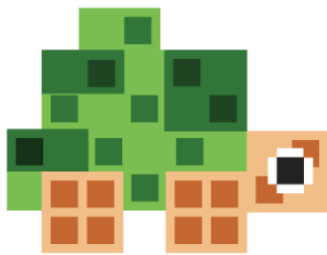


# Preparatory lessons for



# RIDE

Robotics for the Inclusive Development  
of Atypical and Typical Children

## Learning materials

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# THEMATICS OF A 6- LESSON ROBOTICS CURRICULUM

In order to efficiently use RIDE's learning materials, students require a grasp of basic knowledge regarding the use of the robotics kit.

For this reason, we recommend a preparatory **6-lesson series of robotics training activities** as per the thematics shown below. **Building on the skills shown in the thematics**, the students can **easily build and program** moving, line-tracing, glowing, musical or head-shaking, arm-swinging figures, simple „puppet theatres“, catapults, door-opening houses, castles with moving drawbridges, and walking human and animal figures **during text-processing activities**.

## THEMATICS OF BASIC ROBOTICS ACTIVITY SESSIONS

Lesson	Theme and expected result	Recommended exercises
1.	<p>Introduction to the robot hardware, trying out pre-built robots, introduction to the software, modifying the programming of the pre-built robots.</p> <p>Writing simple robot programs.</p> <p>Introduction to and programming DC motors. Programming straight and turning motion. Use and programming of LEDs.</p> <p>Significance of cycles and repeats.</p>	<p>Modifying programs: changing the direction, speed and duration of movement.</p> <p>Writing their first own robot program: practice of previously learned functions.</p> <p>Building a robot moving through a predetermined path (e.g. a maze outlined via duct tape).</p> <p>Dancing robot: programming choreography, repeated movements</p> <p>Blinking LEDs</p> <p>Building a traffic junction, with functioning traffic lights</p> <p>Equipping robot vehicles with turn signals and reversing lights</p>
2.	<p>Use and programming of the Buzzer.</p> <p>Use and programming of sensors I. (Touch Sensor). Introduction to sensor testing interfaces.</p> <p>Upgrading the robot built in the previous session with a Touch Sensor. Significance of „forever“ and „if“. Branching commands.</p>	<p>Modifying the program: changing the sound's pitch and rhythm</p> <p>Programming a tune based on a musical score</p> <p>Building a musical merry-go-round which changes direction at the push of a button</p> <p>Building a battering ram carrying a Touch sensor at the front. It moves forward until it hits a wall, backs up for 2 seconds, then moves forward again</p> <p>Building an RC car – equip any vehicle with 1-5 Touch sensors. Moving forward, backward, left and right are each triggered by the press of a Touch sensor.</p> <p>Building a piano – keys press down on Touch sensors, which correspond to different pitches of sound on a Buzzer.</p>

Lesson	Theme and expected result	Recommended exercises
3-4.	Use and programming of sensors II. (IR Photoreflector) Measuring distance – methods. Calibration.	„Cowardly robot" – if a hand is placed in front of it, it flees Building and programming robots that stop at a line Robot that stays in a circle Robot that stays on the table Merry-go-round with security system – if someone „enters", it stops Building a tracking robot Maze-traversing robot
5.	Use and programming of sensors III. (Sound sensor, Light sensor). Upgrading the robot built during the previous session with Sound and Light sensors.	Actions triggered by sounds, e.g. The castle bars its gates at the enemy's warcry Merry-go-round started by light signals Simulating street lights (lights up at dusk, shuts off at dawn) Robot that lights up when it enters a tunnel Equipping the piano with a „register" – if a light sensor is covered, it shift sound 1 octave higher/deeper Light-controlled car. (2 Light sensors – the car goes in the direction where light is coming from.)
6.	Introduction to, calibrating and programming servo motors Safety rules regarding servo motors Calibration of servo motors, determining angle in test mode. Setting velocity and sequential movement of servo motors. Setting multiple servo motors simultaneously.	Building boom barrier Building catapult (a light sensor in the bucket is obscured when a projectile is placed inside, which causes the arm to activate) Petting zoo (light sensors in the heads of animals, if pet, the animal turns its head, nods, wags its tail, beeps etc.)