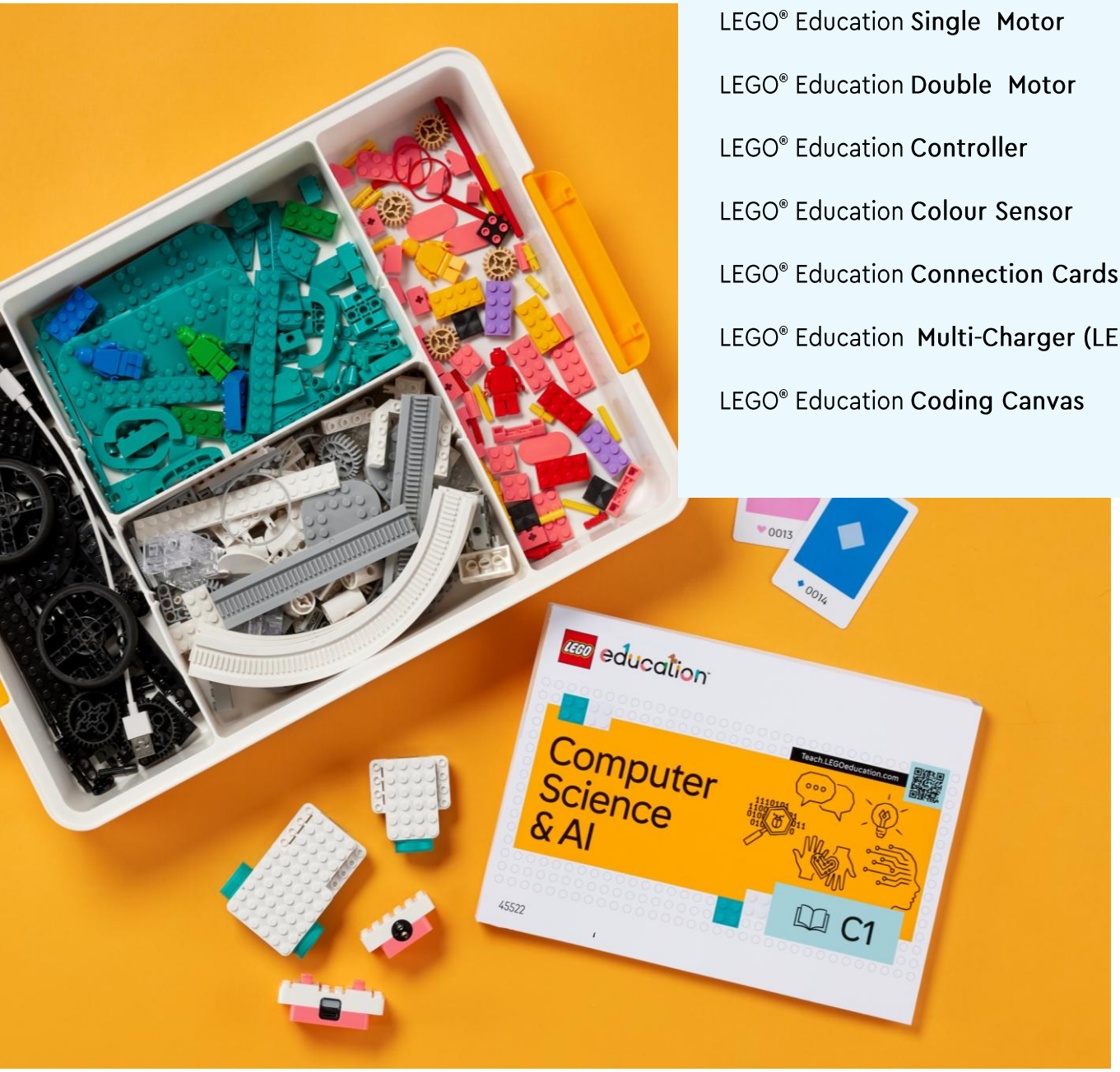
Product Specifications

# LEGO® Education

## Computer Science & AI

## Kit 45522



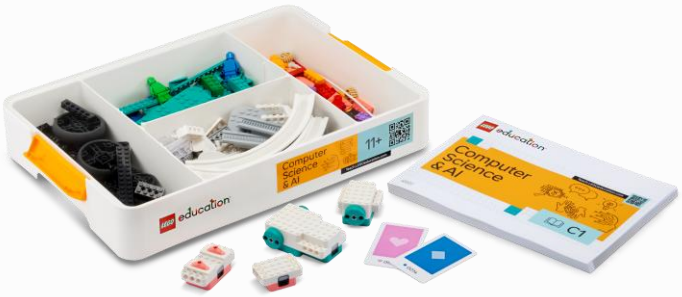


Product Specifications

# LEGO® Education

## Computer Science & AI Kit

## 45522




**Description**

The LEGO Education Computer Science & AI  Kit Year 7-9 contains 379 age-appropriate LEGO® bricks, building instructions, interactive hardware, and a USB charging cable.

The kit includes 30 hands-on computer science lessons grouped into six units, each including four lessons and a design challenge, accessible through the Teacher portal.

**Key features**

**30 Unique Lessons**
Ready-to-teach, curriculum-aligned computer science & AI lessons for year 7-9

**Bricks and more**
Includes LEGO bricks, double motor, single motor, colour sensor, controller, two connection cards, building instructions, and USB charging cable

**Teacher portal**
Classroom-ready lessons, presentations, and getting-started materials

**Coding Canvas**
Intuitive app with word-based coding to bring student creations to life

**Hardware**
45650 Single motor
45651 Double motor
45652 Controller
45653 Colour sensor

**Age mark**
Suitable for year 7-9

**Storage Box**
H: 30.8 cm, L: 42.6 cm, W: 10.5 cm

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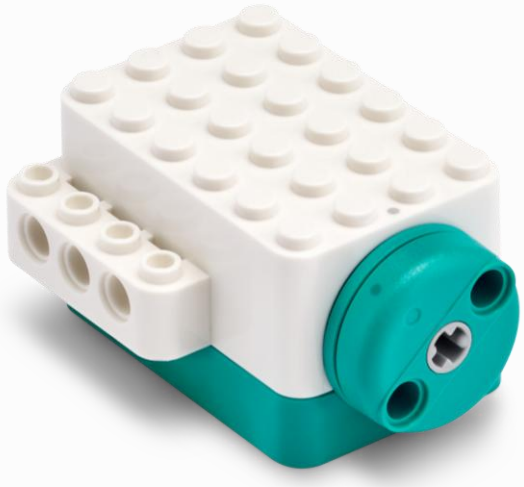
# LEGO® Education

## Single Motor

45650



| | |
|---|---|
| **Description** | The LEGO® Education Single Motor can work alone, pair with other LEGO® Education interactive hardware, or connect to a laptop or tablet for coding tasks. |
| **Key features** | **Wireless single motor**<br>Made for hands-on learning and straightforward, intuitive building of moving models.<br>**Motor output**<br>Featuring our latest tech, the motor includes a new precision drivetrain and absolute encoding for maximum control and flexibility.<br>**Charging and communication**<br>Easy USB-C charging and effective communication via Bluetooth Low Energy 4.2.<br>**Age mark**<br>Suitable for ages 5 and up. |
| **Connection** | Bluetooth Low Energy (BLE 4.2). |
| **Battery Capacity** | 450 mAh (maximum charge rate: 900mA). |
| **Motor Performance** | • No-load speed: 127-135 rpm<br>• Current consumption: 39-59mA<br>• Loaded speed (25mNm): 110-119 rpm<br>• Current consumption: 157-205mA<br>• Stall torque: 121-152mNm<br><br>All performances are measured at 4.2 V (fully charged battery) |
| **Sensor inputs** | Absolute encoding on motor output |

*Not all features may be fully operational at the time of launch

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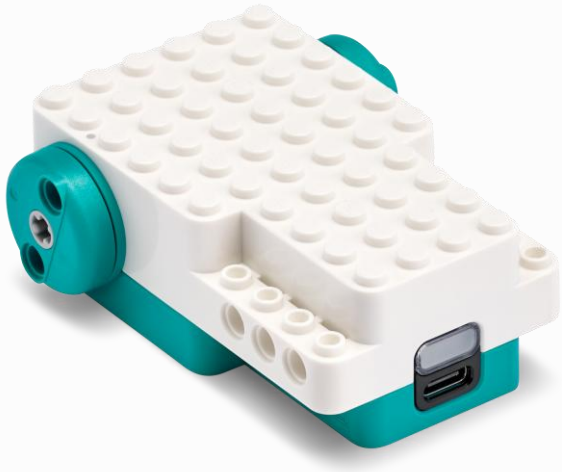
# LEGO® Education

## Double Motor

45651



| | |
|---|---|
| **Description** | The LEGO® Education Double Motor can work alone, pair with other LEGO® Education interactive hardware, or connect to a laptop or tablet for coding tasks. |
| **Key features** | **Wireless double-motor**<br>Made for hands-on learning and straightforward, intuitive building of moving models.<br>**2 motor outputs**<br>Featuring our latest tech, the motor includes a built-in motion sensor for coding, a new precision drivetrain and absolute encoding for maximum control and flexibility.<br>**Charging and communication**<br>Easy USB-C charging and effective communication via Bluetooth Low Energy 4.2.<br>**Age mark**<br>Suitable for ages 5 and up. |
| **Connection** | Bluetooth Low Energy (BLE 4.2). |
| **Battery Capacity** | 900 mAh (maximum charge rate: 1500mA). |
| **Motor Performance** | • No-load speed: 322-346 rpm<br>• Current consumption: 70-107mA<br>• Loaded speed (50mNm): 192-220 rpm<br>• Current consumption: 649-753mA<br>• Stall torque: 148.1-173.1mNm<br><br>All performances are measured at 4.2 V (fully charged battery) |
| **Sensor inputs** | • 3-axis Accelerometer<br>• 3-axis Gyroscope<br>• Absolute encoding on both motor outputs |

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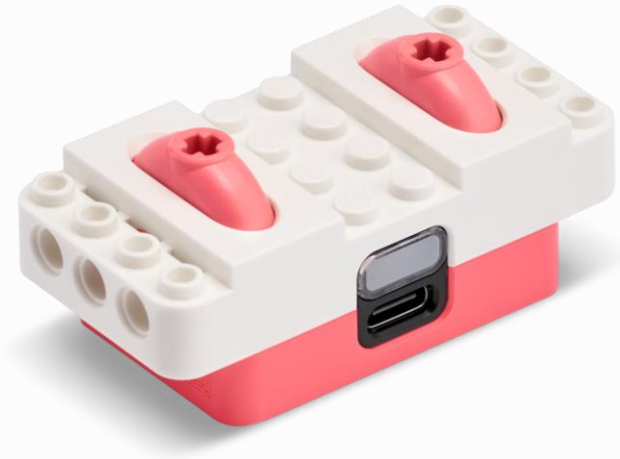
Product Specifications

# LEGO® Education

## Controller

## 45652



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|---|---|
| **Description** | The LEGO® Education Controller can directly operate motorised models or be built into designs as an activation sensor. The controller connects to single and double motors for interactive, hands-on learning or to a laptop or tablet for coding tasks |
| **Key features** | **Hands-on learning**<br>Featuring 2 levers with high-resolution magnetic encoders, the controller supports interactive lessons.<br>**Adaptable**<br>Versatile and intuitive, use the controller as a remote control or build it into a model as an activation sensor.<br>**Flexible**<br>Suitable for ages 5 and up.<br>**Easy to use**<br>Easy USB-C charging and effective communication via Bluetooth Low Energy 4.2. |
| **Connection** | Bluetooth Low Energy (BLE 4.2). |
| **Battery Capacity** | 95 mAh (maximum charge rate: 190mA) |
| **Sensor inputs** | Two mechanical levers with absolute encoding<br>Ability to report<br>• Degrees: -45 to 45 (+/- 2 degrees tolerance)<br>• Percentage: -100% to 100%<br>• Steps [-3, -2, -1, 0, 1, 2, 3] |

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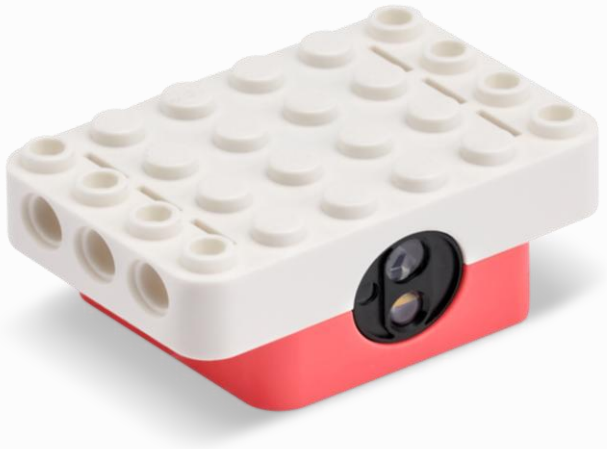
Product Specifications

# LEGO® Education

## Colour Sensor

## 45653



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| **Description** | The LEGO® Education Colour Sensor can detect and react to 6 LEGO® colours straight out of the box, with more detailed detection available when used with the supplementary app. It can be paired with motors or connected to a laptop or tablet for coding activities. |
| **Key features** | **Colour sensor**<br>An ultra-compact sensor with robust performance, ideal for efficient, hands-on learning in the classroom.<br>**Detects LEGO® colours**<br>Senses and reacts to 6 LEGO colours straight out of the box at a distance of 4–16 mm.<br>**Versatile use**<br>Pair with motors for hands-on learning or connect to a laptop or tablet for coding activities.<br>**Charging and communication**<br>Easy USB-C charging and effective communication via Bluetooth Low Energy 4.2.<br>**Age mark**<br>Suitable for ages 5 and up |
| **Connection** | Bluetooth Low Energy (BLE 4.2). |
| **Battery Capacity** | 135 mAh (maximum charge rate: 270mA) |
| **Sensor inputs** | Colour sensor with 6 LEGO colours |

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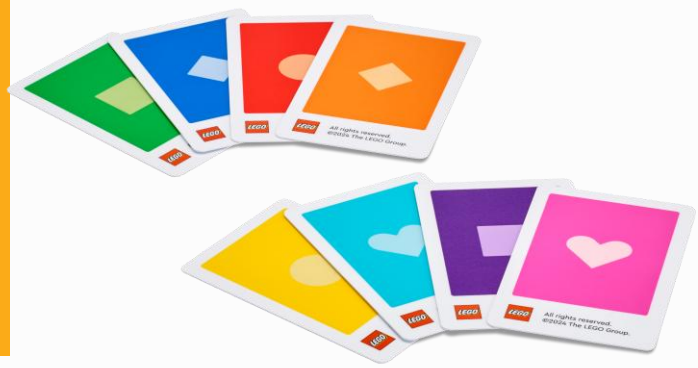
Product Specifications

# LEGO® Education

## Connection Cards

45657



**Description**

With the LEGO® Education Connection Card packs, each student team gets its own unique colour card, and when the connection card is scanned in front of a device, the matching colour lights up on the component. Each pack includes 8 cards to enable connection. Just tap a card over a motor, controller, or sensor to connect.

**Key features**

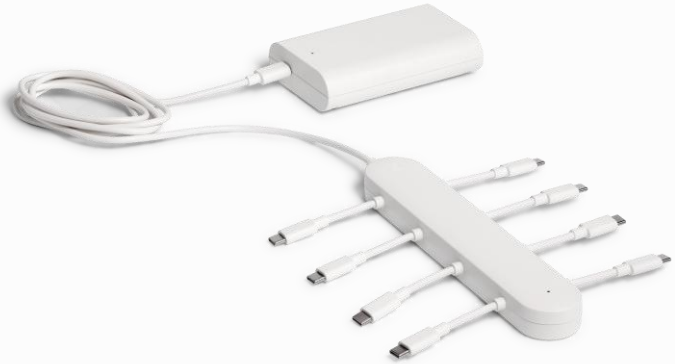
**Size/format**
ID-1 (also known as CR-80)
85.6 × 53.98 mm / 3.370 × 2.125 inches
**RFID antenna/chip**
Not user programmable
ISO 14443A/B compatible (proximity/short range)
**Reading range**
The card is readable in a distance of 0-6 cm from the HW elements (tolerance +/- 1 cm)
**Adaptable**
These connection cards are compatible with LEGO® Education Science Kits.
**Age mark**
Suitable for ages 5 and up

Product Specifications

# LEGO® Education

## Multi-Charger (LEI)

45624



| | |
|---|---|
| **Description** | The LEGO® Education Multi-charger connects to up to 8 elements. Works with the AC Cable (45656). |
| **Key features** | **8-port USB-C docking station**<br>Charge 8 devices simultaneously.<br><br>**Age mark**<br>The multi-charger is considered IT equipment and should only be used by children under adult supervision. |
| **Connection** | Input: AC power (110-230v).<br>Output: 8x USB-C charging ports. |
| **Performance** | • Maximum power consumption: 66W<br>• Standby consumption: <1.15W<br>• Maximum total charge rate: 5A @5v<br>• Charge rate per port: 0.5-1.5A @5v |

# LEGO® Education

## Coding Canvas

**Key features**

When LEGO® Education Coding Canvas is used with LEGO Education hardware (Science or Computer Science & AI), the pupils can:

- get a first encounter with a playful, experimental and safe AI experience
- bring their builds to life in a playful and interactive environment
- learn computational thinking and computer science concepts through block-based coding
- tinker, tweak, debug and experiment with LEGO Education HW and LEGO Education models
- grow with their experience, as the app caters for year 1-3 (icon blocks) and 4-6 (word blocks) with toolboxes suitable for learners on all levels.

**Language**

The LEGO® Education Coding Canvas is available in 21 languages: English (US), English (UK), English (AU), Chinese (simplified), Japanese, German, Dutch, Swedish, Norwegian, Danish, French, Italian, Korean, Portuguese (BR), Spanish (MX), Polish, Turkish, Vietnamese, Arabic, and Finnish.

**Open-Source**

No. But an API will be publicly available.

**Supported platforms**

Native iOS app for iPad
Web app (developed for Chromium browsers, e.g., Google Chrome)*
*WebBLE is a requirement, as connecting to the hardware requires bluetooth

**System Requirements**

Bluetooth
Camera (e.g., built-in web camera)

**Programming Languages**

Icon and Word blocks (Blockly-based, similar to Scratch)

There is no text-based coding in the app, but LEGO Education will make the API (Application Programming Interface) publicly available with a Python installation package, meaning that users will be able to use their favourite text-based programming tool to interact with LEGO Education Hardware

# LEGO® Education

## Coding Canvas

**Units & Lessons**

Units and lessons are facilitated from the Teacher Portal, and not within the Coding Canvas itself. When the pupils need to engage with a specific lesson the Teacher Presentation will display a Lesson PIN. This PIN is then entered in the Coding Canvas by the pupils, which loads a pre-populated canvas that holds the Lesson Starter Code (the initial code snippet that can bring a model to life), and a curated block palette, reducing the complexity for the pupils.

This means that Coding Canvas is much more lightweight than the LEGO Education SPIKE app, since there is no heavy content to download on the pupils' devices.

**Software Distribution**

**Web App**
The Web App is freely available online at code.legoeducation.com
**iPad App**
The iPad app can be installed through the Apple App Store on iPads or Apple School Manager.

There is no user login required to engage with the experience on either platform.

**Data Privacy**

The Coding Canvas does not require account creation or user login. In compliance with GDPR the Coding Canvas does not collect personally identifiable information or health information from users, although reading IP addresses is necessary for the Coding Canvas to function. Images used for training AI or for AI functionality are never stored or collected, and all processing of AI-related data is done locally on the pupils' devices.

Coding Canvas might not support all hardware features and functionalities.