

OAKWOOD JUNIOR/SENIOR HIGH: BEGINNING ROBOTICS

Beginning Robotics

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Using the FIRST Lego League as a culminating experience, students will study beginning robotics using official Lego League materials. Topics of study will include robotics and technology, programming skills, simple engineering, research skills, cooperative teamwork, and presentation skills. Public presentation will be a part of the course. This course is open only to those students identified as gifted (in any domain of giftedness).

Explanation of Abbreviations:

Example for Ohio Standards

7.ST.A.1

7 = Grade Level

ST = Standard

A = Benchmark

1 = Grade Level Indicator

Academic Content Standards K-12 Science Abbreviations

ST = Science and Technology

SI = Scientific Inquiry

SWK = Scientific Ways of Knowing

Academic Content Standards K-12 Mathematics Abbreviations

M = Measurement

DAP = Data Analysis and Probability

Academic Content Standards K-12 Technology Abbreviations

NT = Nature of Technology

TSI = Technology and Society Interaction

TCA = Technology and Communication Applications

TIL = Technology and Information Literacy

Academic Content Standards K-12 English Language Arts Abbreviations

R = Research

Academic Content Standards K-12 Social Studies Abbreviations

SSSM = Social Studies Skills and Methods

OAKWOOD JUNIOR/SENIOR HIGH: BEGINNING ROBOTICS

Robotics and Technology

1. Examine the reciprocal influences of pop culture, medicine and science fiction on the development of robotics
2. Examine how choices regarding the use of technology are influenced by constraints caused by various unavoidable factors (e.g., system constraints, time constraints, limited resources) (8.ST.A. 2)
3. Analyze a design or invention and explain its historical importance (e.g., robots) (7.TSI.C.2)

Programming Skills

1. Develop basic programming skills, such as move forward, reverse, curve turn, point turn, detect line, stop and coast
2. Incorporate sensors (touch, light, rotation, and/or calibration) in programming
3. Use visual images (flowcharts, maps) to determine multiple steps in programs
4. Learn the basic structures of a program (i.e. move, loop, switch, etc)
5. Compare two sets of data using measures of mean (8.DAP.D.4)
6. Estimate a measurement to a greater degree of precision than the tool provides (e.g., rotation, distance) (7.M.E.3)
7. Show that the reproducibility of results is essential to reduce bias in scientific investigations (7.SWK.B.1)

Simple Engineering

1. Learn the common lego parts, their names and their uses
2. Understand elements of strong robot design and development (e.g., leverage, leapfrog development, test repeatedly)
3. Design and build a product or create a solution to a problem given more than two constraints (e.g., size, function, time) (8.ST.B.3)
4. Evaluate the overall effectiveness of a product design or solution (8.ST.B.4)
5. Cite examples of controls, and predict resultant changes in a system for

OAKWOOD JUNIOR/SENIOR HIGH: BEGINNING ROBOTICS

that control (e.g., wheel size, robot speed, material variation) (7.NT.B.4)

6. Formulate and identify questions that guide scientific investigations, connect to science concepts, enhance robot performance, and can be answered through scientific investigation (7.SI.A.3)

Research Skills

1. Examine current events related to annual Lego League theme
2. Develop open-ended research questions about a defined information need (7.TIL.B.1)
3. Select and evaluate relevant information about a specific topic in several sources (7.TIL.B.2)
4. Read, construct and interpret data in various forms produced by self and others in both written and oral form (e.g., tables, charts, maps, graphs, diagrams, and symbols) (8.SI.B.3)
5. Chart information gathered from multiple sources to determine facts to be used in a project (7.TIL.A.5)

Cooperative Teamwork

1. Establish guidelines, rules and time lines for group work (7.SSSM.D.3)
2. Understand and provide constructive feedback
3. Create a team identity
4. Reflect upon the performance of a classroom group in which one has participated, including the role and contribution of each member in reaching group goals (7.SSSM.D.4)

Presentation Skills

1. Use a variety of communication techniques, including oral, visual, written or multimedia reports, to present information that supports a clear position with organized and relevant evidence about the topic or research question (7.R.E.8)
2. Disseminate results obtained through collaborative research projects to a larger audience (e.g. post results on a Web page, e-mail to group participants) (8.TCA.C.2)

OAKWOOD JUNIOR/SENIOR HIGH: BEGINNING ROBOTICS

3. Evaluate information product based on content and audience (e.g., Did the information communicate the intended message to the correct audience?) (8.TCA.B.3)