/iTfiJV or Click here to give your feedback

4-H LEGO® EV3 ROBOTICS CLUB *Meetings*





Paul Hill | Mike Isom | Stacey MacArthur
Utah State University Extension

DISCOVER
4-H LEGO® EV3 ROBOTICS

4-H Club Meeting 1

Driving the Base Robot

Supplies

- LEGO EV3 robot kit
- Computer
- EV3 MINDSTORMS software installed
- Internet connection
- Folder with paper (club journal)
- Pencil or pen

INTRODUCTION

Get ready to embark on an adventure in LEGO® robotics! In this activity, you will get right to work building your very first robot called "Driving Base." Robots are machines that can perform tasks on command, or by writing programs on your computer. The process of building and operating your robot is called robotics. The robot you will build is autonomous. This means it can sense things, plan, and act without human intervention. In this club meeting, you will be working with the Medium Motor, Touch Sensor, Color Sensor Down, Gyro, and Ultrasonic Sensor.

Activity #1

BUILDING THE DRIVING BASE ROBOT

TIME: 30-45 MINUTES

To get started, follow these simple directions:

1. Download the LEGO MINDSTORMS Education EV3 software here: https://education.lego.com/en-us downloads/mindstorms-ev3
2. Open LEGO MINDSTORMS Education EV3 software.
3. Select "Robot Educator."
4. Within "Robot Educator," select "Building Instructions."
5. Within "Building Instructions," select the "Driving Base" module, then click "Open."
6. Perform all tasks within the "Driving Base Module" (slides 1-46).
7. Within "Building Instructions," select the "Medium Motor - Driving Base" module, then click "Open."
8. Perform all tasks within the "Medium Motor - Driving Base" (slides 1-21).

9. Within "Building Instructions," select the "Touch Sensor" module, then click "Open."
10. Perform all tasks within the "Touch Sensor" (slides 1-7).
11. Within "Building Instructions," select the "Color Sensor Down" module, then click "Open."
12. Perform all tasks within the "Color Sensor Down" (slides 1-7).
13. Within "Building Instructions," select the "Gyro Sensor" module, then click "Open."
14. Perform all tasks within the "Gyro Sensor" (slides 1-10).
15. Within "Building Instructions," select the "Ultrasonic Sensor" module, then click "Open."
16. Perform all tasks within the "Ultrasonic Sensor" (slides 1-9).
17. Within "Building Instructions," select the "Gyro Sensor" module, then click "Open."
18. Perform all tasks within the "Gyro Sensor" (slides 1-10).

Define the Following Terms

- Autonomous –
- Robotics –

Reflect

- What did you learn?
- What role did each team member play in the building process?
- Why is it important to record where the ports are hooked up?
- Why is it important to know the names of all the parts?
- What are the names of the seven LEGO® parts/pieces you used today?

Apply

- How does building robots as a team apply in other situations?
- What is a career area that relies on teamwork?
- When do you work as a team at home? At school?
- Why is teamwork so important?

KEEP LEARNING!

Make It Official

- Club name -
- Robot name -
- Club colors -
- Mascot -

Debriefing

Explain that being a part of a robotics club requires a great deal of responsibility. Not only is the LEGO EV3 kit very expensive, but there are over 1,000 pieces that must be kept track of. Allow time for questions and answers. Mention that records are necessary for the club to function properly and to remember programs from previous club meetings. Instruct the youth to become familiar with the 4-H portfolio by going to www.utah4h.org.

References and Other Resources

LEGO Group (2013). LEGO® MINDSTORMS® Education EV3 Software. Retrieved from: education.lego.com

4-H Club Meeting 2

Introduction to Programming and Movement

Supplies

- LEGO EV3 robot kit
- Computer
- EV3 Mindstorm software installed
- Internet connection
- Folder with paper (club journal)
- Pencil or pen

INTRODUCTION

Now that your robot is built, it's time to start programming it. Robots must be programmed in order to move. Robots use sensors to collect information and interact with their surroundings. This is a great opportunity to get oriented with the LEGO® Mindstorms EV3® software. In this club meeting, you will write your first program, test it, and troubleshoot any unpredicted results. You'll also program your robot to play a simple tune.

Activity #1

PROGRAMMING THE DRIVING BASE ROBOT

TIME: 35-45 MINUTES

To get started, follow these simple directions:

1. Download the LEGO MINDSTORMS Education EV3 software: https://education.lego.com/en-us/downloads/mindstorms-ev3
2. Open LEGO MINDSTORMS Education EV3 software.
3. Select "Robot Educator."
4. Within "Robot Educator," select "Basics."
5. Within "Basics," select the "Configuring Blocks" module, then click "Open."
6. Perform all tasks within the "Configuring Blocks" (slides 1-10).
7. Within "Basics," select the "Straight Move" module, then click "Open."

8. Perform all tasks within the "Straight Move" (slides 1-5).
9. Within "Basics," select the "Curved Move" module, then click "Open."
10. Perform all tasks within the "Curved Move" (slides 1-5).
11. Within "Basics," select the "Tank Move" module, then click "Open."
12. Perform all tasks within the "Tank Move" (slides 1-5).
13. Within "Basics," select the "Move Object" module, then click "Open."
14. Perform all tasks within the "Move Object" (slides 1-5).

Make a Plan

In the space below, plan your first program before you start programming. Measure the distance the robot must travel. Measure how far the robot moves on one rotation. Find out how many rotations it takes for the robot to make a 90-degree turn.

_____
_____
_____
_____
_____
_____

Define the Following Terms

- Block -
- Code -
- Sequence Beam -
- Configuration Panel -
- Controller -

Reflect

- What were the problems you encountered when programming your robot?
- How did you fix these problems?
- Did your program work perfectly the first time? If not, what did you do to make it work?
- How many rotations does it take to make a 90-degree turn?

Apply

- When have you used instructions at home to complete a task?
- When have you had to troubleshoot a problem at home? At school?
- When will following instructions be useful to you in the future?
- Why is it important to be able to follow instructions?
- What if a pilot didn't have pre-flight instructions?

KEEP LEARNING!

Debriefing

Troubleshooting is defined as solving a problem by tracing back, identifying, and correcting faults within a mechanical or electronic system. Let club members know that this is part of being an engineer. Not everything works perfectly the first time. In fact, with robotics it can often take several attempts by trial and error to make the robot complete a task. Robots are only as good as their engineers and programmers. Trial and error are part of the process. Instruct the youth to keep a journal of what they learn so they can refer to it in future programs. Make sure the club's programs are saved on the computer and/or a flash drive. Allow time for review and questions.

References and Other Resources

LEGO Group (2013). LEGO® MINDSTORMS® Education EV3 Software. Retrieved from: education.lego.com

4-H Club Meeting 3

Introduction to Sensors, Movement Review, and Engineering

Supplies

- LEGO EV3 robot kit
- Computer
- EV3 Mindstorm software installed
- Internet connection
- Folder with paper (club journal)
- Pencil or pen
- Unit Converter app (Google it)

INTRODUCTION

You've already used the Move block in the previous activity. In the Move block's Control Panel you have the options for setting or configuring how the block tells the robot to move. There are several methods available: Seconds, Rotations, Degrees, and Unlimited. In this club meeting, you will have a chance to use each method and determine which is the best for different tasks. In this activity, you will be working with the Light Sensor, Gyro Sensor, and Ultrasonic Sensor.

Activity #1

MOVING THE DRIVING BASE ROBOT

Time: 35-45 MINUTES

To get started, follow these simple directions:

1. Download the LEGO MINDSTORMS Education EV3 software: https://education.lego.com/en-us/downloads/mindstorms-ev3
2. Open LEGO MINDSTORMS Education EV3 software.
3. Select "Robot Educator."
4. Within "Robot Educator," select "Basics."
5. Within "Basics," select the "Stop at Line" module, then click "Open."
6. Perform all tasks within the "Stop at Line" module (slides 1-5).
7. Within "Basics," select the "Stop at Angle" module, then click "Open."

8. Perform all tasks within the "Stop at Angle" module (slides 1-5).

9. Within "Basics," select the "Stop at Object" module, then click "Open."

10. Perform all tasks within the "Stop at Object" module (slides 1-5).

Activity #2

CALIBRATION

TIME: 20 MINUTES

Use the chart below to calibrate your robot for travel by time.

Time Driven	Predicted Distance	Actual Distance
1 second		
5 seconds		
10 seconds		
25 seconds		

What is calibration? When you calibrate your robot, you are gathering information about the robot's performance to plan or estimate for future performance. Programming that relies on a signal to get the robot to perform a task requires calibration.

Distance Traveled Formula:

1. Diameter: a straight line passing through the center of a circle or sphere and meeting the circumference or surface at each end.

2. Circumference/Perimeter: the length of the outer boundary of a circular area.

3. Pi (ϖ): 3.142; a mathematical constant that is the ratio of a circle's circumference to its diameter.

4. What is your wheel's diameter? Diameter x Pi = Circumference. Calculate your circumference in the space below:

5. If you know how far your robot needs to travel, just divide that distance by the circumference of the wheel to find the number of rotations.

6. Distance Needed/Distance Traveled Per Rotation = Number of Rotations.

7. How many rotations would it take for your robot to travel six feet? Hint: You'll need a unit converter app.

ENGINEERING PROCESS

TIME: VARIABLE

This next part is the moment you've been waiting for. This is the process engineers follow when making everything they need to:

1. Identify Problem
2. Research Problem
3. Develop Solutions
4. Select Solution
5. Construct Prototype
6. Evaluate Solution
7. Share Solution
8. Redesign

Follow these steps on your next robot mission and then rebuild!

Reflect

- What happened when your robot ran for the first time?
- Did your robot coast to a stop?
- Why is it important to know more than one way to program your robot?

Apply

- How do you solve problems in everyday life?
- What is an example of something you have to calibrate at home? At school?
- Will computer programming help you in the future? Why or why not?

KEEP LEARNING!

Debriefing

Troubleshooting is defined as solving a problem by tracing back, identifying, and correcting faults within a mechanical or electronic system. Let club members know that this is part of being an engineer. Not everything works perfectly the first time. In fact, with robotics it often takes several attempts by trial and error to make the robot complete a task. Robots are only as good as their engineers and programmers. Trial and error are part of the process. Instruct the youth to keep a journal of what they learn so they can refer to it in future programs. Make sure the club's programs are saved on the computer and/or a flash drive. Allow time for review and questions.

References and Other Resources

LEGO Group (2013). LEGO® MINDSTORMS® Education EV3 Software. Retrieved from: education.lego.com

4-H Club Meeting 4

Introduction to Multitasking and Switches

Supplies

- LEGO EV3 robot kit
- Computer
- EV3 Mindstorm software installed
- Internet connection
- Folder with paper (club journal)
- Pencil or pen
- Unit Converter app (Google it)
- Calculator
- Ruler

INTRODUCTION

Now that you've learned about several sensors and how your robot can move, it's time to see how your robot can react to its environment.

Activity #1

THE DRIVING BASE ROBOT REACTING TO ITS ENVIRONMENT

Time: 30-40 MINUTES

To get started, follow these simple directions:

1. Download the LEGO MINDSTORMS Education EV3 software: https://education.lego.com/en-us/downloads/mindstorms-ev3
2. Open LEGO MINDSTORMS Education EV3 software.
3. Select "Robot Educator."
4. Within "Robot Educator," select "Beyond Basics."
5. Within "Beyond Basics," select the "Multitasking" module, then click "Open."
6. Perform all tasks within the "Multitasking" module (slides 1-5).
7. Within "Beyond Basics," select the "Switch" module, then click "Open."
8. Perform all tasks within the "Switch" module (slides 1-5).
9. Within "Beyond Basics," select the "Multiple Switch" module, then click "Open."
10. Perform all tasks within the "Multiple Switch" module (slides 1-5).

Reflect

- What is the difference between a switch and multitasking?
- When would you use a switch instead of multitasking? And vice-versa?

Apply

- What did you learn about multitasking? Did you make a plan before starting to program?
- How do you multitask in everyday life? Is it smart to plan ahead?
- Can you think of any switches we use in our brain?

KEEP LEARNING!

Debriefing:

Make sure the youth read each slide carefully. It's not a race, so don't rush. It is critical to make a plan before programming a robot to move–it saves time and patience. Instruct the youth to keep a journal of what they learn so they can refer to it in future programs. Once they learn what it takes to make a perfect left or right turn, they'll need to apply that code again down the road. Make sure the club's programs are saved on the computer and/or a flash drive. Allow time during the activity for review and questions.

References and Other Resources

LEGO Group (2013). LEGO® MINDSTORMS® Education EV3 Software. Retrieved from: education.lego.com

Supplies

- LEGO EV3 robot kit
- Computer
- EV3 Mindstorm software installed
- Internet connection
- Folder with paper (club journal)
- Pencil or pen

INTRODUCTION

Looping makes repetitive tasks easy! Robots are great for performing these repetitive tasks because they don't get bored. In this club meeting, you will learn to utilize the Loop block in the Flow menu. By using Loop blocks, you are repeating a section of code for a set number of times, indefinitely, or until a sensor responds or another action occurs.

Activity #1

LOOPING TO REPEAT CODE

Time: 30 MINUTES

1. Download the LEGO MINDSTORMS Education EV3 software: https://education.lego.com/en-us/downloads/mindstorms-ev3
2. Open LEGO MINDSTORMS Education EV3 software.
3. Select "Robot Educator."
4. Within "Robot Educator," select "Beyond Basics."
5. Within "Beyond Basics," select the "Loop" module, then click "Open."
6. Perform all tasks within the "Loop" module (slides 1-5).
7. Questions to ask participants:

   What are some reasons for using a Loop block?

   What is the pseudocode for driving a square using the Loop block?

Reflect

- What does the Loop block do?
- When performing the square program, did it work the first time?

Apply

- What are five tasks you wish a robot could do for you?
- Choose one of the five tasks. Design a robot specifically for that task. Write the pseudocode to complete the task.
- What other things helps us perform tasks?
- Do any of these things have similar characteristics to robots?

KEEP LEARNING!

Debriefing:

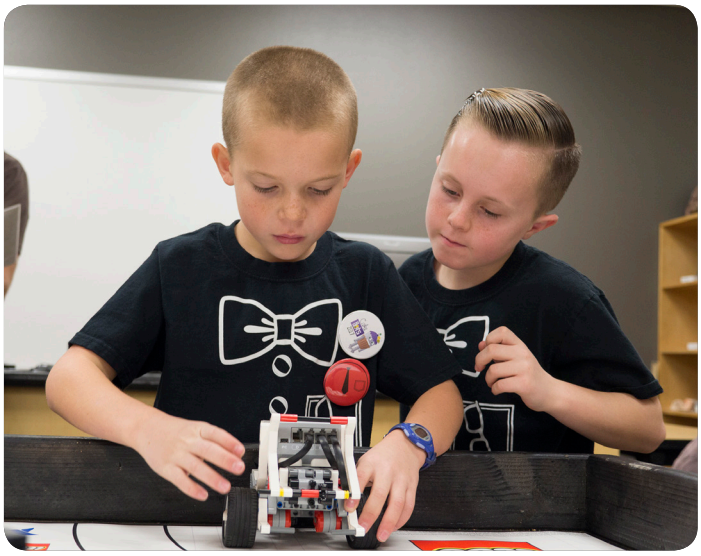
Make sure the youth review each slide carefully. Make sure that each youth has a chance to program using the Loop block. They all need to understand all of its capabilities. Make sure the club's programs are saved on the computer and/or a flash drive. Allow time during the activity for review and questions.

References and Other Resources

LEGO Group (2013). LEGO® MINDSTORMS® Education EV3 Software. Retrieved from: education.lego.com

4-H Club Meeting 6

Loops, Switches, and Light Sensor



Supplies

- LEGO EV3 robot kit
- Computer
- EV3 Mindstorm software installed
- Internet connection
- Folder with paper (club journal)
- Pencil or pen
- Black electric tape

INTRODUCTION

In this club meeting, you will use all the knowledge you have gained from previous activities. You'll be calibrating the light sensor so the robot can use it to follow a line and complete a maze course. The Light sensor allows the robot to know where it's going. You will also use the Switch block, which you learned about in Club Meeting 4.

Activity #1

COMPLETING A MAZE COURSE

TIME: 30-40 MINUTES

To get started, follow these simple instructions:

1. Download the LEGO MINDSTORMS Education EV3 software: https://education.lego.com/en-us/downloads/mindstorms-ev3
2. Open LEGO MINDSTORMS Education EV3 software.
3. Select "Robot Educator."
4. Within "Robot Educator," select "Basics."
5. Within "Basics," select the "Stop at Line" module, then click "Open."
6. Review the "Stop at Line" module (slides 1-5).
7. Within "Robot Educator," select "Beyond Basics."
8. Within "Beyond Basics," select the "Switch" module, then click "Open."
9. Review the "Switch" module (slides 1-5).

10. Within "Robot Educator," select "Beyond Basics."

11. Within "Basics," select the "Loop" module, then click "Open."

12. Review the "Loop" module (slides 1-5).

13. Questions to ask participants:

    What is the light level detected by your robot on the ground?

    What is the light level of the black electric tape your robot will follow?

    Was your robot able to follow a line?

    Did your robot turn corners as it followed the line?

    Why do you think the robot wiggles so much when it follows the line?

Reflect

- Why is it important for you to understand how different blocks (like Loops and Switches) work together?

- How does your robot make decisions as it follows a line?

Apply

- When do you have to make difficult decisions at school? At home?

- What did you learn today? How will it help you in different situations?

KEEP LEARNING!

Debriefing:

Make sure the youth read each slide carefully. Make sure that each youth has a chance to program using the Loop and Switch blocks so they understand how they are used together. Help the youth recognize why the robot appears to wiggle as it follows the line. It wiggles as it follows the black tape because it is making decision after decision to turn as it detects a change in surface color. Programming the Switch block inside of the Loop block allows the robot to go on indefinitely as it stays on course and follows the black surface. Make sure the club's programs are saved on the computer and/or a flash drive. Allow time during the activity for review and questions.

Congratulations

You have completed all the LEGO® MINDSTORMS® Education EV3 curriculum modules necessary to be considered competent in robotics. If you would like to go further, this curriculum pack provides extensive content for 4-H club leaders as you seek to engage your 4-H club members in real-world engineering challenges and enable them to apply and develop their programming knowledge to topics such as vehicle reversing warning systems, keyless ignition systems, and cruise control. All these activities are available in PDF format for easy printing for you to inspire your club to discover the importance of coding in our everyday lives.

Download Here:

https://education.lego.com/en-us/support/mindstorms-ev3/coding-activities

References and Other Resources

LEGO Group (2013). LEGO® MINDSTORMS® Education EV3 Software. Retrieved from: education.lego.com

More to Discover

Congratulations on completing your Discover 4-H club meetings! Continue with additional curriculum in your current project area, or discover other 4-H project areas. Check out the following links for additional 4-H curriculum.

1. www.discover4h.org
2. http://www.4-h.org/resource-library/curriculum/
3. http://utah4h.org/curriculum/

Become a 4-H Member or Volunteer

To **register** your Utah club or individuals in your club, visit and contact your county Extension office.

http://utah4h.org/about/

http://utah4h.org/join/index

For help registering in 4-H online, visit:

http://utah4h.org/staffresources/4honlinehelp

Non-Utah residents, please contact your local 4-H office:

http://www.4-h.org/get-involved/find-4-h-clubs-camps-programs/

Stay Connected

Visit Your County Extension Office

Stay connected with 4-H activities and news through your county Extension office. Ask about volunteer opportunities, and don't forget to register for your county newsletter. Find contact information for counties in Utah here:

https://extension.usu.edu/locations

Enjoy the Fair!

Enter your project or create a new project for the county fair. Learn about your county fair and fair judging here:

http://utah4h.org/events/index

Participate in Local or State 4-H Activities, Programs, Contests, or Camps

For Utah state events and programs, visit:

http://utah4h.org/events/index

http://utah4h.org/projects/

For local Utah 4-H events and programs, visit your county Extension office:

https://extension.usu.edu/locations

Non-Utah residents, please contact your local 4-H office:

http://www.4-h.org/get-involved/find-4-h-clubs-camps-programs/

Discover *Service*

Become a 4-H Volunteer!

http://www.youtube.com/watch?v=UBemO5VSyK0

http://www.youtube.com/watch?v=U8n4o9gHvAA

To become a 4-H volunteer in Utah, visit us at:

http://utah4h.org/join/becomevolunteer

Serve Together as a 4-H Club or as an Individual 4-H Member

Use your skills, passions, and 4-H to better your community and world. You are needed! Look for opportunities to help in your area or participate in service programs that reach places throughout the world (religious groups, Red Cross, etc.).

Hold a Club Service Project

USU Collegiate 4-H Club hosted "The Gift of Giving" as a club activity. Club members assembled Christmas stockings filled with needed items for CAPSA (Community Abuse Prevention Services Agency).

http://tinyurl.com/lu5n2nc

Donate 4-H Projects

Look for hospitals, nursing homes, or other nonprofit organizations that will benefit from 4-H projects. Such projects include making quilts for CAPSA or Primary Children's Hospital, or making beanies for newborns. During Utah 4-H State Contests, 40 "smile bags" were sewn and donated to Operation Smile.

Partner with Local Businesses

92,000 pounds of processed lamb, beef, and pork were donated to the Utah Food Bank in 2013 by multiple companies.

http://tinyurl.com/pu7lxyw

Donate Money

Clubs or individuals can donate money gained from a 4-H project to a worthy cause. A nine-year-old 4-H member from Davis County donated her project money to help a three-year-old battle cancer.

http://tinyurl.com/mqtfwxo

Give Us Your *Feedback*

Help us improve Discover 4-H curriculum. We would love feedback or suggestions on this guide. Please go to the following link to take a short survey: Click here to give your feedback or go to: https://goo.gl/iTfiJV