SAINTS GLOBAL

ACTIVITY PLAN

ROBOTICS

INTELLECTUAL CORE

Version 2026.1

Companion to the BRC: a series of one-hour activity sessions for use on weekly activity night or at home. Each session declares which requirements it contributes to.

THE CULMINATING EVENT

The troop demo

In Session 4, each saint runs his own robot through his own chosen task in front of the troop. The sustained build, code, and test work between Sessions 3 and 4 — assembling the robot, finishing the program, running it through multiple test passes, fixing at least one failure — is what makes the demo possible. The demo is where the build, the program, the test results, and the explanation are verified together.

INDOOR — MEETING ROOM WITH TABLE SPACE FOR EACH ROBOT, A POWER STRIP, AND FLOOR OR COURSE AREA FOR TASKS THAT NEED IT

4 SESSIONS IN THIS PLAN

SESSION 1 · INTELLECTUAL CORE

60 min target

Inspect the workspace and name the categories

Handle each tool and category of robot before any build begins.

SESSION AIM

Run Step 1 end to end — the workspace hazards by station, the first-aid response for cuts, burns, and eye injuries, the three categories of robot (remote-controlled, telerobot, autonomous) with one real example of each, and the safety gear each youth will wear at the build bench. Saints leave with Step 1 marked on the BRC and a clear picture of the kind of robot they will choose to build.

WALK AWAY WITH

- Can name the hazards at each station (cutting tools, soldering iron, moving parts, electrical) and the prevention rule for each
- Can give the first response and the stop point for cuts, burns, and eye injuries
- Can distinguish remote-controlled, telerobotic, and autonomous robots with one real example of each
- Has chosen the safety gear he will wear at the build bench and put it on once

BRING / SET UP

- The actual build workspace, set up with the tools the group will use (cutting tools, soldering iron and stand, hand tools, battery)
- A basic first-aid kit and eyewash bottle, laid out where the group can see them
- Safety gear for each youth: safety glasses, closed-toe shoes, hair tie if needed
- One example of each robot category to point at: an RC vehicle, a video of a telerobot (surgical or bomb-disposal arm), an autonomous vacuum or a small autonomous toy
- Robot Anatomy Reference handout (one per saint)
- BRC printouts and pens

THE HOUR

BLOCK 1 · DISCUSSION **Opener — Hand on the bench** 5 min

Ask the group: "What is one tool on this bench you have never used before, and what worries you about it?" Take four or five answers — soldering iron is the common one, sometimes a rotary tool or a battery. Do not correct fears yet. Put the bench, the heat, the spinning parts, and the electricity on the table as things the group will name and handle before building anything.

SESSION 1 · INSPECT THE WORKSPACE AND NAME THE CATEGORIES (PAGE 2 OF 3)

THE HOUR — CONTINUED

BLOCK 2 · SKILL PRACTICE Walk the bench, name the hazards

16 min

1. Walk the actual build workspace. Stop at each station — cutting, soldering, moving parts, electrical — and have a youth call out the hazard, the prevention rule, and the safety gear that goes with it.
2. Run four short scenarios in sequence: a youth nicks his thumb on a knife; a youth touches a hot iron tip; a youth gets a fleck of solder near his eye; a youth pinches a finger between gears. For each, the group gives the first response and the point at which to stop work and get an adult.
3. Lay the eyewash, the first-aid kit, and the safety glasses out where everyone can see them. Each youth puts on his glasses and confirms they fit.
4. Reinforce that robotics injuries usually happen to attentive people who skipped one step — the gear and the rule are what protect the saint when his attention slips.
5. Leader confirms 1a and 1b: hazards named with prevention and response, first-aid steps correct, eye protection in place.

REQ 1A REQ 1B

BLOCK 3 · DISCUSSION Three categories of robot

18 min

1. Walk the three categories with one real example of each on the table or on screen: an RC car (remote-controlled), a surgical or bomb-disposal arm operated at a distance with video feedback (telerobot), and an autonomous vacuum or self-driving toy that runs on its own logic (autonomous).
2. For each, name the control loop in plain terms: the RC car follows the human in real time; the telerobot follows the human through a camera and sometimes through assistive software; the autonomous robot follows its own program reading its own sensors.
3. Each youth picks one of the three categories and explains it in his own words: what it does well, where it fails, and why a designer would pick it for one job over another.
4. Reinforce that the word "robot" covers very different machines — choosing the right category is part of the design work in Session 2.
5. Leader confirms 1c: the three categories named with one real example and one trade-off per category.

REQ 1C

SESSION 1 · INSPECT THE WORKSPACE AND NAME THE CATEGORIES (PAGE 3 OF 3)

THE HOUR — CONTINUED

BLOCK 4 · SKILL PRACTICE Suit up and try the safety gear

16 min

1. Each youth puts on his full safety gear — glasses, closed-toe shoes, hair tied back, sleeves clear of moving parts — and stands at the bench he will use.
2. Walk a dry-run handling pass: pick up a hand tool the right way, set it down the right way, hand it to another youth the right way (handle first). No power tools yet; this is the handling habit, not the work.
3. Demonstrate the soldering iron stand without an iron in it: where the stand goes, where the cord goes, where the sponge goes, and the "always return the iron to the stand" rule. Have a youth narrate while another mimes it.
4. Each youth names one bench rule he will hold himself to for the rest of the badge — eyes always covered, iron always back in the stand, knife always cuts away, battery never crosses a metal tool.
5. Note any youth whose safety gear is missing or wrong and what is needed before Session 3 (his glasses do not fit, his shoes are open-toed, his sleeves are too loose).

BLOCK 5 · REFLECTION Close — Step 1 marked

5 min

1. Confirm on each saint's BRC: 1a, 1b, and 1c are marked. Step 1 completes in-session.
2. Each youth states one stop rule aloud — the condition under which he puts the tool down and asks for an adult, no matter how close he is to finishing.
3. Next week the group picks each saint's real task and writes the design plan. Bring the Robot Anatomy Reference and any first thoughts about what kind of robot to build.

AT THE CLOSE · DEBRIEF

1. Which tool on this bench did you handle for the first time tonight?
2. What is your stop rule — the condition under which you put the tool down?
3. Which category of robot — remote-controlled, telerobot, or autonomous — do you think you want to build?

Mark 1a, 1b, and 1c after this session. Step 1 completes in-session. Note any saint whose safety gear is missing or wrong and confirm it is in place before Session 3.

SESSION 2 · INTELLECTUAL CORE

60 min target

Pick the task and design the robot

A sketch with components, motion, and a sensor input precedes the build.

SESSION AIM

Each saint picks the real task his robot will perform, names the success conditions in measurable terms with at least one sensor input, and writes a design plan covering components, degrees of freedom, and the control method. Saints leave with a written plan, a parts list, and the kit or scratch-build path chosen for the build between Sessions 2 and 3.

WALK AWAY WITH

- Has picked a real task the robot will perform and written the success conditions in measurable terms
- Has named at least one sensor input the robot needs and what reading means task-done
- Has sketched a design plan covering components, two degrees of freedom, and the control method
- Has chosen the kit or scratch-build path and a parts list to assemble before Session 3

BRING / SET UP

- The Robot Anatomy Reference from Session 1 (each saint brings his)
- Blank design-plan sheets and pencils — one per saint, with grid paper for the sketch
- A printed parts list per available kit (FLL, VEX, micro:bit, Arduino, or scratch-build) so saints can pick what is realistic
- A measuring tape, a stopwatch, and a marker — so success conditions are tied to a real number
- BRC printouts and pens

THE HOUR

BLOCK 1 · DISCUSSION **Opener — Tinkerer or engineer** 5 min

Ask the group: "What is the difference between a tinkerer and an engineer?" Take a few answers. The point to land on, plainly: the engineer writes the plan before he builds, and the plan names what the robot is supposed to do in numbers — distance, time, accuracy. Tonight the group does the engineer's work.

SESSION 2 · PICK THE TASK AND DESIGN THE ROBOT (PAGE 2 OF 3)

THE HOUR — CONTINUED

BLOCK 2 · DISCUSSION Three fields, one system

14 min

1. Pick three robotics fields the group will name and use: sensing (the robot reads the world), programming (the robot decides what to do), and mobility or manipulation (the robot moves itself or moves something else). Human–robot interaction is a fourth a saint may add if his task involves a person operating or working alongside the robot.
2. Walk how the three fields connect in one real robot — an autonomous vacuum: a bump and cliff sensor (sensing), a path-following program with a recharge rule (programming), and two driven wheels and a vacuum head (mobility + manipulation). Each field carries part of the work; missing any of them breaks the robot.
3. Each youth names the three fields his own task will need and what each field has to do for him. The youth building a line-follower: an IR ground sensor (sensing), an if-then loop on the reading (programming), two-wheel drive (mobility).
4. Reinforce that systems thinking — naming the parts and how they connect — is what separates an engineer from a tinkerer.
5. Leader confirms 2a: three fields named and explained in terms of one real robot system.

REQ 2A

BLOCK 3 · CREATIVE Pick the task, name the numbers

18 min

1. Each youth picks a real task his robot will perform. Examples that work at this level: follow a 1-meter black line to the end without leaving it; pick up a small object from point A and drop it at point B; drive forward and stop within 5 cm of a wall; spin in place when a button is pressed and stop when it is pressed again.
2. Write the success conditions in measurable terms: the distance in centimeters or meters, the time in seconds, the accuracy in percent of attempts that count as success (e.g. three of five runs).
3. Name the sensor input the robot will read to do the task — a touch switch, a distance sensor (ultrasonic or IR), a light or color sensor, a button, an IMU/gyro. Write the reading that means task-done in numbers (e.g. "distance < 5 cm" or "line reading < threshold").
4. A youth who picks a vague task ("a cool robot that does stuff") rewrites it now until it has a verb, a number, and a sensor. Vague tasks produce vague robots.
5. Leader confirms 2b: task picked, success conditions measurable, one sensor input named with the reading that means done.

REQ 2B

SESSION 2 · PICK THE TASK AND DESIGN THE ROBOT (PAGE 3 OF 3)

THE HOUR — CONTINUED

BLOCK 4 · CREATIVE Sketch the design plan

18 min

1. On the grid sheet, each youth sketches his robot from above and from the side. Label the controller, the sensor(s), the actuator(s), and the power source.
2. Mark the two degrees of freedom — the two independent motions the robot can perform (e.g. two driven wheels = forward/back and turn; or one drive axis + one arm joint). The two motions must actually move; a robot whose only motion is "blinks an LED" does not satisfy 3a.
3. Write the control method on the sheet: tethered or untethered, remote-controlled or autonomous, programmed in blocks or in text, on what controller (micro:bit, Arduino, VEX/FLL brick, a custom board).
4. Choose the kit or scratch-build path — the youth lists the parts he already has, the parts he needs to acquire, and where they will come from before Session 3. The leader sanity-checks budget, time, and skill against the task.
5. Each youth shows his sketch to one other youth, who tries to find one weak spot — a missing wire, a sensor that cannot actually read what the plan says, a degree of freedom that is actually one. Fix the weak spot on the sheet before leaving.
6. Leader confirms 2c: design plan in the saint's own hand showing components, two degrees of freedom, and control method.

REQ 2C

BLOCK 5 · REFLECTION Close — Parts list, build path

5 min

1. Confirm on each saint's BRC: 2a, 2b, and 2c marked this session.
2. Each youth leaves with the design sheet, a parts list, and a clear path to having those parts in hand before Session 3 — kit pulled from the shelf, ordered, or borrowed. A saint without parts cannot wire up in Session 3.
3. Next week is the wire-up and program-structure rehearsal — bring the design sheet, the controller, sensors, motors, wires, and the laptop or device for programming.

AT THE CLOSE · DEBRIEF

1. What is the number that means your robot succeeded — distance, time, or count?
2. Which weak spot did the other saint find on your sketch, and how did you fix it?
3. What is on your parts list that you do not yet have, and how will you have it by next week?

Mark 2a, 2b, and 2c after this session. Confirm every saint has a written design plan, a parts list, and a build path. Note any saint whose parts will not be in hand by Session 3 and arrange to source them.

SESSION 3 · INTELLECTUAL CORE

60 min target

Wire up and rehearse the program

Wire one sensor, write one loop, and commit the build schedule.

SESSION AIM

In-session, each saint wires the controller to one motor and one sensor, gets the sensor reading on the controller, and writes the program loop with one conditional that decides what the robot does on the reading. The actual build completion, the full program, and the multi-test iteration are off-meeting work between Sessions 3 and 4. The session ends with the demo locked: date, build milestones, and a test schedule on the calendar.

WALK AWAY WITH

- Has wired the controller to at least one motor and one sensor and seen the sensor reading change in real time
- Has written a loop with one conditional that decides what the robot does on the sensor reading
- Has the Test-and-Iterate Log started with the first run, expected behavior, and observed behavior recorded
- Has the build schedule on the calendar with milestones before the demo and at least one test pass after assembly

BRING / SET UP

- Each saint brings: his controller, sensors, motors, wires, mounting parts, power, and laptop or device (the parts from his Session 2 list)
- A shared parts crate for the common backups: jumper wires, alligator clips, a spare battery, a multimeter, a screwdriver set, tape, zip ties
- The design sheet from Session 2 (each saint brings his)
- The soldering iron and stand set up at one bench if any saint plans to solder — supervised every minute it is hot
- Test-and-Iterate Log handout (one per saint)
- BRC printouts and pens

THE HOUR

BLOCK 1 · DISCUSSION **Opener — What does ambiguous look like** 5 min

Ask the group: "When your sensor reading is between the value that means 'go' and the value that means 'stop' — what should the robot do?" Take a few answers. Good code does not just handle the easy cases; it anticipates the in-between. Tonight each saint writes the loop and the conditional that handles his own ambiguous case.

SESSION 3 · WIRE UP AND REHEARSE THE PROGRAM (PAGE 2 OF 4)

THE HOUR — CONTINUED

BLOCK 2 · SKILL PRACTICE **Wire one motor, one sensor** 22 min

1. Each youth wires his controller to one motor through its driver and to one sensor. Power comes last — every connection is checked before the battery goes in.
2. Bench rule, named aloud before the first wire: glasses on, iron back in the stand every time, battery out of the loop while changes are being made, no metal across the battery terminals.
3. Power on. Each youth reads the sensor value on the controller (serial monitor, a display, or a printed value in the editor) and watches the number change when he changes the world — hand in front of the distance sensor, light on or off the light sensor, finger on the touch sensor.
4. Each youth runs the motor through one direction and stops it through the controller — not a power-cycle, but a command. Wire the motor to its driver, the driver to the controller, then prove the controller can turn it on and off.
5. Any youth whose wire-up is not reading or not running asks for help — this is the moment to catch a wrong pin, a loose connection, a wrong polarity. Catching it now is much cheaper than catching it during the off-meeting build.
6. Leader notes which saints have a working sensor read and a controlled motor by the end of the block. Those are the in-session pieces of 3a and 3b; full satisfaction comes at the demo.

BY TIER

ENTRY	Wire one sensor and one motor only. Aim for one clean reading and one controlled motor run. The build between sessions completes the second degree of freedom and any second sensor.
ESTABLISHED	Wire both motors (or both motion axes) and one sensor in-session if time allows. Aim for both degrees of freedom moving under controller command.
MENTOR	Wire the full system the saint sketched, including any second sensor. Coach an entry-tier saint through one connection on his bench once your own is reading and running.

REQ 3A REQ 3B

SESSION 3 · WIRE UP AND REHEARSE THE PROGRAM (PAGE 3 OF 4)

THE HOUR — CONTINUED

BLOCK 3 · SKILL PRACTICE Write the loop and the conditional

18 min

1. Each youth writes the main loop — the part of the program that runs over and over: read the sensor, decide, write to the motor. Whether the editor is block-based or text-based, that is the shape.
2. Add one conditional on the sensor reading: if the reading is X, do A; otherwise do B. Tied to the design plan from Session 2 — a line-follower turns left when the IR sees white, drives forward when it sees black; a wall-stopper stops when the distance sensor reads less than 5 cm.
3. Write the unambiguous case first, then the in-between case — what does the robot do when the reading is right at the threshold, or when the sensor cuts out for one frame. A good program does not freeze or thrash on noise.
4. Run it. Move the world in front of the sensor and watch the motor respond. Adjust the threshold value until it behaves the way the design plan says it should.
5. A youth who pastes code from a tutorial rewrites at least the conditional in his own words, in his own variable names. The point is that he can explain what each line does, not that the line works.
6. Leader notes the in-session structure for 3b — loop, conditional, threshold — and flags that the full program is finished off-meeting.

REQ 3B

BLOCK 4 · CREATIVE Start the test log, lock the schedule

10 min

1. Hand out the Test-and-Iterate Log. Each youth records his first in-session test: run number, the condition he set up, what he expected the robot to do, what it actually did, and one observation about the gap.
2. On the same log, sketch the build schedule between now and the demo: the assembly milestone (when the robot is mechanically complete), the program milestone (when the loop and conditional handle the task end to end), and a test-iterate milestone (at least three test passes with one failure identified and one improvement made).
3. Write the demo date and time on the log in pen. The robot the saint brings to the demo is the one this schedule produces — no last-minute build at the table.
4. Each youth names one person (parent, mentor saint, leader) he will text or show his work to halfway through the build week. Someone outside his head sees a draft before the demo.

REQ 3C

SESSION 3 · WIRE UP AND REHEARSE THE PROGRAM (PAGE 4 OF 4)

THE HOUR — CONTINUED

BLOCK 5 · REFLECTION **Close — Build week locked** 5 min

1. On the log, in pen: assembly milestone date, program milestone date, test-iterate milestone date, demo date.
2. Confirm each saint leaves with his controller, sensors, motors, wires, and the design sheet. A part left at the meeting room is a part missing all week.
3. Next session is the troop demo. Bring the robot, the design sheet, the Test-and-Iterate Log filled in across the week, and the BRC.

AT THE CLOSE · DEBRIEF

1. Which sensor reading did you actually see change tonight, and what number range did it cover?
2. What does your robot do when the sensor reading is ambiguous — write it in one sentence.
3. Which milestone in the build week are you least sure you can hit, and who will you ask for help?

Mark the in-session structure for 3a and 3b after this session — wire-up working and loop-with-conditional written. Do not fully sign 3a, 3b, or 3c yet; the full assembly, complete program, and multi-test iteration are earned off-meeting and verified at the Session 4 demo. The Test-and-Iterate Log is the trail of evidence.

SESSION 4 · INTELLECTUAL CORE

60 min target

Demo, iterate, and sign off

Demonstrate the robot, explain the system, and name what comes next.

SESSION AIM

Each saint demonstrates his finished robot performing its chosen task, explains how design, sensors, and program work together, and walks through the Test-and-Iterate Log — the failure he found and the improvement he made. The session closes with a reflection on the hardest part of the process and one ethical responsibility tied to his own project, then the BRC sign-off.

WALK AWAY WITH

- Has demonstrated his robot performing its task reliably for the troop
- Has explained the design, sensors, and program of his robot in plain language
- Has named one failure his robot hit and one improvement (mechanical or program) he made
- Has a signed BRC and one ethical responsibility named in terms of his own project

BRING / SET UP

- Each saint brings: his finished robot, his design sheet, his Test-and-Iterate Log, and his BRC
- A table per saint with a power strip and space for the task setup (line, target, course, wall — whatever his task needs)
- A stopwatch and a measuring tape for verifying success conditions
- A spare battery, jumper wires, and a screwdriver on a shared tool tray for last-minute fixes
- Half-sheets for the keep-and-drop reflection in the Close block

THE HOUR

BLOCK 1 · DISCUSSION Opener — Build-week report

5 min

Go around the room, one line each: which build-week milestone gave you the most trouble — assembly, program, or testing? Keep it brief and practical. Mark who needs ten extra minutes of bench time before the demos start, and who is ready to go.

SESSION 4 · DEMO, ITERATE, AND SIGN OFF (PAGE 2 OF 3)

THE HOUR — CONTINUED

BLOCK 2 · CREATIVE Run the troop demo

22 min

1. Each saint runs his robot through his chosen task in front of the group. Three attempts. The success conditions from his Session 2 design plan — distance, time, accuracy — are the bar.
2. After the runs, the saint explains in plain language how design, sensors, and program work together: which sensor reads what, what the loop does each pass, and what the conditional decides. He uses his design sheet to point at the parts, not slides.
3. The leader (and one other saint if it helps) asks one practical follow-up: "What does it do when the sensor reading is right at the threshold?" "Why did you pick this controller?" "What is the part you would replace first if you had more time?"
4. A robot that does not run on the first attempt gets one fix on the bench, two minutes max, before the second attempt. After two attempts, the saint walks through the Test-and-Iterate Log and explains the failure in terms of what he documented — that counts toward 3c whether or not the live demo succeeds.
5. Leader verifies against the design plan and the log and marks 3a, 3b, 3c, and 3d per saint. The bar is reliability and explanation, not perfection.

REQ 3A REQ 3B REQ 3C REQ 3D

BLOCK 3 · DISCUSSION Hardest part, ethical line

14 min

1. Each saint, one minute: which step of the process — design, building, programming, testing — cost him the most this month, and what he did to push through it. Listen and affirm; do not correct the answer.
2. Then each saint names one ethical line tied to his own project: one way his robot could be misused, one task it should not be asked to do, one person it could fail or break trust with. Stay grounded in the actual robot on his bench — not abstract AI ethics.
3. The point to land plainly: a designer who can build a thing has to also be the one who decides what the thing should not do.
4. Leader notes the in-session reflection and marks 4a and 4b per saint.

REQ 4A REQ 4B

SESSION 4 · DEMO, ITERATE, AND SIGN OFF (PAGE 3 OF 3)

THE HOUR — CONTINUED

BLOCK 4 · REFLECTION Keep and drop

14 min

1. On a half-sheet, each saint writes three habits from this month he plans to keep — daylight bench discipline, writing the design before the build, testing in the real environment, logging each run, asking for help mid-week.
2. On the same sheet, he writes one habit he plans to drop — the late-night solder, the copy-pasted code he could not explain, the test on the bench instead of in the real environment, the milestone he hit by stretching the truth.
3. Each saint reads one of his keep-habits aloud. Quick and concrete, one line each, no commentary. The point is the public commitment, not the polish.
4. Leader collects the half-sheets at the end as a record of where the group landed.

BLOCK 5 · REFLECTION Close — BRC sign-off

5 min

1. Walk the BRC with each saint, requirement by requirement. Mark what is done. Note anything outstanding — a missing log entry, a demo that needs one more clean pass — with a concrete deadline before the Board of Review.
2. Leader gives one short, specific note to each saint by name: one thing he did well this month that earned the badge.
3. Confirm with each saint where the robot will live now — disassembled and parts returned to the kit, stored intact for a sibling to use, or kept for next year's harder task.

AT THE CLOSE · DEBRIEF

1. Which test run in your log changed how you thought about the design?
2. Which step — design, build, program, or test — cost you the most, and what got you through it?
3. What is the one thing your robot should not do, even though it could?

Mark 3a, 3b, 3c, and 3d after the demos in Block 2 — these are earned together in the demo with the Test-and-Iterate Log as evidence. Mark 4a and 4b after Block 3. Anything outstanding gets a dated deadline on the BRC; final sign-off completes when the remaining piece is finished.

HANDOUT 1 OF 2

FROM SESSION 1 — THREE CATEGORIES OF ROBOT

Robot Anatomy Reference

Carry this from Session 1 into the design work in Session 2 and the wire-up in Session 3.

ROBOTICS · FIELD CARD

Name each part before you build it.

Every robot has four subsystems. Point at each one on your design sketch.

THE FOUR SUBSYSTEMS

point at each on your sketch

1 CONTROLLER
The robot's brain — runs the program loop.

Reads sensors, decides, writes to motors.

Examples: micro:bit, Arduino, VEX or FLL brick, Raspberry Pi.

2 SENSORS
The robot's eyes, ears, and skin.

Read the world as numbers the program can use.

Examples: touch switch, ultrasonic or IR distance, light or color, gyro, line follower.

3 ACTUATORS
The parts that move the robot or its world.

Take a command from the controller and act.

Examples: DC motor (wheels), servo (arm joint), stepper motor, gripper, LED, speaker.

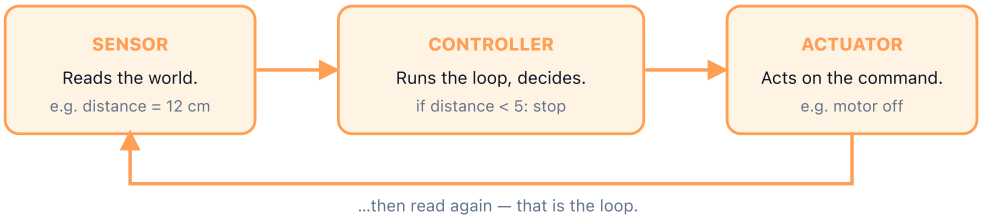
4 POWER
What keeps the controller and motors alive.

Sized to the motors, not just the controller.

Examples: AA pack, lithium battery, USB cable, wall power. Keep metal away from terminals.

THE SIGNAL LOOP

read · decide · write — over and over

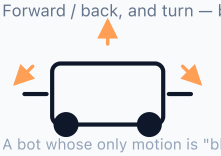


POWER All three stages need power. If the motor stalls when it runs, the battery is undersized for the work.

DEGREES OF FREEDOM

two independent motions, both must move

Two-wheel drive
Forward / back, and turn — both axes driven.



A bot whose only motion is "blinks an LED" does not count.

Drive plus arm
One drive axis, one joint that moves on its own.

A wheel and a fixed scoop is one degree of freedom, not two.

A sketch with the four subsystems labeled is the start of every build.

Print this handout for in-person reference during session 1 — three categories of robot.

HANDOUT 2 OF 2

FROM SESSION 3 — START THE TEST LOG, LOCK THE SCHEDULE

Test-and-Iterate Log

Carry from Session 3 into the off-meeting build. Each row is one real test run; do not back-fill.

ROBOTICS · WORKSHEET

Run it five times before you call it working.

One row per test. Write the gap between expected and observed in plain words.

1 TASK & SUCCESS NUMBERS

from your Session 2 plan

Task .....

Success .....

Sensor + threshold .....

2 TEST RUNS

one row per run · do not back-fill

#	CONDITION	EXPECTED	OBSERVED	ONE CHANGE
1				
2				
3				
4				
5				
6				

3 THE FAILURE & THE FIX

one real failure, one real change

Failure .....

Change made .....

Mechanical or program? .....

4 BUILD MILESTONES

dates in pen, before you leave Session 3

Assembly done ..... Program done ..... Tests done .....

Mid-week check with ..... (parent · mentor · leader)

5 LOCK THE DEMO

IN PEN

Test where the robot will run — the bench is not the real environment.

Print this handout for in-person reference during session 3 — start the test log, lock the schedule.