# Sumobot Challenge

# Pre-Activity Quiz

1. **What must you keep in mind when building a robot to fight another robot by trying to push it out of a ring?**

2. **How can you use gears to your advantage in the competition?**

# Pre-Activity Quiz **Answers**

1. **What must you keep in mind when building a robot to fight another robot by trying to push it out of a ring?**

   **Robot structure, that is, to scoop the other robot, pushing mechanism, etc.**

   **Robot weight**

   **Robot gear ratio: power vs. speed**

1. **How can you use gears to your advantage in the competition?**

   **Use a low gear ratio (small gear turning a big gear) and focus on a powerful attack.**

   **Use a high gear ratio (large gear turning a small gear) and focus on a speedy attack.**

   **Use a medium gear ratio and balance between both power and speed.**

# Sumobot Challenge

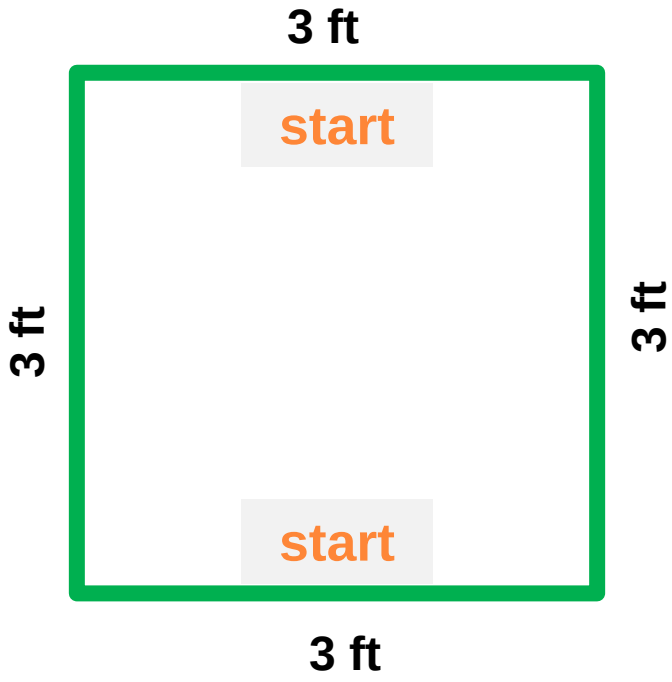
**75 minutes**

## To build and program a robot to battle another robot.

- **Two robots are placed on opposite sides of a square ring facing each other.** **See diagram on next slide ➔**
- **The teacher, who will judge the challenge, counts down from 3 and says, "Go!"**
- **At Go!, students press their EV3 brick buttons to activate their programs for the challenge.**
- **The robot that first has *both* of its tires outside the ring at once is declared the loser; the other robot is the winner of the match and moves on to the next round.**

# Battleground Setup & Rules

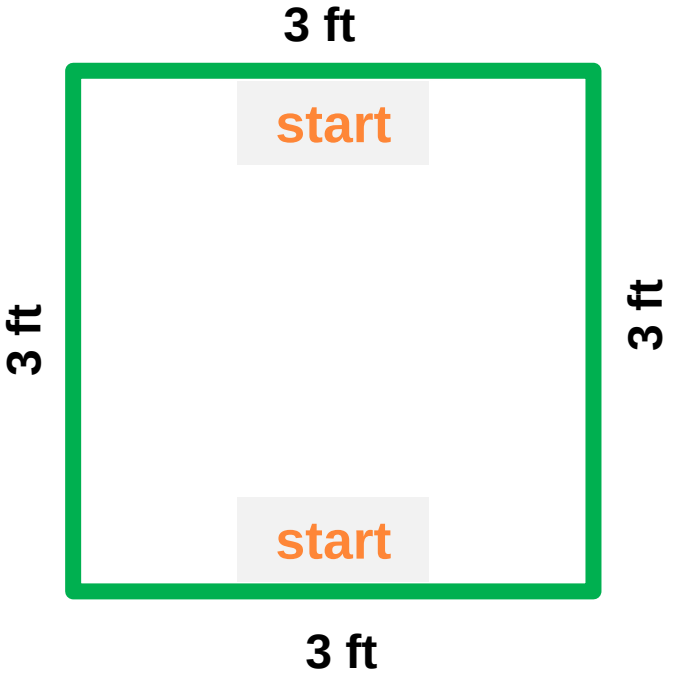
- The “ring” consists of a 3 x 3 foot square area.
- The robots start at opposite sides of the challenge ring.




- After the battle begins, students may **not** touch their robots unless the teacher deems it necessary.

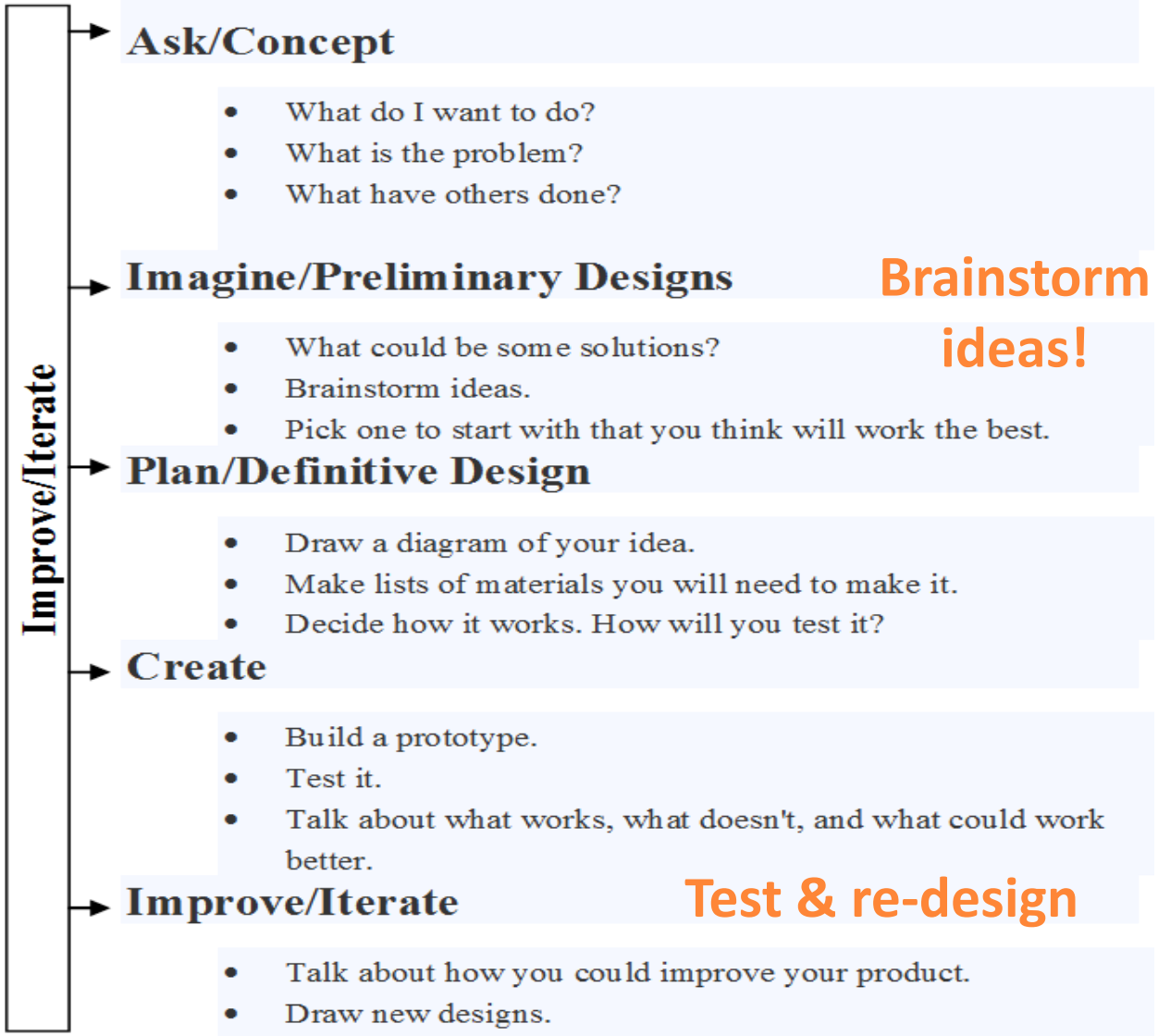
# Battleground Materials List

- **Ruler or tape measure**
  **(to measure out the “ring”)**
- **Black electrical tape**
  **(to mark the square area)**
- **Little stickers or signs to signify the robot starting points**



# Engineering Design Process

Follow these steps...



# Post-Activity Quiz

1. **What type of gear ratio did you use for your Sumobot? How did that affect the fight?**

2. **How did you design your robot and/or your program to help you complete the task?**

# Post-Activity Quiz **Answers**

1. **What type of gear ratio did you use for your Sumobot ? How did that affect the fight?**

   **If a large gear ratio was used (big gear turning small gear), the robot was faster but sacrificed power.**

   **If a small gear ratio was used (small gear turning big gear), the robot had a lot of power while sacrificing speed.**

   **If the gear ratio used was close to 1 (similar-sized gears turning each other), the robot maintained a balance of both power and speed.**

2. **How did you design your robot and/or your program to help you complete the task?**

   **Possible answers:**

   **Changing gear ratio (power vs. speed)**

   **Designing different structures to help fight the other robot**

   **Designing a program so the robot moves directly towards the robot opponent**

# Vocabulary

**design:** Loosely stated, the art of creating something that does not exist.

**gear:** A rotating machine part with cut teeth that mesh with another toothed part in order to transmit torque; in most cases, the teeth on both gears are identical in shape.

**torque:** The tendency of a force to rotate an object about its axis or pivot.