Did You Know?

Leonardo da Vinci sketched plans for a humanoid robot in the late 1400s. It was a mechanical knight.
Introduction
Sports or Robotics?

55% of robotics students go on to major in science or engineering.
NRSC Workshops - Accessibility

Have workshops for mainstream teachers

1. Addresses accessibility, hearing loss, interpreter use, etc.

1. Flexible - 2 hrs to all day
NRSC Workshops - Robotics

Have workshops for:

1. VEX Robotics

1. Robotics for the classroom
NRSC Workshops

- ACT Testing Strategies
- English/Literacy Strategies in classroom
- Cybersecurity
- Math
- Science
Robots help with STEM skills

Students learn:

- logic & patterns
- following step by step directions
- leads to understanding of complex machines
- frustration is normal and okay
- problem solving
- people skills
Curriculum Connections:

- Common Core (CC) for Math
- Standards for Technological Literacy (STL)
- Next Generation Science Standards (NGSS)
- ASL Standards (Clerc Center)
<table>
<thead>
<tr>
<th>Domain #</th>
<th>Grade</th>
<th>Cluster</th>
<th>Standard</th>
<th>Unit Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.OA</td>
<td>4</td>
<td>Operations and Algebraic Thinking</td>
<td>Use the four operations with whole numbers to solve problems.</td>
<td>Idea Book Pages</td>
</tr>
<tr>
<td>4.MD</td>
<td>4</td>
<td>Measurement and Data</td>
<td>Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</td>
<td>Idea Book Pages</td>
</tr>
<tr>
<td>4.MD</td>
<td>4</td>
<td>Measurement and Data</td>
<td>Represent and interpret data.</td>
<td>Idea Book Pages</td>
</tr>
<tr>
<td>6.EE</td>
<td>6</td>
<td>Expressions and Equations</td>
<td>Represent and analyze quantitative relationships between dependent and independent variables.</td>
<td>Idea Book Pages</td>
</tr>
<tr>
<td>7.RP</td>
<td>7</td>
<td>Ratios and Proportional Relationships</td>
<td>Analyze proportional relationships and use them to solve real-world and mathematical problems.</td>
<td>Idea Book Pages</td>
</tr>
</tbody>
</table>
### STL Connections

| 3.C | 3-5 | Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study. | Various relationships exist between technology and other fields of study. | - Matching Exercise  
- Optional Research Activity  
- Optional Idea Book Exercise |
|------|------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 3.F | 6-8 | Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study. | Knowledge gained from other fields of study has a direct effect on the development of technological products and systems. | - Matching Exercise  
- Optional Research Activity  
- Optional Idea Book Exercise |
### Next Generation Science Standards

<table>
<thead>
<tr>
<th>Grade</th>
<th>Category</th>
<th>PE Code</th>
<th>Performance Expectation (PE)</th>
<th>Unit Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Energy</td>
<td>4-PS3-1</td>
<td>Use evidence to construct an explanation relating the speed of an object to the energy of that object.</td>
<td>Challenge Robot Build, Idea Book Pages/Engineering Notebook</td>
</tr>
<tr>
<td>4</td>
<td>Energy</td>
<td>4-PS3-4</td>
<td>Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</td>
<td>Challenge Robot Build, Idea Book Pages/Engineering Notebook</td>
</tr>
<tr>
<td>3-5</td>
<td>Engineering Design</td>
<td>3-5-ETS1-1</td>
<td>Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</td>
<td>Challenge Robot Build, Idea Book Pages/Engineering Notebook, Following Challenge Rules</td>
</tr>
<tr>
<td>3-5</td>
<td>Engineering Design</td>
<td>3-5-ETS1-2</td>
<td>Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</td>
<td>Challenge Robot Build, Programming Activities, Idea Book Pages/Engineering Notebook, Following Challenge Rules</td>
</tr>
</tbody>
</table>
### Next Generation Science Standards

| 6-8   | Energy            | MS-PS3-5 | Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object. | Challenge Robot Build
|       |                   |          | - Idea Book Pages/Engineering. Notebook |
| 6-8   | Engineering Design | MS-ETS1-2 | Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. | Challenge Robot Build
|       |                   |          | - Idea Book Pages/Engineering. Notebook |
ASL Standards -

Discourse and Presentation-
- Engage effectively in a range of collaborative discussions (e.g., one-on-one, in groups, teacher-led) with diverse partners on grade 6 (and 7&8) topics, texts, and issues, building on others' ideas and expressing their own clearly.

Language -
- Demonstrate command of the standard ASL grammar and usage when signing (live and published). Use knowledge of language and its structure when signing and viewing (live and published).
Code & Go

It is fun and introduces very BASIC coding.

Good for developing counting and pattern skills.
Code & Go

Has cards with challenges

Students can design their own maze.
Code & Go

Activity -
need a volunteer!
BeeBot

Another BASIC coding robot.
Can use with younger ages.
Topics:
  counting, ABCs, insects
Wonder Workshop - Dash and Dot

Works well with math.

Good with shape lessons.

Apps are available and free.
Wonder Workshop - Dash

Activity - Need a volunteer!
Wonder Workshop - Dash

1. Show me 7 on the number line
2. Create a number sentence
3. Create a shape
Using Blockly app with Dash to make a number

Level 1 challenge - Pick a number between 1 and 10 - make Dash move that many times forward and/or backward.

Level 2 challenge - How can you use coding blocks to move forward 100cm or 200cm in 2 movements? 3 movements? Record on paper or digitally. How do we know if our distances with Dash are accurate?
Using Blockly app with Dash to make a number

Level 3 challenge -

How can you use coding blocks to move forward or backward to end up 100cm or 200cm ahead after 3 movements? 4? 5? Record your number sentence with addition and subtraction on paper or digitally.
The Learn to Code Curriculum is organized into six coding levels and covers six fundamental coding concepts: sequencing, loops, events, conditionals, functions, and variables. For students who are new to Dash and Dot, we recommend beginning with Level A.

Each coding level is aligned to a recommended grade as a guide, but we also suggest that you consider your students’ coding experience when determining where to start.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
<th>Level E</th>
<th>Level F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended grade level</td>
<td>K</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Sequencing</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
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<td></td>
</tr>
</tbody>
</table>
Sphero
- Very grade flexible
- Basic to complex code
- Deals with more complex math
  - Degrees, minutes, angles
  - Geometric shapes
- Physics
Sphero

Ordered Pairs
LittleBits

- Makes a platform of easy-to-use electronic building blocks

- Blocks are
  - Color-coded
  - Magnetic
  - Reusable
Each Bit is color-coded by its function in the circuit.
Activity - Money Scales
VEX Robotics

Students learn how to:

1. plan robots - design/planning skills
2. build robots - engineering skills
3. program robots - coding skills
4. teamwork - soft skills
5. troubleshoot - logical/problem solving skills
VEX Robotics

Have competitions at regional, state, and world levels

We can get you started with a robotics team!
At first, it was kind of confusing and awkward, but we persevered and kept a positive outlook.
VEX Robotics

Curriculum - Project Lead the Way can be used

VEX does have their own curriculum to support their platforms

VEX IQ - 3rd - 8th grades
VEX VRC - 6th - 12th grades
NRSC Online

Website - www.aidb.org/nrsc
Facebook - NTID Regional STEM Center
Twitter - @nrscenter
Instagram - @nrscenter
Thank you for attending!

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256-589-0494 (text)
(or grab my business card)