PUTTING THE FUN BACK INTO LEARNING!

# Robotics Curriculum Guide

October 2017

Dear Parents and Guardians,

RoboLAB is a year-long robotics program aimed at implementing technology enhanced learning in classrooms. It aims to promote robotics as a tool for application of concepts learnt by students in classroom using STEM (Science, technology, Engineering and Mathematics) integration by creating multiple intelligence based learning environment.

## Curriculum Coverage for October:

### Grade 3:

| Topic Name | Activity Description | Science, Technology, Engineering & Mathematics Relevance | Key Words |
|---|---|---|---|
| **Catapult challenge** | Construction of a catapult and identify the effective position of fulcrum to increase the distance an object moves. | **Science**- Identification of lever as simple machine.<br>**Mathematics**- Build new knowledge through problem solving. | Robotics<br>Design<br>Build<br>Problem solving<br>Energy<br>Simple machine<br>Lever |
| **My first toy car** | Construction of a car to observe how stored energy gets converted into movement energy. | **Science**-Conservation of energy. | |

### Grade 4:

| Topic Name | Activity Description | Science, Technology, Engineering & Mathematics Relevance | Key Words |
|---|---|---|---|
| **Let's start building** | Construction of ramps of varying height to explore relationship between the height of inclined plane and the distance travelled by the ball. | **Science**- Identification of inclined plane as simple machine.<br>**Mathematics**- Understand measurable attributes of object and process of measurement, Apply appropriate techniques to determine measurements | Robot<br>Robotics<br>Design<br>Build<br>Problem solving<br>Simple machine |

### Grade 5:

| Topic Name | Activity Description | Science, Technology, Engineering & Mathematics Relevance | Key Words |
|---|---|---|---|
| **Magnifying shapes.** | Construction of pantograph. | **Technology**-Role of society in development and use of technology. **Mathematics**: Ratio & Proportion. | Pantograph<br>Energy<br>Motor<br>Remote controlled<br>Think<br>Programming<br>Algorithm<br>Brick<br>Display block<br>Sound Block<br>Forever Block |
| **Understanding vehicles.** | Construction of remote controlled car using two motors. | **Science**-Transfer of energy. **Technology**-Relating to real world examples through technology. | |
| **Let's start THINKing.** | Introduction to THINK, Programming the i-Pitara brick to display message on LCD screen, play sounds. Use of forever block. | **Science**-Understanding science and technology. **Technology**-Algorithm development, Introduction to sequential programming. | |

**Grade 6:**

| Topic Name | Activity Description | Science, Technology, Engineering & Mathematics Relevance | Key Words |
|---|---|---|---|
| **Create your own music.** | Program the i-Pitara brick to blow the buzzer, play various tunes. | Technology- Algorithm development, sequential programming. | Design<br>motors<br>build<br>Think<br>problem solving<br>Simple machine<br>Programming<br>Forward<br>Backward<br>Display block<br>Sound Block<br>Forever Block<br>Buzzer<br>Algorithm<br>Turn |
| **My first autonomous car** | Construction of an autonomous car and programming it to move forward and backward for a specified time. | **Technology**-Algorithm development, sequential programming. **Mathematics**-Develop and demonstrate spatial sense, Specify location and describe spatial relationships using programming (Geometry). | |
| **How are cars steered?** | Construction of an autonomous car and programming it to take turns to follow a specified path. | **Technology**-Algorithm development, Sequential programming. **Mathematics**-Develop and demonstrate spatial sense, Specify location and describe spatial relationships using programming (Geometry). | |

**The Core Competency Focus:** Problem solving-creative-cooperative-project based learning-critical thinking

**How Can You Help?** Please could you make sure your children bring; robotics book, pen (black or blue) and pencil for all Robotics lessons and help your children to learn the meanings of the key words.

**Homework:** Students will carry out an independent research task to enable them to come up with a design solution.

**Useful Website:** Here is a useful website to help the student in robotics: www.thinklabs.in

## Grade 7:

| Topic Name | Activity Description | Science, Technology, Engineering & Mathematics Relevance | Key Words |
|---|---|---|---|
| **My robotic fan** | Construction & programming a fan to rotate for a specified time. | **Technology**-Algorithm development, sequential programming. | Design<br>Build<br>Simple machine<br>Problem solving<br>Programming<br>Algorithm<br>Forward<br>Backward<br>Sensor<br>Conductivity |
| **My first autonomous car** | Construction of an autonomous car and programming it to move forward and backward for a specified time. | **Technology-**Algorithm development, sequential programming.<br>**Mathematics-**Develop and demonstrate spatial sense, specify location and describe spatial relationships using programming (Geometry). | |
| **I respond to different materials differently** | Classifying materials as conductors and insulators using conductivity sensor. | **Science** – Differentiation between conductors and insulators.<br>**Technology** - Algorithm development | |

## Grade 8:

| Topic Name | Activity Description | Science, Technology, Engineering & Mathematics Relevance | Key Words |
|---|---|---|---|
| **I respond to only touch** | Construction of an autonomous car using touch sensor and programming it to detect obstacles. | **Technology**- Exploring digital sensor (i-Pitara touch sensor), Algorithm development, Use of multiple control construct IF.<br>**Mathematics**- Represent mathematical situations using | Design<br>Build<br>Problem solving<br>Programming |

| | | | |
|---|---|---|---|
| | | algebraic symbols, Analyze change in various contexts (Algebra). | Algorithm<br>Algebra<br>Conductor materials<br>Insulator materials<br>Touch Sensor<br>Conductivity Sensor<br>IF Block |
| **I respond to different materials differently** | Classifying materials as conductors and insulators using conductivity sensor. | **Science** – Differentiation between conductors and insulators.<br>**Technology** - Algorithm development, use of conditional construct IF.<br>**Mathematics -** Represent and analyse mathematical situations using algebraic symbols. Analyze change in various contexts (Algebra). | |

Kind regards

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