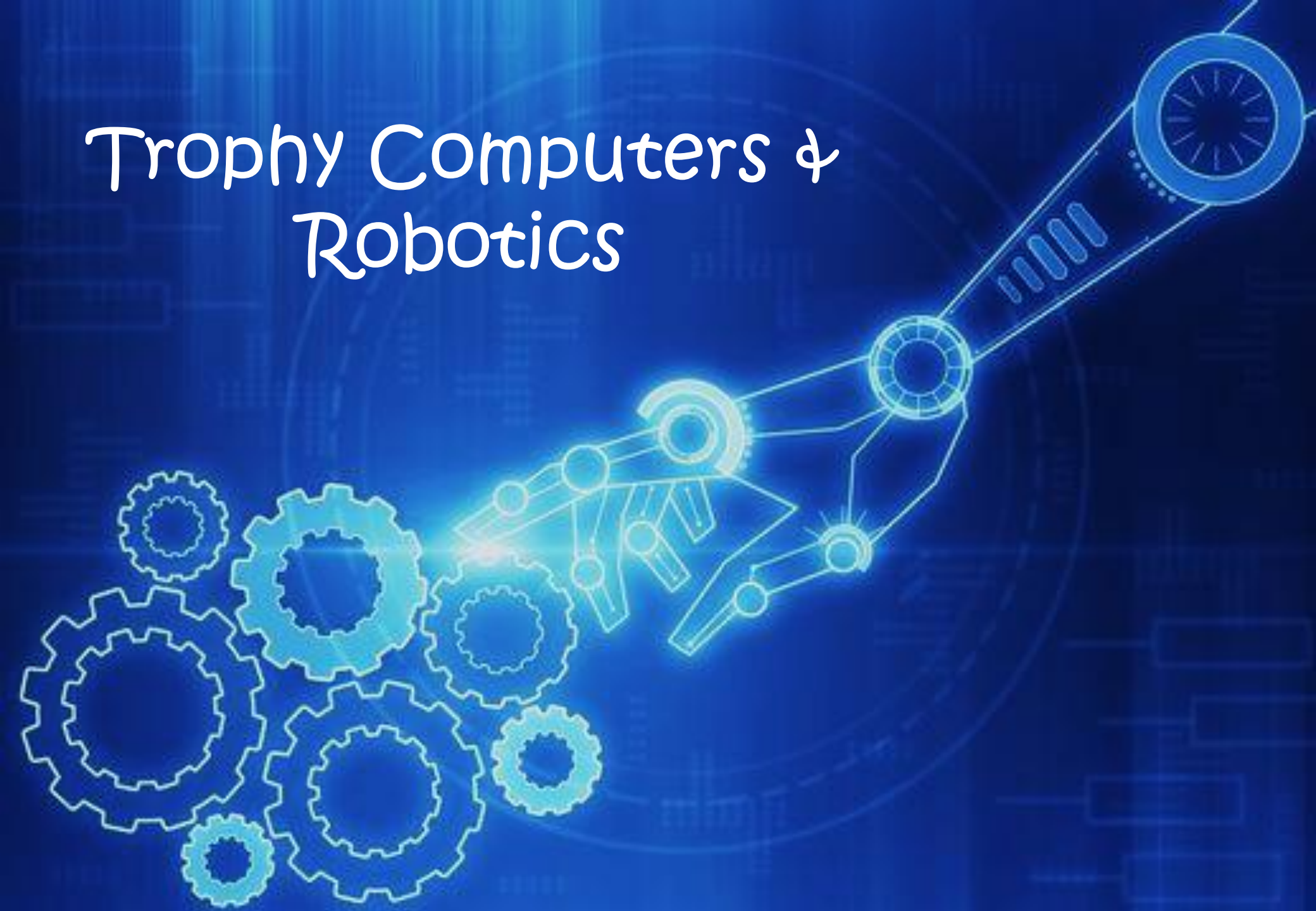
Trophy Computers & Robotics




Steps
of the
TCR curriculum

Grade RR - R Brainy Bricks stories(robotics)

Why should kids start with normal blocks and play themes? Isn't it a waste of special and valuable time and something they can do at home?

Play themes and activities are designed for our young learners. Through popular themes such as family life, communities, animals and transport we promote a child's self-expression and knowledge and understanding of the world.

At the same time, we provide children with opportunities to "Learn by Making" and to exercise their creativity.
In this way we make children receptive for a positive start to their early development in coding and designing.

- ❑ Read, discuss and build the story with geo-art(2D) and LEGO(3D)
- ❑ Step-by-step sequencing
- ❑ Manipulating objects (codes)
- ❑ Pixel-art coding - Spatial orientation, "binary coding" with colours
- ❑ "Sell" your model – learn to present

Grade 1-3 Robotics

Basic mechanics with LEGO

We start with LEGO mechanics sets to introduce the correct building skills for future robotics projects.

We focus on:

- ✓ Structures
- ✓ Wheels and axles
- ✓ Gears
- ✓ Levers
- ✓ Pulleys

Schools that implement late in the phase will have to do a bridging course before they can move on to their own grade level, so it may feel that they only "play with LEGO" but we need to establish the correct foundation of mechanical building before they can continue to building robots.

We build various mechanical machines that the learners will find in or around their home or town.

The machines will either be remote controlled or coded, depending on their age/grades.

Additional Coding:

Scratch Jr coding is introduced

Scratch 3.0 is introduced from grade 3 level.

Design process:

Where timetables allow, we build a robotics project from recycled material.

Meet Sammy – the new robot on the floor!

Gr1-3

Meet Sammy. This cute little peanut butter and jelly sandwich is actually a robot that teaches coding principles and skills to children in grades K-2.
You don't need a tablet, smartphone, or computer to program this robot; programs are created by simply laying down a sequence of physical code cards.
As the robot drives over the code cards, an OID optical scanner on the bottom of the robot reads the code cards one by one and loads the program.
Next, place the robot on a grid made of map cards, and the robot runs the program.
You can program the robot to move in different directions, activate its output gear, light up its LED, play sounds, and respond to different function cards. The integrated output gear makes it possible to build simple robotic creations with arms or other moving parts that respond according to the program's instructions.

Grade 4-6 Robotics

<u>LEGO/micro:bit robotics</u>

Learn how to build robots using various LEGO and micro:bit sets

The aim is to:

- ✓ Follow the design process
- ✓ Program the robots to do different missions using sensors and various attachments.

(This is the reason why we focus on LEGO mechanics in the junior grades).

<u>Coding:</u>

- ✓ Scratch 3.0
- ✓ Micro:bit

<u>Computer applications</u>

- ✓ CAD design

Grade 7-9 Robotics

Maqueen/LEGO/micro:bit robotics

The aim is to:

- ✓ Solve problems
- ✓ Program the robots to do different missions using sensors and various attachments like claws/grippers etc.

Coding:

- ✓ Micro:bit
- ✓ Nezha servos/DC motors

Computer applications

- ✓ CAD design

Computer applications

Gr R-3

- ✓ Mouse skills
- ✓ Basic skills on MS PowerPoint and MS Word
- ✓ Paint

Gr4-6:

- ✓ MS Office
- ✓ Video editing

Gr7-9

- ✓ MS Office

Learning across the curriculum (LAC)

Coding & Robotics

Engineering
Problem solving
Coding
Control systems

Art
Creative design
Presentations

Maths
Sequencing
Measurements

Life skills
Learn across the curriculum

Practical
hands-on experience

FUN
5 Different ways of learning

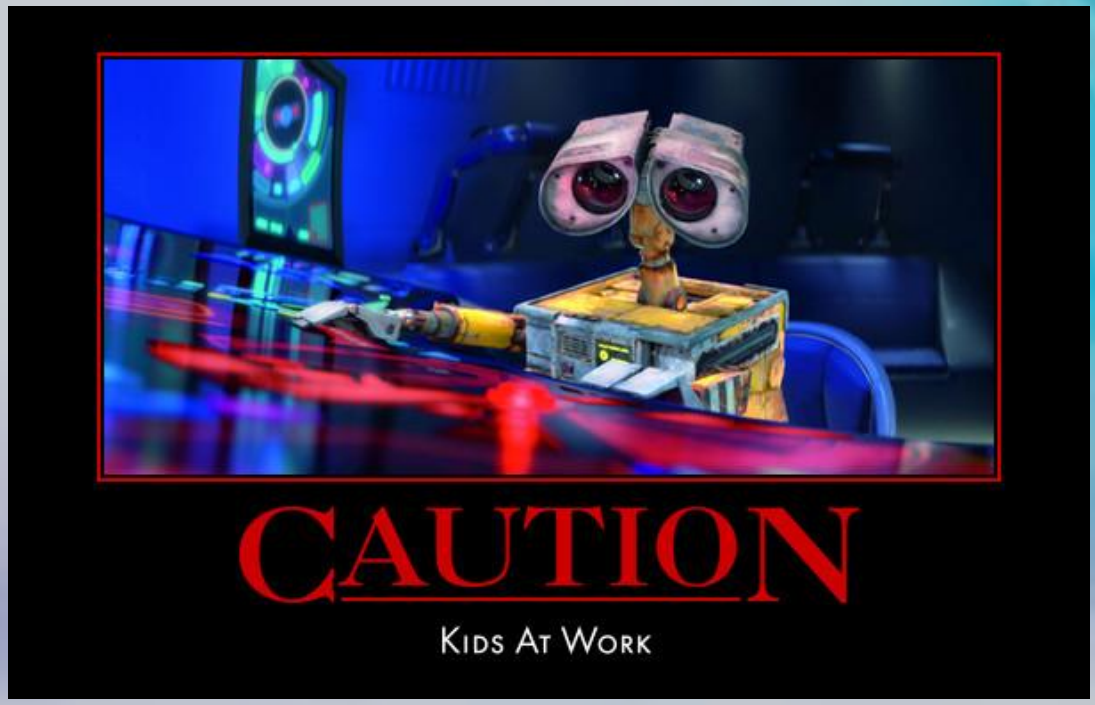
Science
Experimenting
Asking questions

Technology
Inventions
Machines
Design process

In the mechanics classes we:

- Learn by following the facilitator or
- By Step-by-step instructions or
- By reading a 2D picture or
- By copying a 3D model.
- Build from key-steps only.
- Also have creative designs where we can explore our own ideas.
- Do lots of repetition!

- We learn how to work in groups
- To share and
- To be organized



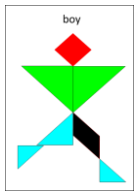
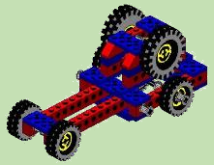
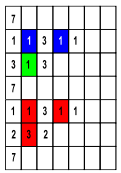
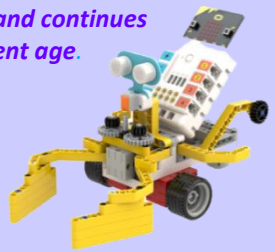
Learning cross the curriculum (LAC)

If all the above steps were done properly, we have touched on all the subjects across the curriculum while focusing on
Coding and Robotics.

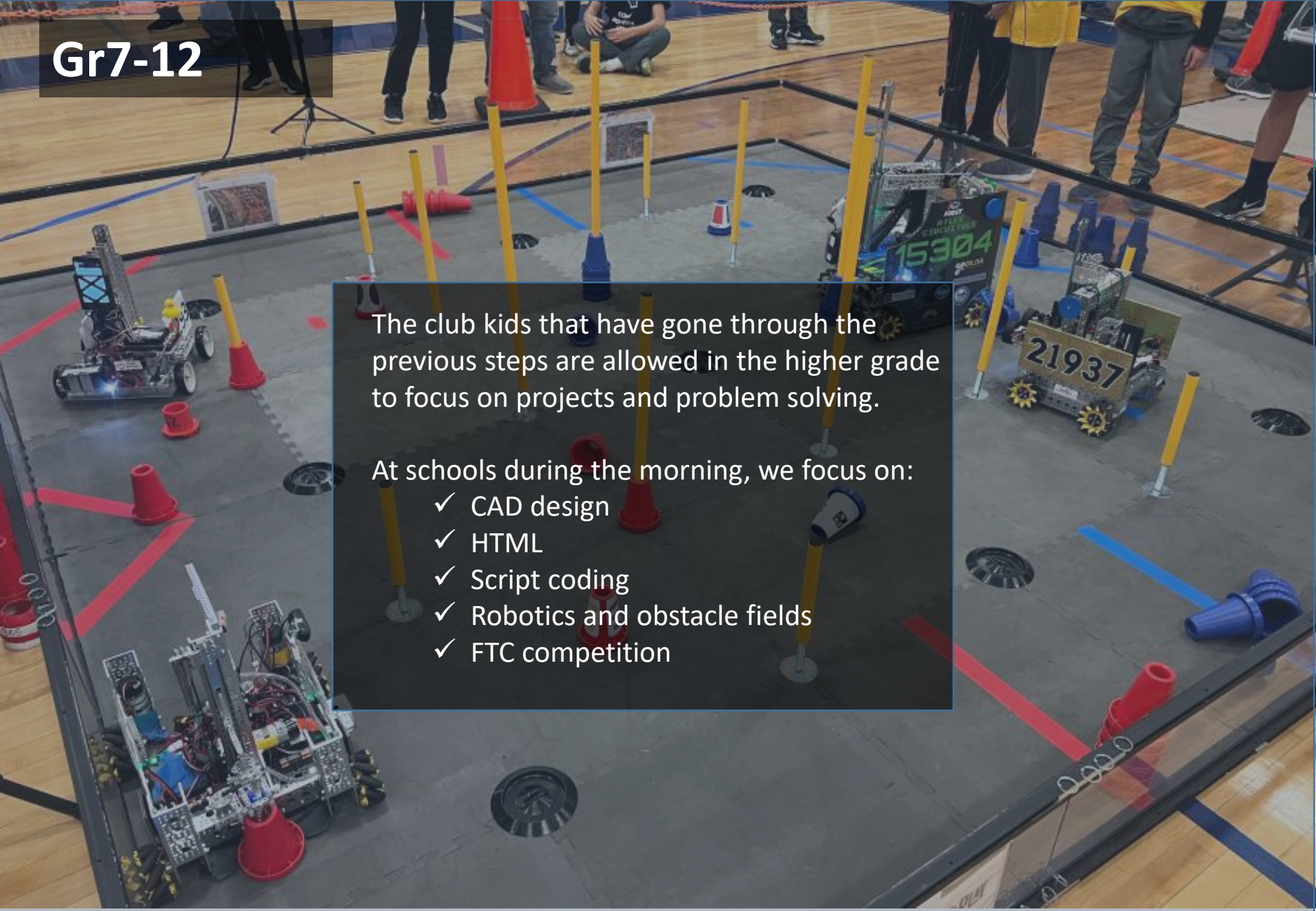
We build each year on a previous year's skills.

The difficulty levels will increase as they progress.

All (older) newcomers will start with a **bridging** course.

Preschool Robotics	LEGO Mechanics	LEGO / Nezha Robotics	Computer classes	Coding classes
GrRR-R	**Gr1-3**	**Gr4-9**	**GrR-9**	**Gr1-9**
Brainy Bricks theme building Read, discuss and build the story with Geo-art and/or LEGO	**Basic skills Gr1** ✓ Basic mechanical building skills ✓ Strengthening methods ✓ Communication skills ✓ Follow facilitator step-by-step ✓ 3D models 	**Introduction to robotics** ✓ Basic robot building ✓ Step-by-step basic programming ✓ Sensors and attachments ✓ Problem solving ✓ Obstacle fields ✓ PAT Projects ✓ CAD drawings	**GrR** ✓ Mouse skills ✓ G-Compris ✓ Drag and drop	**Sammy the robot** ✓ Gr1-3 coding ✓ Put out the steps(codes) ✓ Robot reads steps ✓ Robot complete maze 
 	**Mechanics – practical application Gr2** ✓ Structures ✓ Wheels & axles ✓ Gears ✓ Levers ✓ Pulleys ✓ Follow building plans/3D models ✓ Change model creatively afterwards 		**Gr1-3** ✓ Basic MS Office computing skills while doing themes and spelling ✓ Paint ✓ Scratch Jr coding	**Scratch Jr and Scratch 3.0** Learn about: ✓ Algorithms ✓ Coding sprites, backdrops, music ✓ How to use commands, decisions and loops ✓ Create your own interactive stories, games
Pixel art coding A basic form of binary coding (the language of computers) - coding by numbers and colours	**Mechanics – practical application Gr3** ✓ Everyday machines ✓ Logical thinking and deduction ✓ We-Do junior coding *The theory can be done for Gr4-7 as well, just change the difficulty level of the machines to build*	**Intermediate / Advanced** ✓ Applied robotics ✓ Creative projects ✓ Advanced programming ✓ Problem solving projects ✓ CAD drawings	**Gr4-6** ✓ Basic editing on Word, Excel and PowerPoint ✓ Animations and transitions ✓ Research ✓ Internet and e-comm ✓ Video editing ✓ Scratch 3.0	
 	✓ Progressive levels of difficulty ✓ Individual / teamwork depending on class sizes. ✓ Problem solving ✓ Building steps are colour coded to highlight specific areas of importance. ✓ Some steps are mixed on purpose to enable them to find and solve problems in the later stages of each year	***The robotics course is unlimited and continues up to student age.*** 	**Gr7-9** ✓ MS Office programs - advanced	**Micro:bit** ✓ Do animations ✓ Algorithms ✓ Games ✓ Robot sensors ✓ Mazes 

Gr7-12



The club kids that have gone through the previous steps are allowed in the higher grade to focus on projects and problem solving.

At schools during the morning, we focus on:

- ✓ CAD design
- ✓ HTML
- ✓ Script coding
- ✓ Robotics and obstacle fields
- ✓ FTC competition