Implementing Classroom Competitions with VEX EXP

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VEX EXP

Workshop Goals

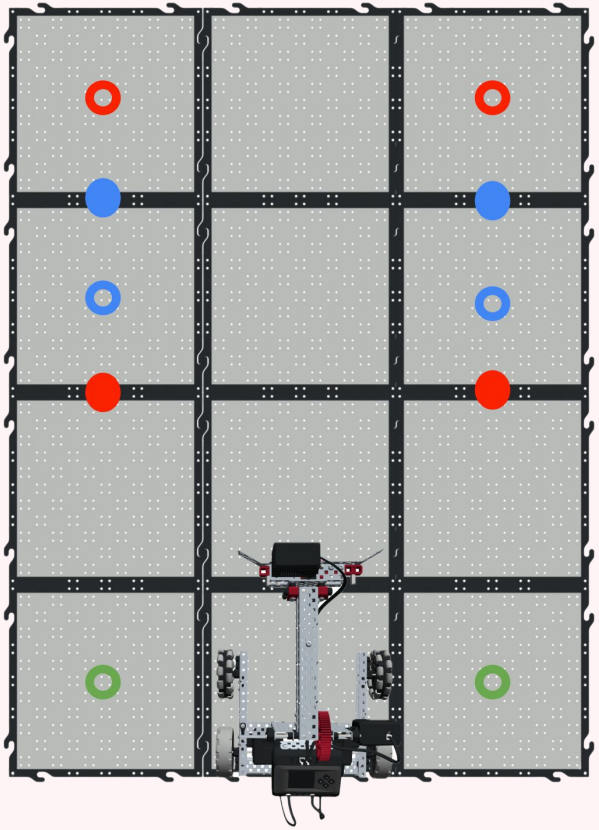
- Experience a classroom-ready VEX EXP competition
- Learn a simple 4-step process to create your own
- Create a competition you can use in your classroom

Why Classroom Competitions?

- Increase engagement and motivation
- Promote collaboration and decision-making
- Support iterative problem-solving

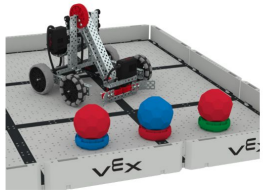
Defend the Castle Competition

- Your Clawbot should start with the back wheels against the back Field wall.
- The goal is to build the "strongest" wall. More points = stronger wall.
    - Drive using the Driver Control Program (2 minutes).
    - Wall pieces must be connected (line, curve, etc.)
    - Points are awarded as follows:
        - Rings (must be placed on the bottom)
            - **Red** Ring = 3 points
            - **Blue** Ring = 2 points
            - **Green** Ring = 1 point
        - Buckyballs (placed on top of rings): Worth 1 point each
    - Same color stacks are worth **double** points
- Collaborate with your partner to develop a strategy. Take turns and record your points during each round.
- The wall with the highest score, wins!



Defend the Castle (Modified)

VEX EXP Activity



Defend the Castle

Drive your Clawbot to build a wall and defend your castle!

Step by Step

1. Build the Clawbot and connect a controller.
2. The object of this activity is to build a wall with Buckyballs and rings using your Clawbot and a Controller. A completed wall segment is a Buckyball sitting in a ring. Combine the walls to keep invaders out!
3. The Clawbot should be on a 3'x3' Field with walls. There should be three Buckyballs and three rings of any color randomly placed around the field. The Clawbot should start with the back wheels touching any of the four field walls.
4. Using the Driver Control Program, pick up and stack Buckyballs using the Controller.
5. Time yourself! How fast can you protect your royal jewels by building a wall? How do you think you can improve your time?

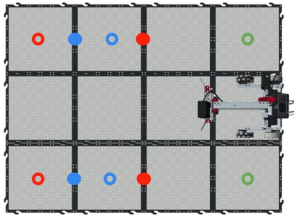
'LEVEL UP'

- **Points -** Assign point values to certain color pieces. Imagine the red rings are cement bases, so try opting for all reds on the bottom.
- **Driver configurations -** Can you try other driver configurations? Which are you best and most accurate with?
  - Split arcade
  - Tank drive
  - Right arcade
  - Left arcade

Pro Tips

- Get a grip! Add rubber bands to the mouth of your Clawbot to add grip strength when grabbing those Buckyballs.
- Go slowly when carrying a Buckyball. Rapid movements combined with your new center of gravity means a high tipping risk. Plus, slow movements allow for greater precision when placing Buckyballs.

VEX EXP Activity



Defend the Castle Competition

Drive your Clawbot to build a wall and defend your castle!

Step by Step

1. Build the Clawbot and connect a controller.
2. Set up a 3'x4' Field with walls. Your Clawbot should start with the back wheels against the back Field wall.
3. Place 2 of each colored Buckyball and 2 of each colored Ring on the Field as shown.
4. The goal is to build the "strongest" wall. More points = stronger wall.
   - You will drive your Clawbot using the Driver Control Program.
   - You have two minutes to build your wall. Wall pieces must be connected (line, curve, etc.)
   - Points are awarded as follows:
     - Rings (must be placed on the bottom)
       1. Red Ring = 3 points
       2. Blue Ring = 2 points
       3. Green Ring = 1 point
     - Buckyballs (placed on top of rings): Worth 1 point each
   - Same color stacks are worth **double** points
5. Collaborate with your partner to develop a strategy. Take turns and record your points during each round.
6. The wall with the highest score, wins!

Create Your Own Competition

1. Identify your goals and constraints
2. Choose a resource to adapt
3. Determine a competition type
4. Adapt and test

Custom Competition “Recipe”

1. **Goals and Constraints:**
   - ….
   - ….

2. **Activity to adapt**: _____.

3. **Competition type:**
   - The type of competition I will create is _____.

4. **Adapt and Test:**
   - I will adapt this Activity by _____.
   - When I tested the activity I found _____.
   - **Changes** I need to make are _____.

Additional Ingredients (optional): _____.

1. Identify Goals and Constraints

Goals:

- To practice driving with precision and to manipulate objects
- To code a robot to drive forward and in reverse
- To design and build a manipulator that can remove objects from the Field as quickly as possible
- To use gear ratios to design a mechanism that can lift the greatest weight

Constraints:

- Robot build
- Time
- Prior knowledge
- Materials such as number of fields, robots, etc.
    - Pieces left in kit after robot builds
- Space
- Number of students playing

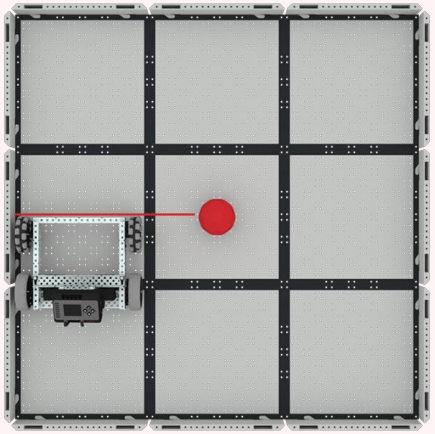
Our Constraints

The constraints for **this** workshop are:

- You must use the Clawbot as is — no modifications
- You can only use the remaining pieces and game objects from the Classroom Bundle (including sensors)
- You must use the pre-built workshop EXP Fields as is

2. Choose a Resource to Adapt

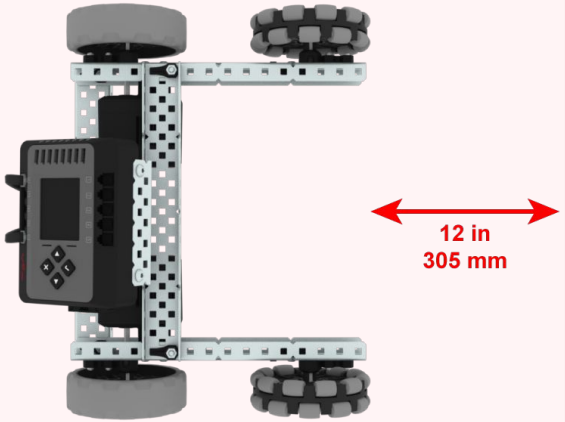
Driver Configurations



Test your robot driving skills with four different driving configurations!

Driving Focused

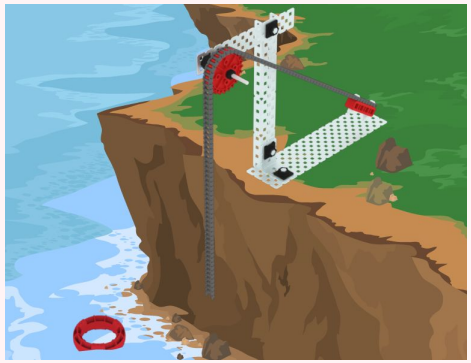
Drive Forward and Reverse



Autonomously move your robot forward and backwards!

Coding Focused

Ring Rescue



Use your design skills to create a contraption to rescue the Ring!

Engineering Focused

Resources Notes

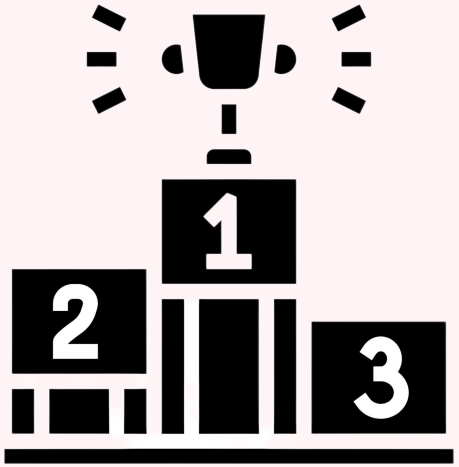
Keep the following in mind as you choose a resource:

- Use the activities as inspiration
- Don’t be afraid to turn one type of activity into another, or combine them
- Some Activities have competition suggestion in the ‘LEVEL UP’ section

3. Choose a Competition Type

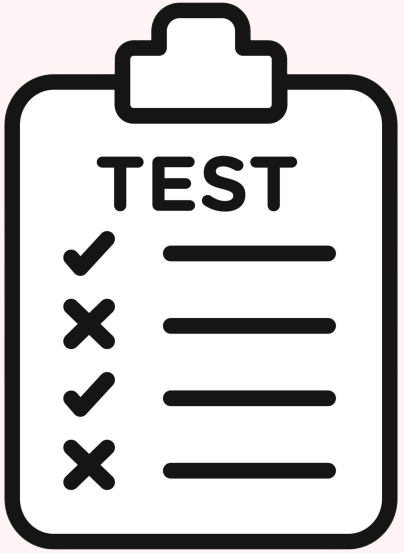
Examples of different types include:

- Points based
- Time based
  - Complete before the clock runs out
  - Complete in the shortest/longest time
  - Create the tallest, strongest, fastest, etc.
- A combination



4. Adapt and Test

- Ensure your rules, scoring, setup, and overall game play are clearly defined
- Take time to try your idea to see if it works
- Keep iterating



Share & Discuss

Now that you had time to test and refine… let's share!

- What worked well?
- What would you refine?
- What ideas did this spark?

- How could you differentiate this activity to meet the needs of all learners?

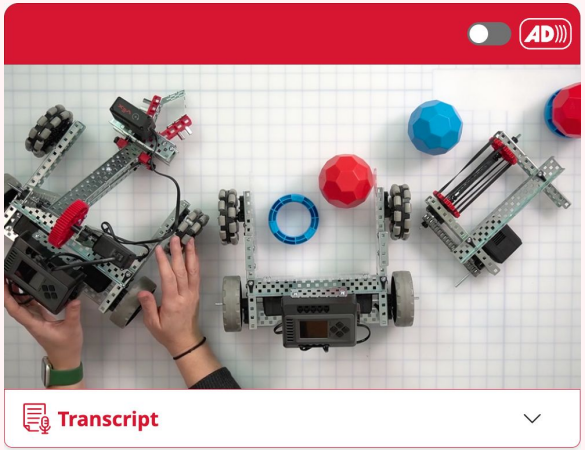
Additional Assessments & Tasks

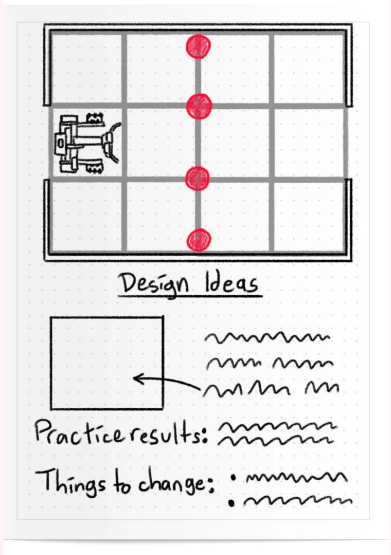
- Assessment/reflection questions
- Rubrics
- Data tables
- Task Cards
- Engineering Notebook requirements

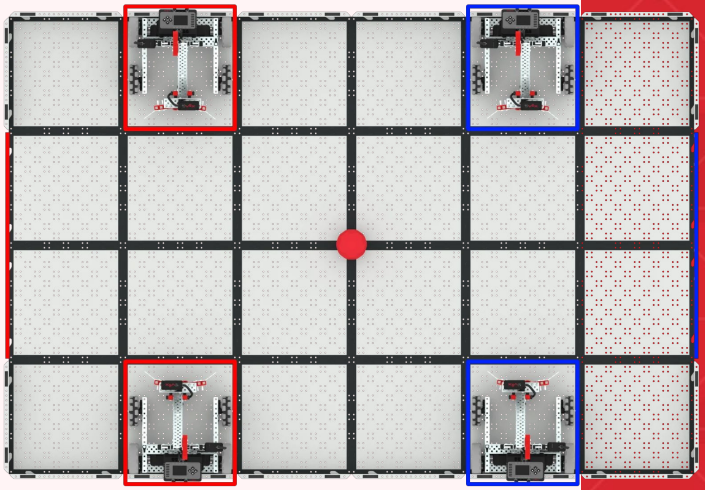
Do you have competition teams at your school? You can reuse old game elements!

Classroom Competition STEM Lab Units

Learn — **Practice** — **Compete**



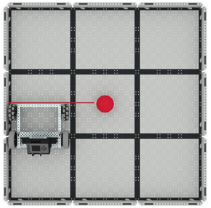




Curricular Supports

Activities

VEX EXP Activity



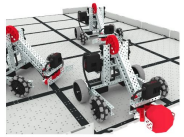
Driver Configurations

Test your robot driving skills with four different driving configurations!

Step by Step

1. Build the BaseBot and connect a controller. Place your BaseBot on a 3'x3' field with a Buckyball or other obstacle in the center, as shown in the image above. The goal of the activity is to explore and test the different driver configurations by driving around the Buckyball without touching it, as fast as you can.
2. Select a driver configuration! There are four of them:
    - **Left Arcade:** Drive the BaseBot forward, reverse, left, and right all using the left joystick.
    - **Right Arcade:** Drive the BaseBot forward, reverse, left, and right all using the right joystick.
    - **Split Arcade:** Drive the BaseBot left and right using the left joystick, and forward and reverse using the right joystick.
    - **Tank Drive:** Drive the left motor of the BaseBot using the left joystick, and the right motor of the BaseBot using the right joystick.
3. Place your robot at the starting line, as shown in the image above, and run the Driver Control Program with your selected driving configuration. How fast can you lap around the Buckyball? Record your time.
4. Once you've successfully driven around the Buckyball in one configuration, move on to another one. Try them all, recording each time to see which configuration allows you to drive the fastest and is the easiest to control!

STEM Labs



Robot Soccer

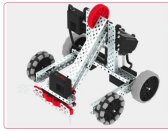
4 Lessons

In this Unit, you will explore how to create a manipulator on your robot to grab, pass, and score the most goals as a robot soccer player in the Robot Soccer competition!

Visit the Teacher's Portal for teacher support materials and videos about the content and facilitation of the Robot Soccer Lessons.

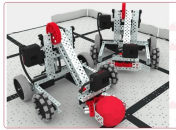
Robot Soccer Teacher's Portal >

< Return to Labs



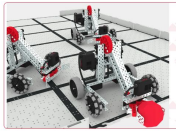
Lesson 1: Introduction

In this Lesson, you will build the Clawbot, charge your Controller and Battery, and get ready to code.



Lesson 2: Manipulators

In this Lesson, you will learn about passive and active manipulators and intake design, in order to iterate on your robot design and compete in a One-on-One Robot Soccer challenge!



Lesson 3: Robot Soccer Competition

In this Lesson, you will apply your learning from the previous Lesson to compete in the Robot Soccer competition!

Wrap Up & Stay Connected

Let's Connect!

- Tag me in the **VEX PD+ Community!** @Lauren_Oberst
- Email: Lauren@vex.com

Want to Learn More? Join VEX PD+ as an All-Access Member!

- Schedule a **1-on-1 Session** in VEX PD+