Newton Chinese Language School
课程介绍Course Description

Course Name: **Robotics & AI for Young**
Day: Tuesdays
Time: 3:45PM-5:00PM
Place: 815 Washington Street, Newton, MA 02460.
Dates:

February: 4th, 11th, 25th (3 classes)
March: 4th, 11th, 18th, 25th (4 classes)
April: 1st, 8th, 15th, 29th (4 classes)
May: 6th, 13th, 20th, 27th (4 classes)
June: 3rd (1 classes)

课程名称 Course Name	**Robotics & AI for Young**
招生对象 Prospective Students	G1 – G5
教学目标 Teaching Objectives	学习机器人基本知识，动手搭建，编程操控机器人运行，结合AI与3D建模知识设计装置进行互动
教学内容 Teaching Content	**Course Objective:** Introduce students to the fundamentals of robotics, artificial intelligence (AI), coding, and 3D design through hands-on activities using VEX GO kits. By the end of the course, students will have a foundational understanding of these technologies and their real-world applications. **Lesson 1: Introduction to Robotics** • **Objective:** Understand what robotics is and how robots are used in the real world. • **Activities:** o Discuss examples of robots in daily life (e.g., vacuum cleaners, delivery robots). o Introduce the VEX GO kit and its components. o Build a simple robot base using the VEX GO kit. **Lesson 2: Getting Started with Coding** • **Objective:** Learn the basics of coding and how to control a robot. • **Activities:** o Introduce block-based coding using VEXcode GO. o Write a simple program to make the robot move forward and backward. o Experiment with different speeds and distances. **Lesson 3: Exploring Sensors**

- **Objective:** Understand how sensors help robots perceive their environment.
- **Activities:**
  - Explore the touch, color, and distance sensors in the VEX GO kit.
  - Write a program to stop the robot when it detects an obstacle.
  - Discuss how sensors are used in self-driving cars.

Lesson 4: Introduction to AI

- **Objective:** Understand the basics of Artificial Intelligence.
- **Activities:**
  - Discuss examples of AI in everyday life (e.g., voice assistants, image recognition).
  - Introduce the concept of machine learning with simple visual examples.
  - Play an interactive AI-based game or activity.

Lesson 5: Building a More Complex Robot

- **Objective:** Apply creativity to build a more functional robot.
- **Activities:**
  - Design and build a robot using multiple VEX GO components.
  - Test the robot's movements and stability.
  - Introduce the concept of iteration in engineering design.

Lesson 6: Coding Loops and Conditions

- **Objective:** Learn how to use loops and conditions in coding.
- **Activities:**
  - Write a program using loops to make the robot perform repeated actions.
  - Add conditions to make decisions based on sensor inputs (e.g., stop when detecting a red object).

Lesson 7: 3D Design Basics

- **Objective:** Explore the basics of 3D design and its applications.
- **Activities:**
  - Introduce students to Tinkercad or a similar platform.
  - Create simple 3D models (e.g., a cube, a car chassis).
  - Discuss how 3D printing works and its use in robotics.

Lesson 8: Collaborative Robot Challenges

- **Objective:** Foster teamwork by solving challenges together.
- **Activities:**
  - Assign groups to build a robot that can complete a specific task (e.g., move an object).
  - Discuss the importance of collaboration in STEM fields.

Lesson 9: AI and Ethics

- **Objective:** Understand the ethical implications of AI.
- **Activities:**
    - Discuss scenarios where AI decisions might be challenging (e.g., self-driving car dilemmas).
    - Encourage students to think critically about the responsibilities of AI developers.

Lesson 10: Coding Functions

- **Objective:** Learn how to use functions to simplify code.
- **Activities:**
    - Write functions for common robot actions (e.g., move forward, turn left).
    - Combine functions to complete a complex task.

Lesson 11: Advanced 3D Design

- **Objective:** Create detailed 3D models for robotics components.
- **Activities:**
    - Design a custom part for the robot in Tinkercad.
    - Simulate how the part would fit and function on the robot.
    - Discuss how 3D design integrates with engineering.

Lesson 12: Integrating AI with Robotics

- **Objective:** Apply AI concepts to enhance robotics projects.
- **Activities:**
    - Introduce pre-built AI models (e.g., image recognition).
    - Program the robot to respond to AI outputs (e.g., move toward a recognized object).

Lesson 13: Testing and Debugging

- **Objective:** Learn how to identify and fix issues in robotics projects.
- **Activities:**
    - Test the robots on a course with various challenges.
    - Discuss common problems and debugging strategies.
    - Refine designs and code for better performance.

Lesson 14: Final Project Planning

- **Objective:** Plan and prepare for a final robotics and AI project.
- **Activities:**
    - Brainstorm project ideas (e.g., a delivery robot, a smart pet).
    - Create a project plan outlining the design, coding, and testing phases.

Lesson 15: Building and Programming the Final Project

- **Objective:** Execute the final project with creativity and precision.
- **Activities:**

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	○ Build the robot and write the necessary code. ○ Incorporate sensors, AI, and custom 3D-designed parts. ○ Test and refine the project. **Lesson 16: Showcase and Reflection** ● **Objective:** Present the final projects and reflect on the learning experience. ● **Activities:** ○ Host a showcase where students present their projects to peers and parents. ○ Reflect on what they learned and what challenges they overcame. ○ Discuss future possibilities in robotics, AI, and engineering.
教学方法 Teaching Method	课程为Lecture加动手实操环节，学生会分为小组进行搭建、编程、操控与互动。
使用教材 Teaching Materials	Vinci自研机器人学习教材，结合VEX GO教具，AI工具与3D设计工具