Mini-Lesson

Introduction

The mini-lesson is a lesson plan handbook specifically simplified for teachers and users. Teachers getting the Neutron creative lab kit can start applying it to teaching right away. The Mini-Lesson section includes models of how to create works using Neuron modules (including model introduction, pictures, demo videos, and paper-based model printouts) , teaching steps, programming demonstrations, thinking after class, list of materials, and creative work processes, etc. The materials and models provided in the mini-lesson are for teachers' reference, not supposed to be imitated strictly. Our original purpose is to get the teachers and users inspired by the model making processes and lessons, rather than providing complete teaching materials. In addition, the mini-lesson teaching processes are designed to focus on cultivating students' creativity and Tinker (transformation) skills. We hope the teachers can consider these tips in teaching.

In these short lessons, students can:

- Actively learn and understand new knowledge in the context of previously learned concepts
- Learn to think independently and collaborate with others to complete the project
- Participate in the creative making process and apply the skills learned
- Freely discuss ideas with team members and use appropriate tools to record plans
- Share creative achievements with each other

As directors in the activities, teachers can:

- Join the students' group discussions and help students organize their ideas
- Deeply understand the knowledge requirements for the students and summarize the key points of the lessons
- Provide materials for the activities and answer questions
- Set up the classroom to create the student-centered environment

Method to use the mini-lesson: teachers can watch the video (scan the QR code, or click on the website link) , and determine if the model is suitable according to the requirements of the lesson. If the model is suitable, the teachers can read the teaching contents, list of materials, programming demonstrations, and work production processes, etc. in details.

Pictures, videos and work description

Teaching procedures: teaching objectives and key knowledge points. We recommend the following 5 teaching steps: Inspire: Inspire students to think; Thinking: Guide students to analyze the model; program: Programming design; Make and Tinker: Students have enough time to create and transform; Share: Show the final product to others

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Thinking after Class

➢ **Review on Key Points:**
9. Programming for distance sensing of the ultrasonic sensors;
10. Use Comparison, Digit and AND nodes.

➢ **Improvement and Optimization:**
6. How about adding a buzzer module?

Regarding the list of materials required for making models, the teachers and students can replace any materials in the list with the those chosen according to their own creative ideas.

List of Materials

Module List

Name	Qty.	Unit
Power supply	1	PCS
Bluetooth	1	PCS
Ultrasonic sensor	1	PCS
Dual motor driver	1	PCS
Motor kit	1	Kit
Connection cable 20CM	1	PCS
Magnetic board	4	PCS
Wheel kit	2	Kit

Material List

Name	Qty.	Unit
Paper-based cat model	1	Set
Double-sided tape	1	Roll
White paper	1	PCS

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Model- making diagram: If the teachers and students encounter problems during the model-reproduction process, they can refer to this diagram.

➢ Demonstration for online programming

Model programming diagram: If the teachers and students encounter programming problems during the model-reproduction process, they can refer to this diagram. If the teachers and students wish to change any function of the model, they need re-programming.
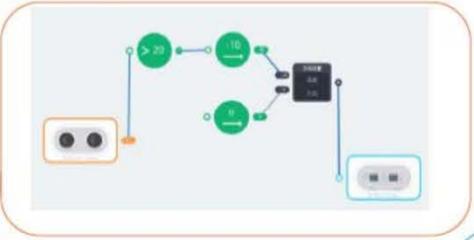
✓ Descriptions for hardware modules and software nodes can be found in the appendix at the end of the page;
✓ For paper-based models of the same design, please find in the appendix at the end of the page;
✓ The works with "□" are under online modes. Download Neuron APP on IPad or smart phone for programming;
✓ Download video of the work from official educational website: http://makeblock.com/
✓ Neuron APP Software version: 1.3.2

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