FAQ

Software Questions

1. Terminology

1.1 Q: What does EV3 stand for?
This is the third generation of LEGO Education MINDSTORMS platform and the "EV" stands for evolution

1.2 What is a P-brick?
The P-brick is a programmable intelligent brick that controls motors and sensors, as well as providing wireless communication (WiFi and Bluetooth).

2. Programming

2.1 Can you use EV3 Software on both Mac and PC?
EV3 software can be used on both Mac and PC to program EV3 P-bricks.

2.2 **What programming platforms can you use with LEGO MINDSTORMS Education EV3?**
Besides the EV3 Software you can use also LabVIEW and RobotC. EV3 is open-source platform and therefore communities are expected to develeop additional languages like for instance JAVA.

2.3 Is there on-brick programming?
Yes, we have continued and improved on-brick programming with the LEGO MINDSTORMS Education EV3 *brick. Students can easily program basic tasks on the brick, and also conduct basic data logging. All of the on-brick programs can be uploaded into the* LEGO MINDSTORMS Education EV3 *software for continued and advanced work.*

2.4 Can I program Retail MINDSTORMS hardware with my LEGO MINDSTORMS Education EV3 Software and vice versa?
Yes,in theory it is possible. However in reality it will difficult since the two products differs significantly.
The Retail Software Version does not include all programming blocks needed for the education hardware, and it does not included Data Logging or teacher version of Conten Editor. Also it is not possible to utilize the Robot Educator Learning Tool together with the Retail Set as it is not possible to build the Robot Educator model.

2.5 Will there be tools to create my own software programming blocks for LEGO MINDSTORMS Education EV3 Software?
Yes, for most users the tool is called MyBlocks and is already available inside the standard EV3 software. For people creating their own hardware a software developer kit will be made available.

2.6 Can I program the LEGO MINDSTORMS Education EV3 P-brick using NXT Software?
No. It is not possible to program your EV3 P-brick with the NXT Software

3.What is new about Data Logging?

3.1 Based on educator feedback, LEGO Education knew how important it was for the data logging functionality to be robust for technology and science classes moving forward. Therefore we have created a whole new Data Logging environment, which is included in the education version of the LEGO MINDSTORMS Education EV3 *Software. The capabilities include:*

Data Logging
- *Live data logging via USB Cable (view Live Graphs)*
- *Remote live data logging via Bluetooth or WiFi (view Live Graphs)*
- *Autonomous data logging – log data on-brick and upload to software.*
- *On-brick data logging – set up and execute data logging directly on brick*
- *Oscilloscope mode – View Sensor data as soon as connected*

Analysis
- *Prediction tool – draw prediction or make predictions*
  - *Inverse proportionality*
  - *Exponential*
  - *Sine*
  - *Cosine*
- *Basic analysis tools – Point Analysis*
- *Advanced Analysis tools - Section Analysis*
  - *Mean*
  - *Median*
  - *Standard deviation*
  - *Curve fit*
- *Easily export data to spreadsheets*

Dataset Calculation
- *Unique calculator interface that allows you to make calculations to datasets*
- *Type in formulas*
- *From Rotational counts via Speed to Acceleration*

Graph Programming
- *Unique new LEGO Education feature*
- *Execute actions based on data readings*
- *Set thresholds for experiments to play sound or start motors, when threshold is reached*

4. Robot Educator

4.1 What is Robot Educator?

Robot Educator is the name of both the basic robot and the tutorials you will find in the software. The Robot Educator is a very simple, very quick-to-build robot that students will have in their hands ready to learn the basics of robotics. It is the robot that introduces the student to the world of robotics. The Robot Educator learning tool is designed to take you and your student's through the essentials of programming, data logging, and hardware. It does so in a structured and engaging way, ensuring that everyone is constructing, programming, and experimenting within a minimum of time.

4.2 Are the Robot Educator activities LEGO MINDSTORMS Education EV3 specific?
Yes

4.3 Is there any added audio/text support with RE?
Robot Educator has text, animations, interactive animations that help explain programming, teacher notes and sample programs/experiments

4.4 Can I use the new Robot Educator learning tool for NXT?
No. The Robot Educator is optimized for LEGO MINDSTORMS Education EV3 Hardware and Software.

4.5 Is LEGO MINDSTORMS Education EV3 backwards compatible to NXT hardware?
Yes. You can program your NXT brick using the new LEGO MINDSTORMS Education EV3 software! However not all software features are supported by the NXT P-brick

5. What is the Content Editor in the software? How does it help educators?

The Content Editor enables educators to edit, adapt, and customize activities - or create their own from scratch. Teachers can use the Content Editor to customize lessons directly at their student's needs or customize to the different grade levels.

The Content Editor provides a digital workbook for students where they can capture their work by inserting text, images, videos and sound creating their owne digital workbook.

The Workbook can easily be used for sharing and communication of end-results among other things making assesment easier.

6. In what languages is the LEGO MINDSTORMS Education EV3 software available?

US English
British English
Danish
Norwegian
Swedish
German
French
Spanish
Italian
Portuguese
Dutch
Korean
Japanese
Chinese
Russian
Arabic

7. What new software-updates have been made?

7.1 What are the new features in the LEGO MINDSTORMS Education EV3 software vs NXT?

There are many new features and improvements from NXT to EV3. Some of the more noticable are :

Lobby:

- *New full screen lobby to navigate through the content provided by LEGO Education, third parties and user generated. Making sure teaching objective is in focus*

Content Editor :

- *Content is editable directly inside the environment, enabling customization of existing project or creation of new ones from scratch*
- *The Content Editor provides a digital workbook for students where they can capture their work by inserting text, images, videos and sound creating their own digital workbook.*

Tighter integration between the P-brick and the programming environment:

- *The hardware page enables monitoring the status and values measured by all the hardware elements.*
- *Hardware elements is automatically recognized thanks to auto-id*
- *Bluetooth configuration is facilitated by the USB to Bluetooth features*

Debugging features now part of the programming environment:

- *Execution highlight*
- *Programming blocks will display a warning symbol if expected hardware by the programming block is different from the detected hardware by auto-ID.*
- *Probes enable to see the values going thru the data wires*

New programming blocks possibilities:

- *Simple strip programming by snapping blocks together (no need to use the beam anymore)*
- *Block parameters configured directly on block*
- *Read program sequence directly on blocks*
- *Improved sequence wires that facilitate showing the structure of the program and creating parallel execution*
- *Wait for change added to easily create robots that behave according to change in the environment. As opposed to wait for threshold that only works by comparing measured values.*
- *Data wires improved and data casting added to simplify data type conversion.*
- *Arrays integrated in the standard blocks.*
- *Loop interruption now possible enabling creating advance state control mechanisms.*

Datalogging:

- *Oscilloscope mode enables live monitoring of the sensors to prepare experiments and validate setup.*
- *Dataset calculation integrated enabling to analyze the data coming from the sensors*
- *Graph programming added, this feature enables users to create zones on the graph that will make the robot react in the physical world based on the data on the graph.*

8. Will the LEGO MINDSTORMS Education EV3 software work on my tablet/phone?
No. At release time, the software works on PC and Mac laptop and desktop systems. Simple control apps are under development and are expected Q3 2013.

Bluetooth

1. What can Bluetooth in the LEGO MINDSTORMS Education EV3 P-brick be used for?
The Bluetooth allows for communication to the programming environment or for brick-to-brick communication.

2.Why use a USB cable to connect the LEGO MINDSTORMS Education EV3 P-brick to the computer when there is Bluetooth communication?
USB connection is faster and some some PC's do not have Bluetooth

3. Can LEGO MINDSTORMS Education EV3 P-bricks be daisy-chained through Bluetooth?
No. Daisy chain is using the USB host to USB connections between bricks.

4. What is the difference between WiFi and Bluetooth?
WiFi and Bluetooth serve different purposes. Bluetooth is for closed range communication between 2 devices. WiFi is for network communication on a wider range, requires a WiFi acces point –router and will consume more battery than Bluetooth.

WiFi

1. What can WiFi with the LEGO MINDSTORMS Education EV3 P-brick be used for?
The WiFi feature can be used for communication from brick to programming environment. It requires that a WiFi dongle is connected to the USB host of the P-brick. We recommend the LEGO MINDSTORMS Education EV3 WiFi dongle.

2.Why use a USB cable to connect the LEGO MINDSTORMS Education EV3 P-brick to the computer when there is WiFi communication?
The USB connection is faster and some classrooms are not equiped with WiFi. The Battery will last longer without WiFi on.

3. Can LEGO MINDSTORMS Education EV3 P-bricks be daisy-chained through WiFi?
No. Daisy chain is using the USB host to USB connections between bricks.

4. Is a router needed?
Yes, if you want to use WiFi a router is needed

5. Is WiFi better than Bluetooth?
WiFi and Bluetooth serve different purposes. Bluetooth is for closed range communication between 2 devices. WiFi is for network communication on a wider range and will consume more battery than Bluetooth.

Hardware Questions

1. Sensors

1.1 What LEGO sensors are available for LEGO MINDSTORMS Education EV3?

The following sensors are indcluded in the Core Set
2 Touch Sensors, 1 Color Sensor, 1 Ultrasonic Sensor, 1 Gyro Sensor

Besides these there are the following sensors available:

IR Seeker, IR Beacon, Temperature Sensor, Renewable Energy Set as well as third party sensors like HiTechnic, Vernier and DCP.

1.2 Will LEGO MINDSTORMS Education EV3 sensors work with the NXT P-brick?
No. The LEGO MINDSTORMS Education EV3 sensors will not work with the NXT P-Brick

> 1.2.1 Will a new cable connection be required?
> *NO. LEGO MINDSTORMS Education EV3 uses the same RJ12 connector cables as the LEGO MINDSTORMS Education NXT.*

1.3 How do the LEGO MINDSTORMS Education EV3 sensors compare with the NXT sensors?

The LEGO MINDSTORMS Education EV3 Sensors are whole new sensors optimized for education use providing better build interface, higher performance and more accuracy than NXT Sensors.

For detailed information on the LEGO MINDSTORMS Education EV3 Sensors see Product Sheets.

1.4 Can LEGO MINDSTORMS Education EV3 sensors be used together with NXT sensors?
Yes. LEGO MINDSTORMS Education EV3 uses the same RJ12 connector cables as the LEGO MINDSTORMS Education NXT.

1.5 Can NXT sensors be used with the LEGO MINDSTORMS Education EV3 P-brick?
Yes. LEGO MINDSTORMS Education EV3 uses the same LEGO Technic elements and RJ12 connector cables.

1.6 Can you use WeDo Sensors with the LEGO MINDSTORMS Education EV3 P-brick?
No, the connectors do not match

2. Motors

2.1 Which motors are included in the Core Set?

2 Large Motors
1 Medium Motor

2.2 How do the LEGO MINDSTORMS Education EV3 motors compare with the NXT motors?
Large Motor Specifications are the same as on NXT however the build interface is optimized for faster and more complex building possibilities.

The Medium Motor is a whole new motor providing whole new possibilities.

For detailed information on the LEGO MINDSTORMS Education EV3 motors see Product Sheets.

2.3 Are the LEGO MINDSTORMS Education EV3 motors interchangeable with the NXT motors?
Technically yes, but the designs are different between the LEGO MINDSTORMS Education EV3 Large Motor and the NXT motor. The LEGO MINDSTORMS Education EV3 Large Motor allows for a better building experience.

> **2.3.1 Can LEGO MINDSTORMS Education EV3 and NXT motors be used together?**
> *Yes*

2.4 Can you use the LEGO MINDSTORMS Education EV3 motors with the NXT P-brick?
Yes. You can use both the Large and the Medium Motor with NXT.

2.5 Can you use power-function motors with LEGO MINDSTORMS Education EV3 P-brick?
No, the connector do not match.

2.6 What does Daisy Chain mean?
Daisy Chain is the ability to link up to 4 LEGO MINDSTORMS Education EV3 P-bricks together using a USB wire and thereby enable your robot to have 16 output ports and 16 input ports all controlled from the main LEGO MINDSTORMS Education EV3 P-brick.

> **2.6.1 What does Daisy Chain require?**
> *Multiple LEGO MINDSTORMS Education EV3 P-bricks, sensors and motors, plus additional standard USB wires for LEGO MINDSTORMS Education EV3.*

2.7 How many LEGO MINDSTORMS Education EV3 P-bricks can I Daisy Chain?
You can Daisy Chain up to 4 LEGO MINDSTORMS Education EV3 P-bricks.

2.8 Is Daisy Chaining supported between WiFi and Bluetooth?
No. Daisy chain requires a USB wire connection between the LEGO MINDSTORMS Education EV3 P-bricks.

3. Intelligent Brick

3.1 How is the LEGO MINDSTORMS Education EV3 P-brick different from the NXT?

The LEGO MINDSTORMS Education EV3 P-brick is a whole new P-brick and the most powerful P-brick ever created by LEGO Education. The LEGO MINDSTORMS Education EV3 P-brick is build up around a faster and stronger processor, which not only increases performace on all parameters compared to NXT, but also introduces whole new possibillities not available with NXT.

For detailed information on the LEGO MINDSTORMS Education EV3 P-brick see Product Sheet.

3.2 Will the LEGO MINDSTORMS Education EV3 P-brick and NXT P-brick use the same firmware?
No.

4. Battery

4.1 What is the charge time and conditions for the rechargeable battery?
The same as NXT. Full charge time is 4 hours and requires a LEGO DC Charger (product 8887).

4.2 Will the batteries interchange between the LEGO MINDSTORMS Education EV3 and the NXT?
No, but the charger is the same between the two platforms. You can therefore reuse your current charger.

4.3 Will the chargers interchange?
Yes.

4.4 What are my battery options? (AA vs. Lithium vs Rechargeables...)?
Recommended use is either AA Alkaline batteries or LEGO MINDSTORMS Education EV3 rechargeable battery.

4.5 Will there be an upgrade/conversion kit from NXT to LEGO MINDSTORMS Education EV3?
No, but the LEGO MINDSTORMS Education EV3 solution offers a good backwards compatibility to NXT and you can therefore use your NXT solution together with EV3 in many situations.

But If you want the full benefit of the LEGO MINDSTORMS Education EV3 solution you will need to transition to EV3.

5. LEGO MINDSTORMS Education Core Set (45544)

5.1 What comes in the kit?

Sturdy storage box and sorting tray for easy classroom management
Building instructions
Rechargeable battery
Ball Wheel
Connecter Cables
USB Cable
LEGO Technic Elements – piece count 541 pcs.
Three motors and five sensors
> *1 P-brick*
> *2 large motors*
> *1 Medium Motor*
> *2 touch sensor*
> *1 Color Sensor*
> *1 Ultrasonic Sensor*
> *1 Gyro Sensor*

5.3 Why is there no longer a sound sensor?
Input from teachers using the NXT platform indicated that the sound sensor was problematic in noisy classrooms and not as relevant for STEM teaching as other sensors. Instead we have included the new Gyro Sensor which was developed classroom use and competition.

LEGO MINDSTORMS Education NXT and LEGO MINDSTORMS Education EV3 Compatibility

1. Can you use NXT parts with the LEGO MINDSTORMS Education EV3?
LEGO MINDSTORMS®Education EV3 uses the same LEGO®Technic elements and RJ12 connector cables as the LEGO MINDSTORMS®Education NXT, so all your existing sensors, motors and building elements will work with the new platform. Please notice that the NXT rechargeable battery cannot be used together with LEGO MINDSTORMS Education EV3 P-brick.

2. Can I connect my NXT P-brick to the LEGO MINDSTORMS Education EV3 P-brick?
No, it is not possible to Daisy Chain with the NXT brick.

3. Can I reuse my rechargeable Battery and my Charger?
No, you cannot reuse your battery as the build interface has changed, but you can reuse your DC Charger (8887).

4. Can I program the NXT P-brick using LEGO MINDSTORMS Education EV3 Software?
You can program your NXT P-brick using the new LEGO MINDSTORMS Education EV3 software! However not all software features are supported by the NXT P-brick.

5. Can I program the LEGO MINDSTORMS Education EV3 P-brick using NXT Software?
No. It is not possible to program your LEGO MINDSTORMS Education EV3 P-brick with the NXT Software.