Robotics at School: Building Skills and Values for the Future

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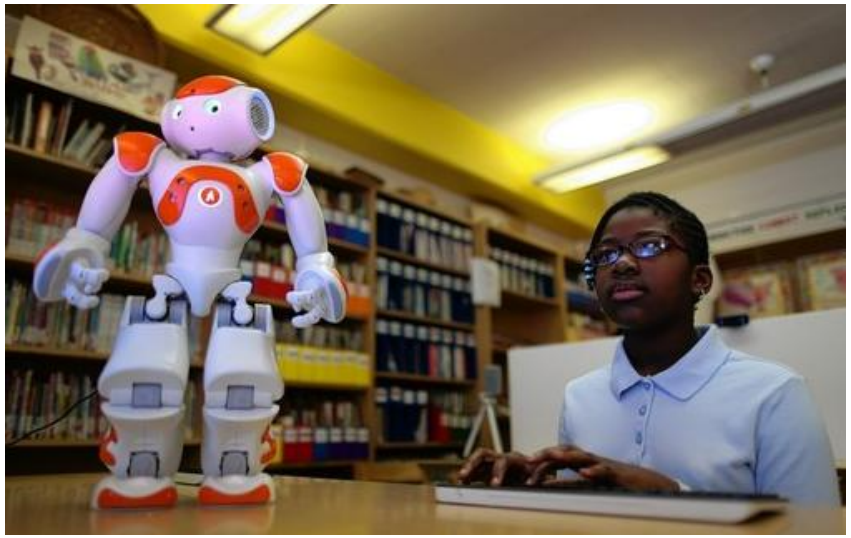
1. Introduction to Educational Robotics

Why Robotics in Education?

- We live in a world that changes rapidly!
- The school plays a crucial role.
- Robotics can be used as an engaging, hands-on learning approach



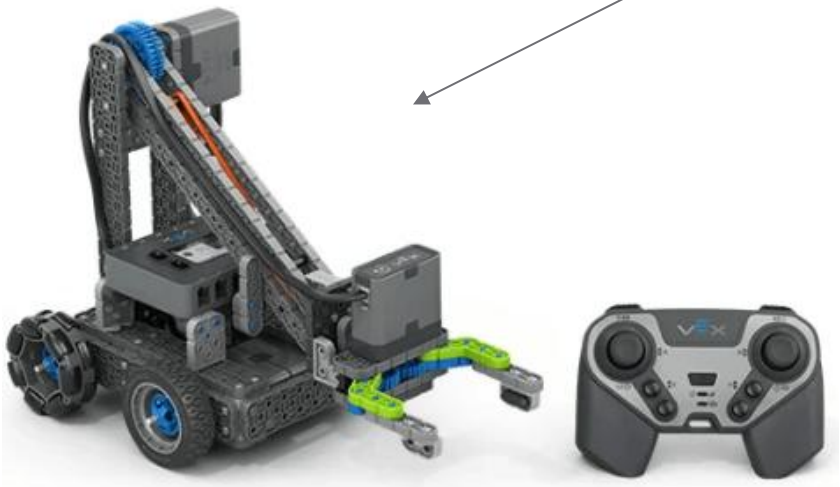
What Is Educational Robotics?

- **Robotics**: scientific discipline that integrates mechanical engineering , electronics (mechatronics) and programming

Popular platforms for teachers/professors

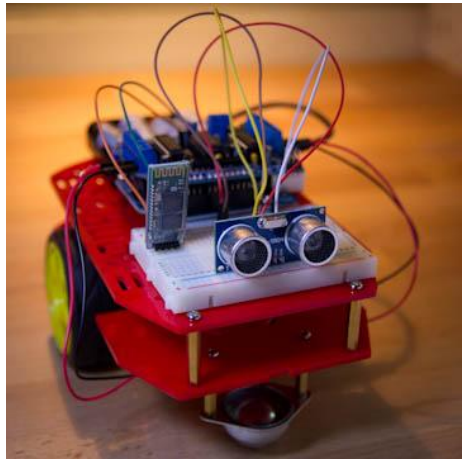
Full Hardware and Software Packages for Designing and Programming

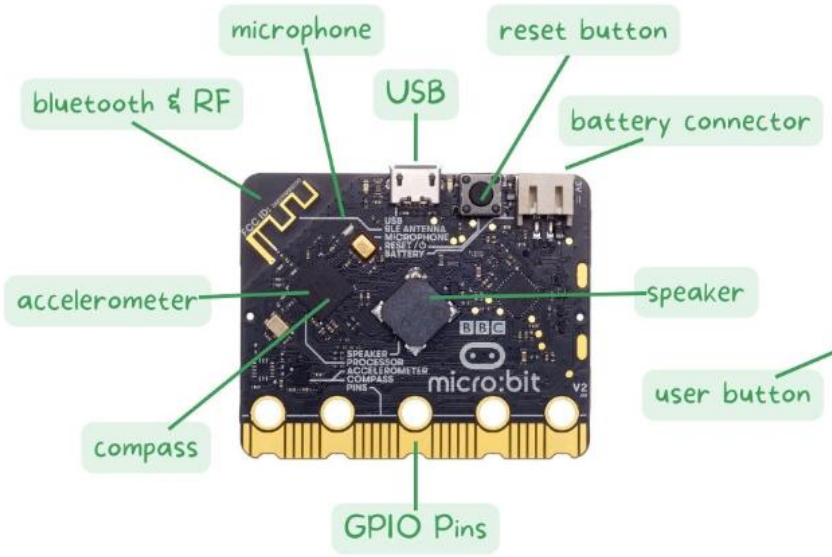
- **LEGO**: https://education.lego.com/en-us/teach/
- **VEX** : https://www.vexrobotics.com

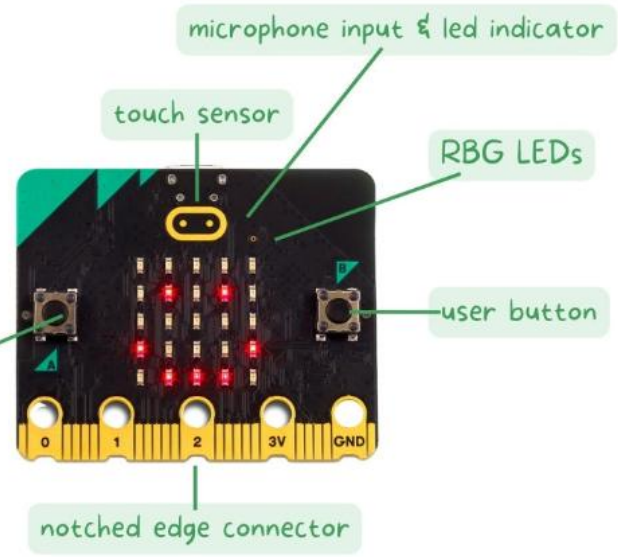


Build the "Brain" of the Robot: hardware and software systems for controlling the robot's motion and behavior

- **Arduino** : https://www.arduino.cc/en/software/
- **micro:bit**: https://makecode.microbit.org/







Classroom Integration Models

- ✓ As a standalone subject (e.g., Coding & Robotics)
- ✓ As part of curriculum (Math, Science, Technology)
- ✓ Afterschool clubs or competitions
- ✓ Cross-disciplinary projects

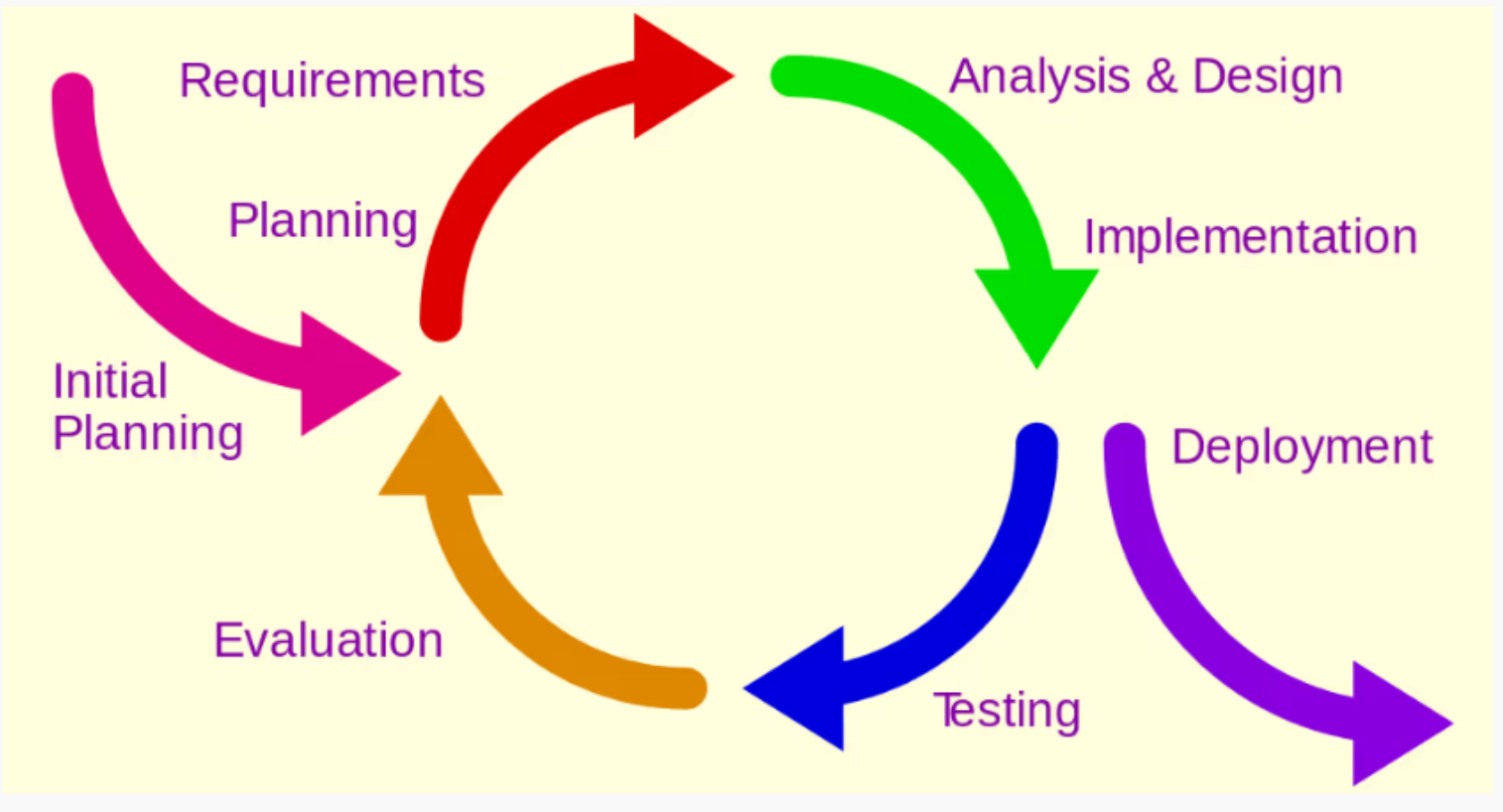
The Role of Teachers and Schools

- Teacher training & support is key
- A supportive school culture for innovation
- Involve parents and local community

2. Building Skills with School Robotics

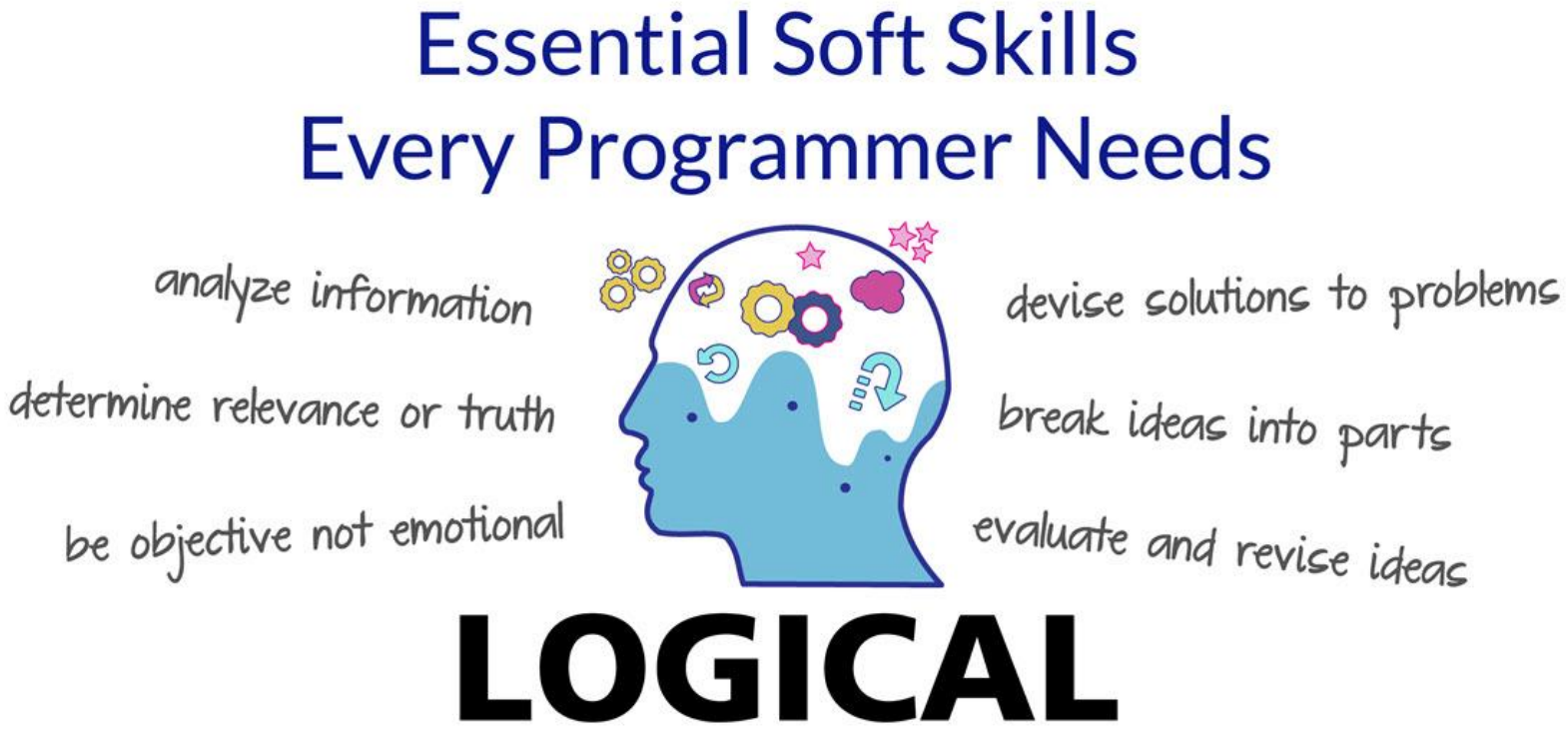
Cognitive & Technical Skills Developed

- Engineering mindset: design, test, iterate



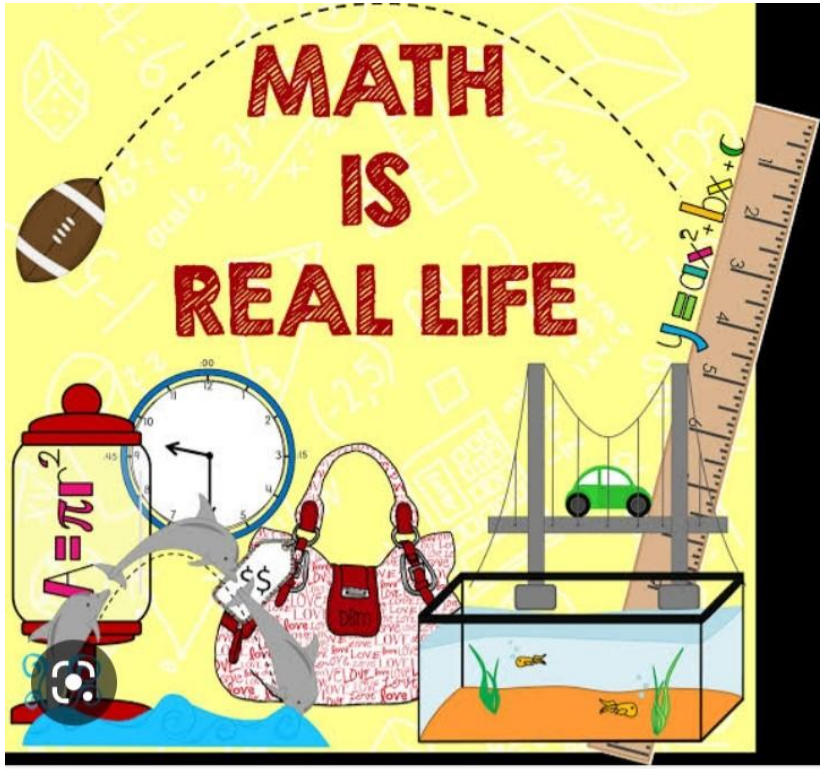
Cognitive & Technical Skills Developed

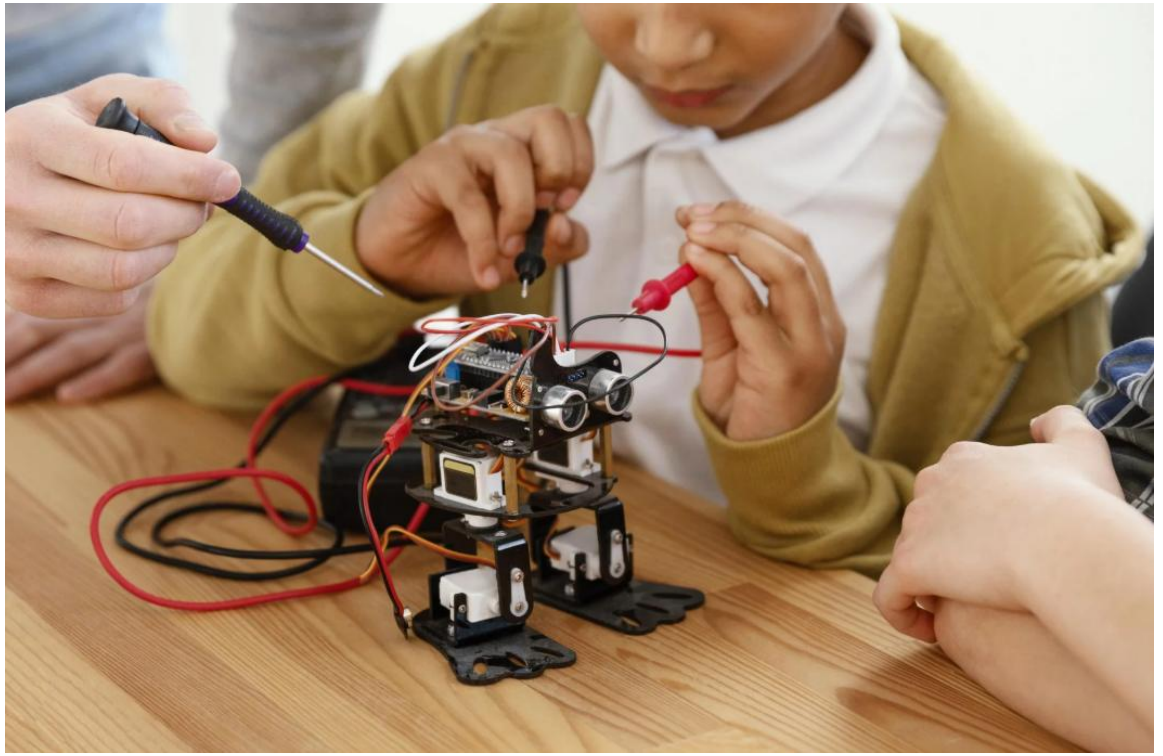
- Logical thinking and coding



Cognitive & Technical Skills Developed

- Real-life math and science applications

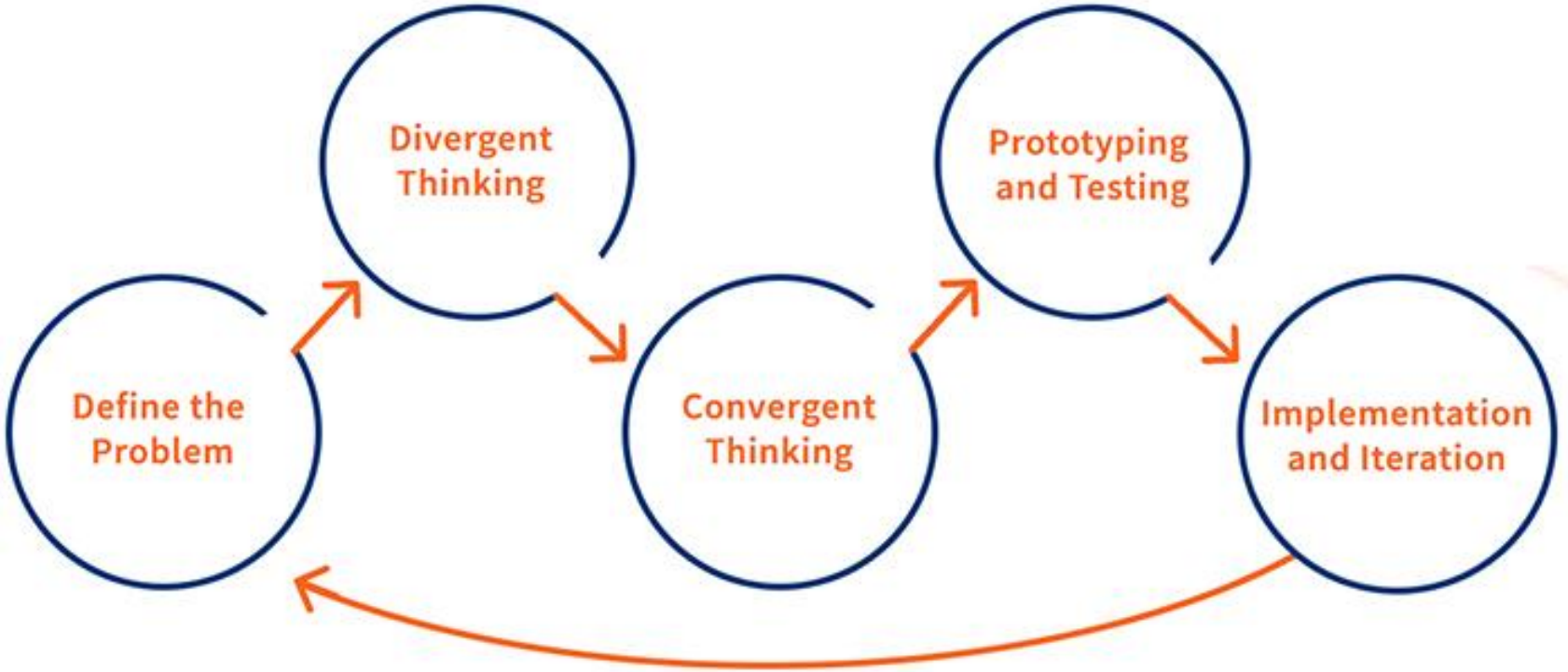




https://xperimentor.science/2022/08/26/how-to-make-a-robot-for-a-school-project-%ef%bf%bc%ef%bf%bc/

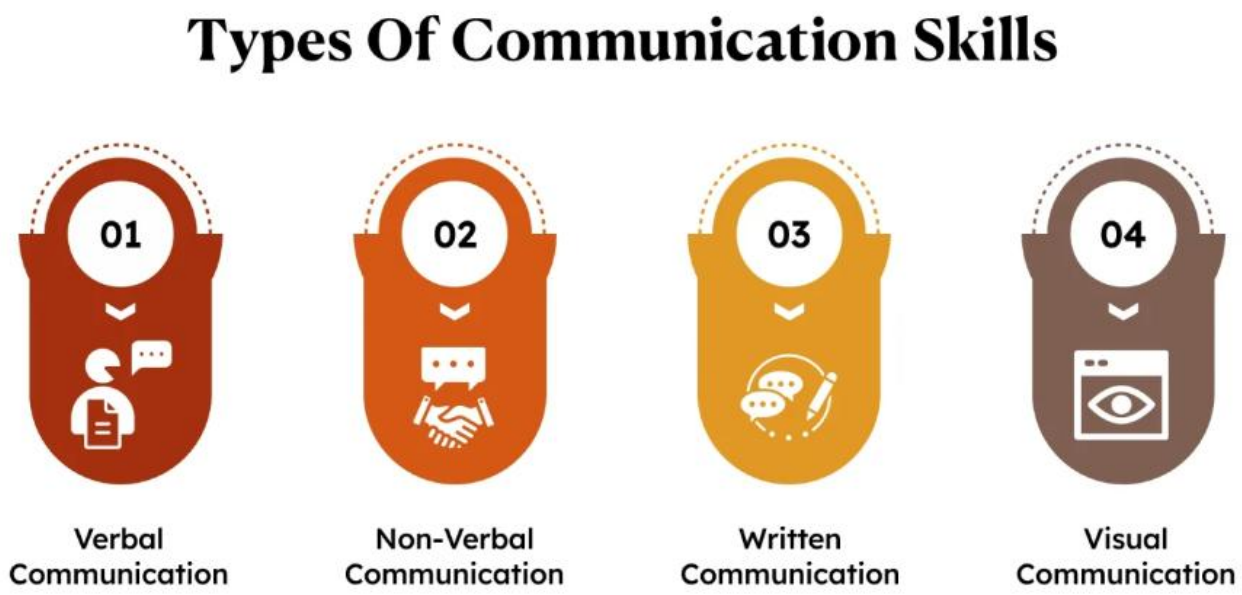
Soft Skills and 21st Century Competencies

- -Creative problem solving



Soft Skills and 21st Century Competencies

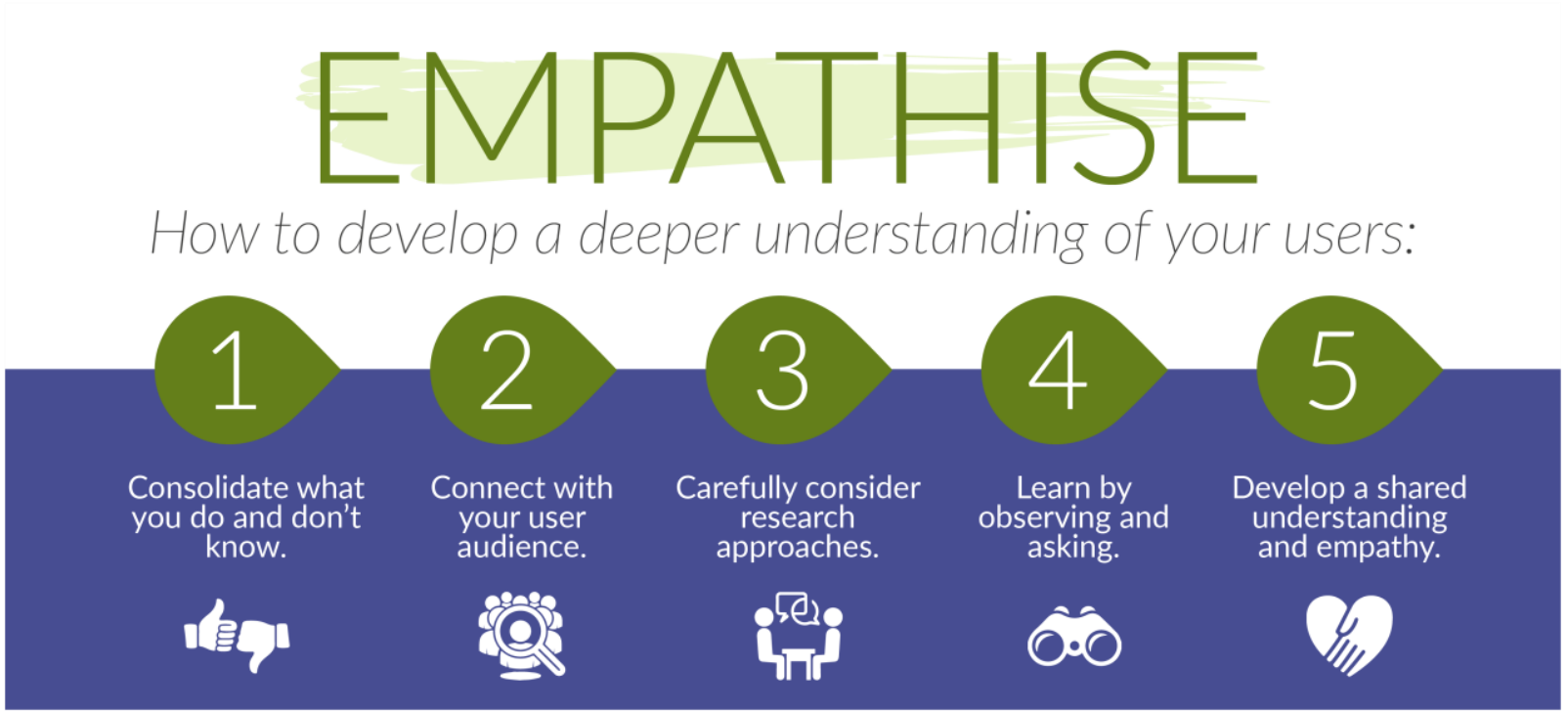
- - Teamwork & collaboration
- - Time management & project planning
- - Communication skills



3. Building Values with School Robotics

Building Values Through Robotics

- **Resilience**: embracing failure as learning
- **Empathy**: creating solutions for real-world needs



Building Values Through Robotics

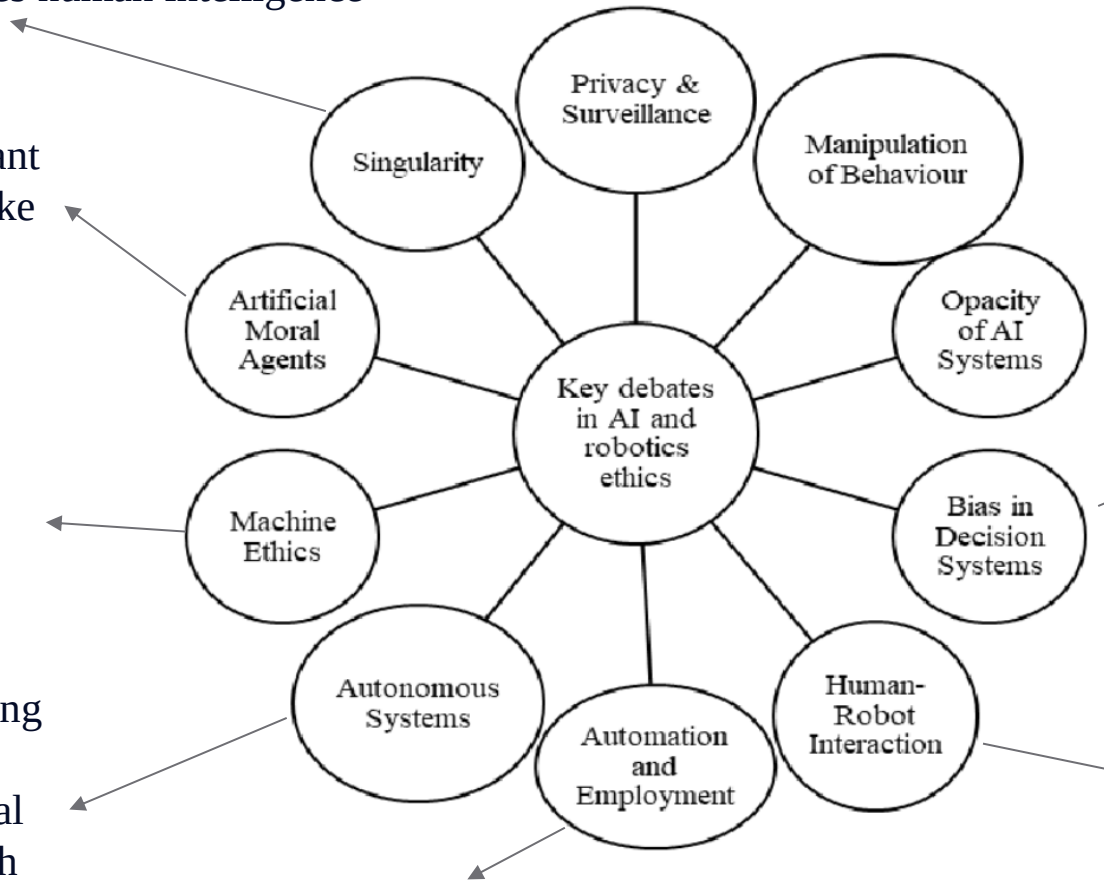
- **<u>Responsibility</u>**: ethical use of AI and ROBOTICS

a hypothetical future point in time when artificial intelligence surpasses human intelligence

AI systems which can recognize the morally relevant aspects of a situation and take them into account in their decisions and actions.

adding or ensuring moral behaviors of man-made machines

ensuring accountability, preventing harm, and maintaining human oversight to address the potential risks and biases inherent in such technologies.



Robots can be dangerous if not properly designed, programmed, and maintained.

can influence our relationships with social robots based on our own gender, ethnicity, and age stereotypes.

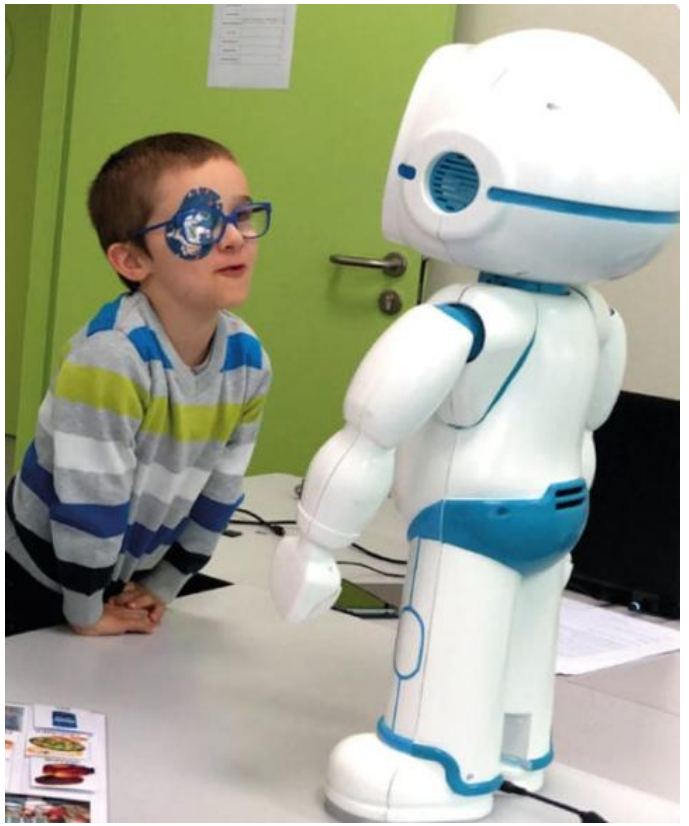
Replacement and its implications for labor

Building Values Through Robotics

- **Inclusivity**: participation across gender and ability

Inspiring Examples

- Robot to assist students with disabilities



4. Available Material, Projects and Students Competitions

Connecting with Science-Technology-Engineering-Arts & Math (STEAM)

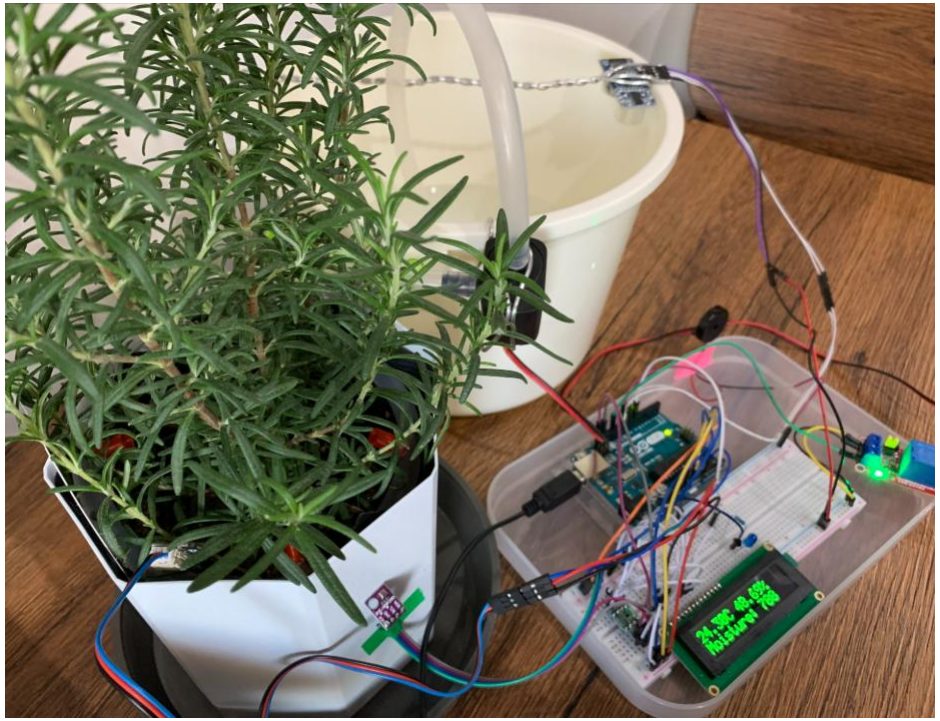
- - Robotics brings Science, Technology, Engineering, Arts, and Math together
- - Encourages inquiry, experimentation, design thinking
- - STEAM-based classroom projects

https://thestempedia.com/blog/easy-steam-activities-and-projects-for-kids/

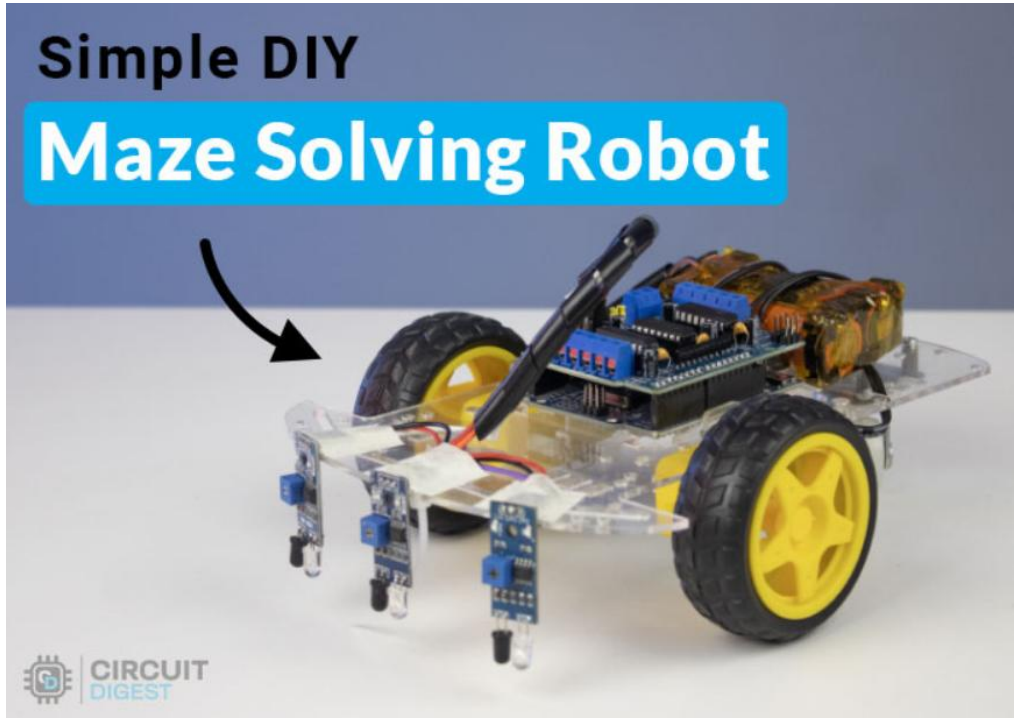
STEAM-based classroom projects

More Student Projects

Automated plant watering system (1)



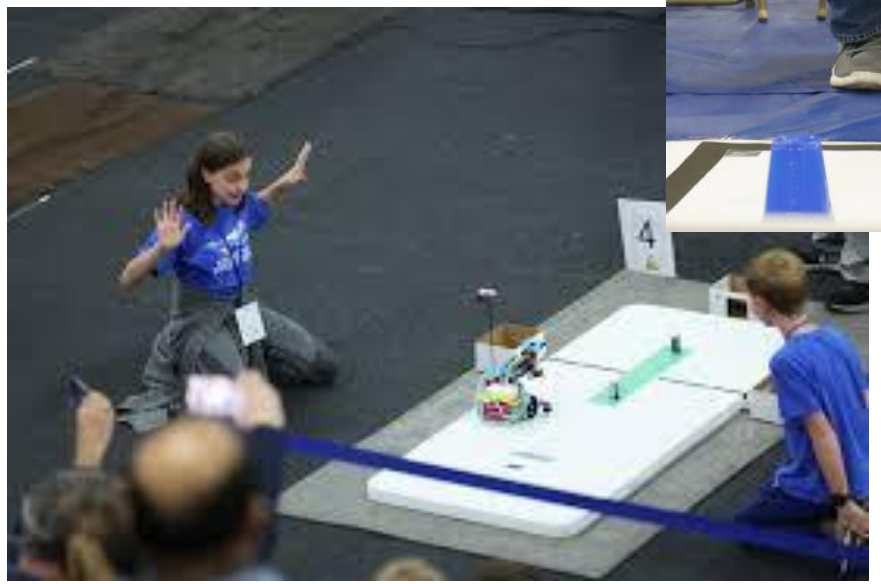
Maze-solving robot with sensors (2)

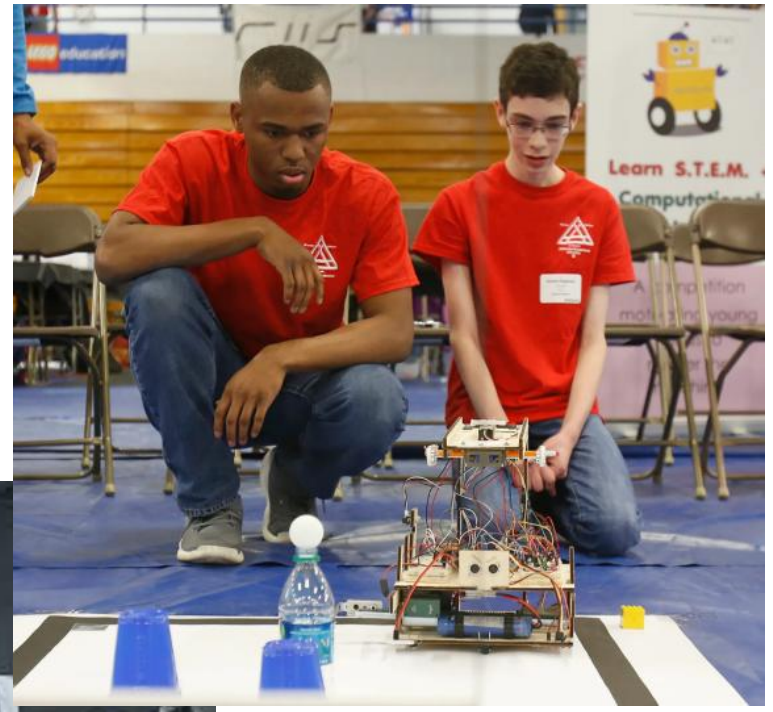


1. https://projecthub.arduino.cc/lc_lab/automatic-watering-system-for-my-plants-e4c4b9
2. . https://circuitdigest.com/microcontroller-projects/arduino-maze-solving-robot

Competitions and Motivation

- World Robot Olympiad (WRO), First Lego League (FLL), Robofest
- Students set goals, solve missions, develop teamwork
- Motivation through real challenge & achievement





5. To sum up…

Conclusion – A Future Worth Building

- Robotics is more than coding—it's character-building
- Prepares students not just for jobs, but for life
- Let's give our students the tools to shape tomorrow

Thank you for your attention! Questions?