
Tools for raising thinkers & innovators
David Ogunshola

The mind is like a machine.
Once it starts, you have no idea how far it can go

Our real job as educators is to help our students know how to think

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What tools can you use to get the minds of students to work?

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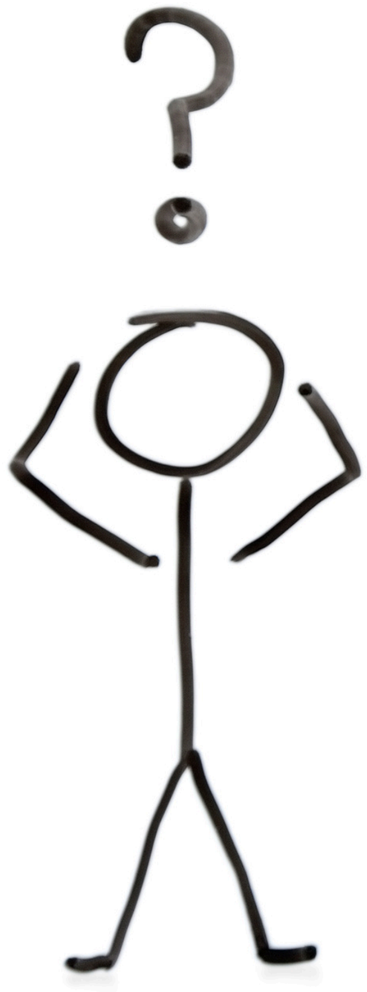

1

Questions

We mostly use questions as tools for checking whether learning has happened (quizzes, tests, exams), but questions are supposed to be used as tools for learning.

Using questions the right way can turn your students into thinking machines

There are broadly two types of questions

Investigable Questions

Questions that require students to perform an ‘investigation’ before they can answer it.

The investigation will most times involve experimentation, collection of data, evidence gathered and investigative design

Non-Investigable Questions

Questions that do not create an opportunity for investigation or experimentation.

They can be answered with just theory or explanations.

There are 3 types of investigations

Descriptive

These investigations focus on counting or describing data from one phenomena.

Sample Investigable Questions

"How many seeds are in an apple?"

Which of these watermelons are the heaviest?

Comparative

These investigations use data to compare two or more phenomena.

Sample Investigable Questions

"Which of these two paper towels absorbs water the most?"

“Does sugar dissolve faster in cold or hot water?"

Experimental

These investigations manipulate a variable to collect data on the resulting variable.

Sample Investigable Questions

"At what time of the day is your shadow longest?"

“How does the weight of an item affect its response to gravity?”

Some popular mistakes teachers make when asking questions

- Calling the first student to raise their hands
- Immediately giving feedback on questions (whether right or wrong)
- Calling the same sets of students repeatedly because you know they will get it right
- Suggesting the answers to students because you want to finish the lesson fast and have no time

2

Scientific Argumentation

The art of scientific argumentation teaches two core skills to students:
- Not to believe everything they hear or read
- How to make informed decisions and defend a position

In a world with so much conspiracy theories and fake news, we need students who know how to question opinions and can make up their mind independently. They can't do that if they can't think

How do you respond to these?

What is responsible for the rising and falling of the sun?

When it’s raining and the sun is out, a lion is having a baby

The earth used to be one continent, but then something happened and it all split into continents

The C-E-R Process

How to think like a scientist

Claim

A statement that answers a question or asserts a position

A tomato is a fruit

Evidence

Observation, Data or Research that supports your claim

- Tomatoes are developed from flowers
- They contain seeds
- Tomatoes protect their seed

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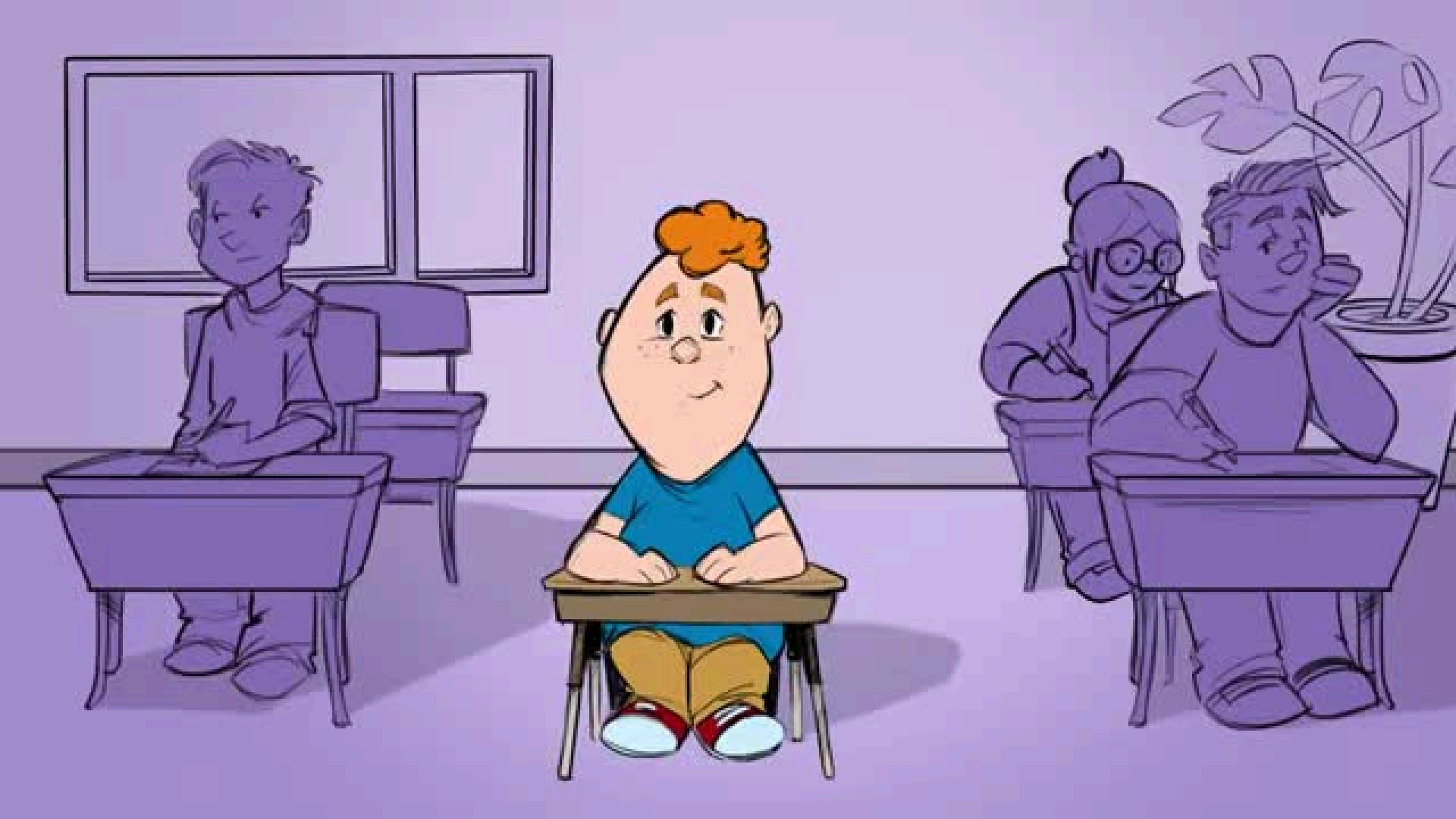
Reason

An explanation of how the evidence supports the claim. Justify how the evidence backs up the claim

Fruits are organisms or plants that are developed from flowers, contain seeds and protect their seed.

Tomatoes meet this definition



Examples

- **Sea water is colder at the bottom than at the top**
- **Air is matter**

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Part 2

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In the first part

We looked at tools you can use as you teach

The next part has to do with teaching methodologies

Project-Based Learning

Giving your students a need to learn, before they learn

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Project-Based Learning (PBL)

An instructional approach where students develop **knowledge and skills** through engaging projects set around challenges and problems they may face **in the real world**

In PBL, students are driven to learn because they have seen the need to learn and they have an immediate application for the knowledge.

THE 6 STEP PROCESS OF PBL

STEP 1

DEFINE THE PROBLEM

STEP 2

SOLUTION CRITERIA

STEP 3

SOLUTION RESEARCH

STEP 4

PICK A SOLUTION

STEP 5

CREATE, RUN, & INSPECT SOLUTION

STEP 6

REFLECT ON SOLUTION

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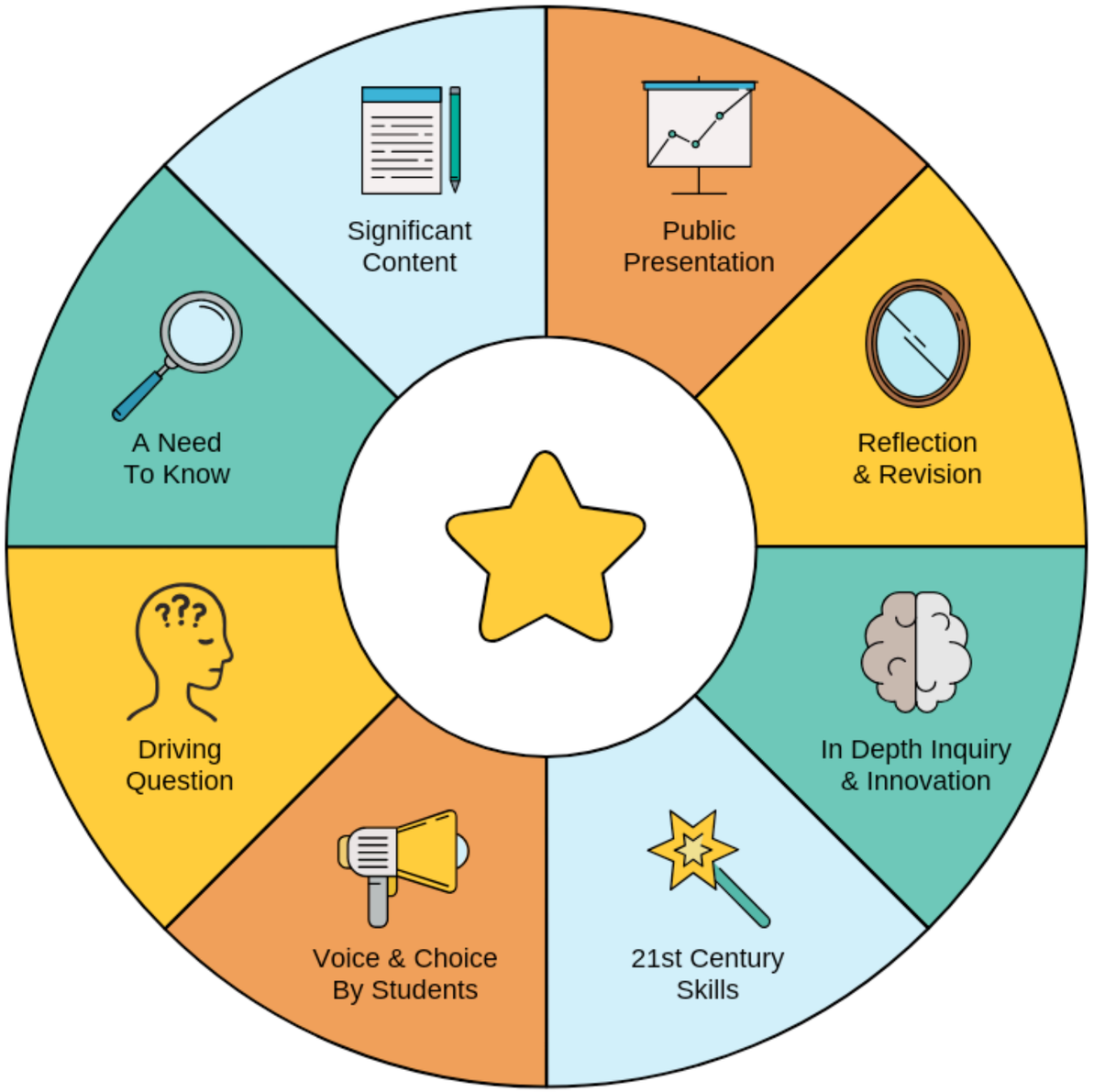
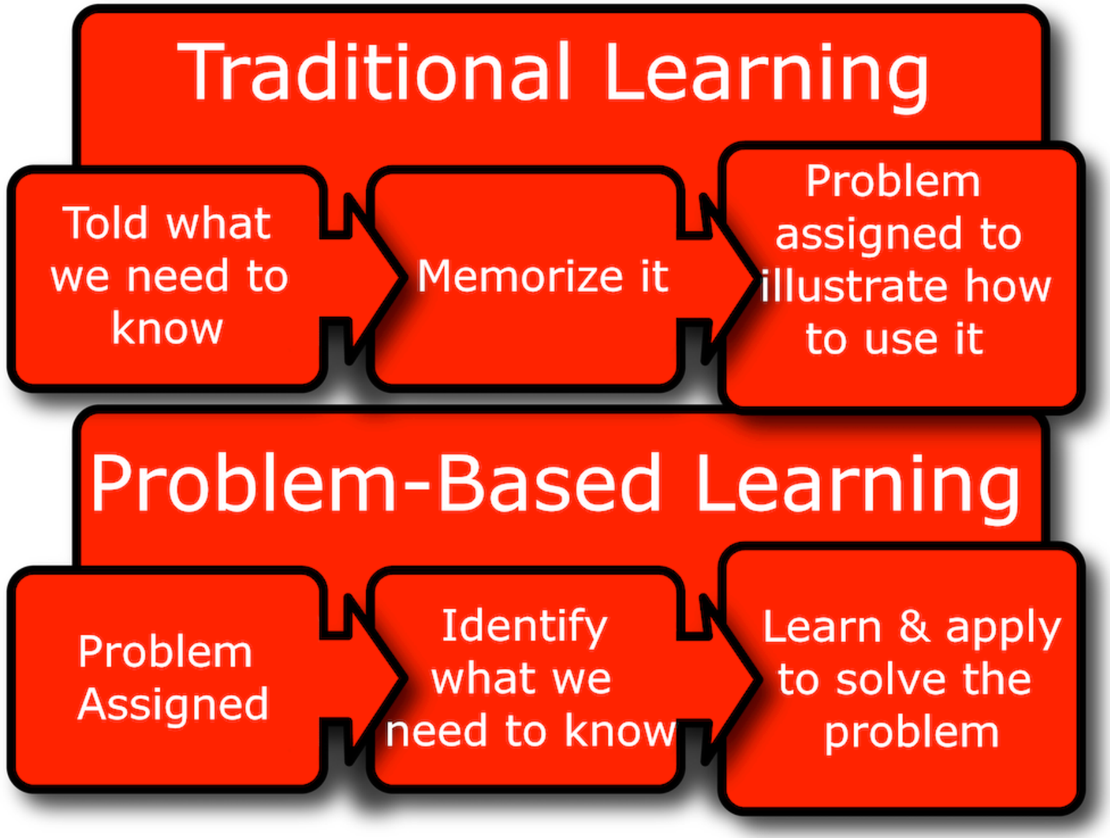


What happens on the background in PBL

Problem-Based Learning (PrBL)

Problem-based learning is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.



Skills developed: Analytical thinking, problem-solving, research, teamwork, adaptability

Inquiry-Based Learning

What happens if we shifted the focus from the answer?

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The goal of the entire process is not to find the right answers, but to help students develop the right framework for thinking

Inquiry-based learning is a learning process that engages students by making real-world connections through exploration and high-level questioning.

Skills developed: Critical thinking, questioning, research skills, self-directed learning, reasoning.

Case-Based Learning

Students are presented with real-life or simulated cases (e.g., medical cases, legal issues) and must analyze the situation, evaluate evidence, and propose solutions or decisions.

Skills developed: Critical thinking, decision-making, research, teamwork, analysis

Socratic Method

A dialogical teaching method in which the teacher uses open-ended, probing questions to stimulate critical thinking. Students are encouraged to analyze, question, and discuss different perspectives.

Skills developed: Logical reasoning, argumentation, critical analysis, active listening.

Design Thinking

Engineering Design Process (EDP)

EDP in class (video)

I’m the Innovation Catalyst

I prepare and coach children to launch startups before the turn 18

Founder, EarlyFounders Labs
Co-Founder, Brainy Hive Schools
Founder, Daveshoope Webmasters
Author, Early Coding for Kids

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