Implementing inquiry in teaching electricity

Inquiry Based Learning

- Developed in the 60s
- Constructivist learning theory

„Inquiry-based learning (also **enquiry-based learning** in British English)[1] starts by posing questions, problems or scenarios—rather than simply presenting established facts or portraying a smooth path to knowledge."
Wikipedia

Why do we see IBL everywhere?

Inquiry based learning is trendy

- Google:
  - 138 000 000 hit for IBL
  - 26 500 hit in Google Scholar just in 2015
- European Schoolnet
  - Several projects:
  - Fibonacci, Mascil, Temi, Sails and others
  - Resources: scientix.eu

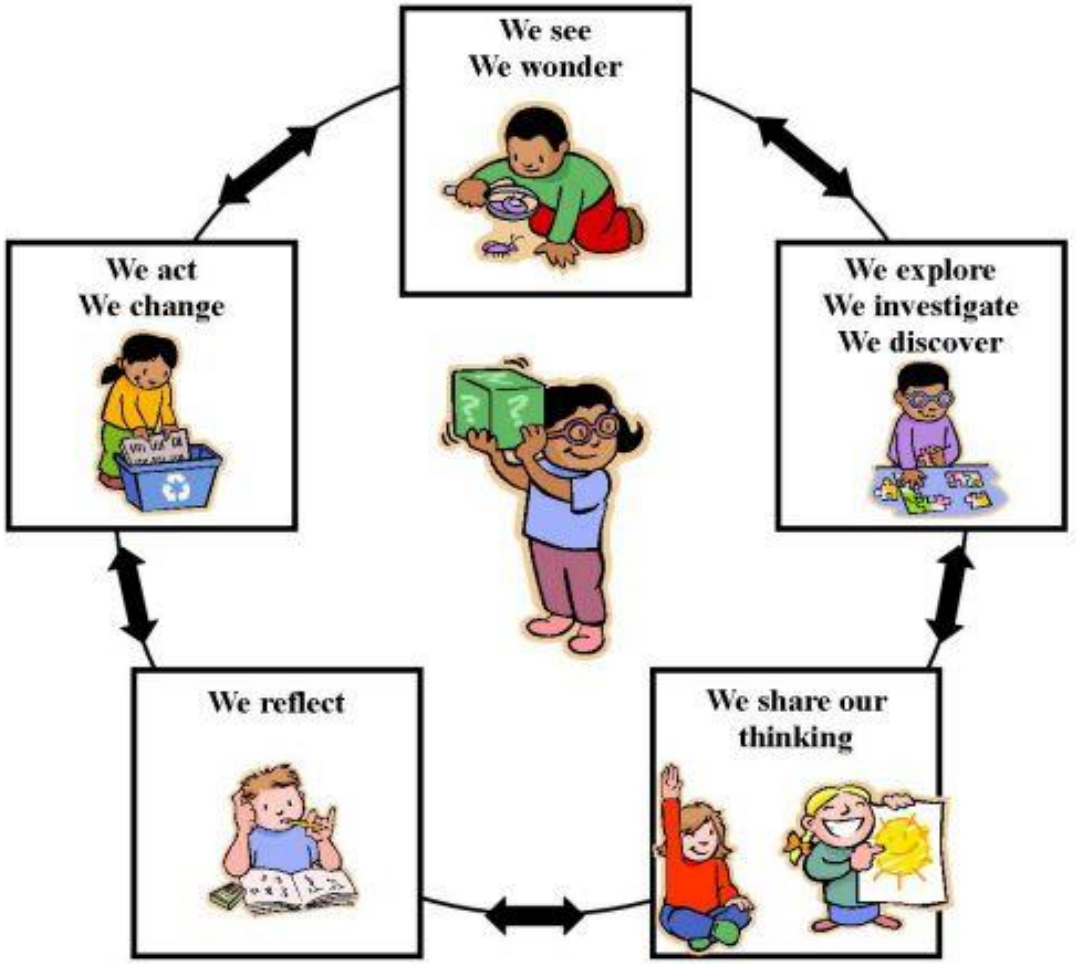
Why do we see IBL everywhere?

IBL for everyone!

Not just for the priviliged ones!

IBL not for everytime!

What is the inquiry cycle?

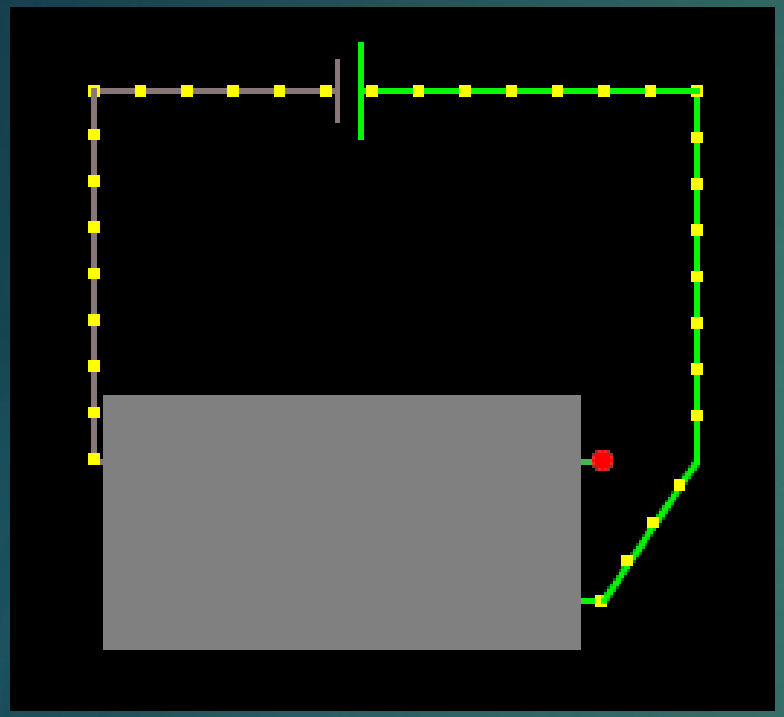



Exploring
Investigating
Processing
Creating
Inquiry
Initiating Inquiry
Choosing the topic
Developing questions
Designing the plan
Selecting information
Formulating the focus
Analyzing information
Evaluating ideas
Organizing & synthesizing findings
Making & presenting product
Assessing product & process
Extending & transferring learning

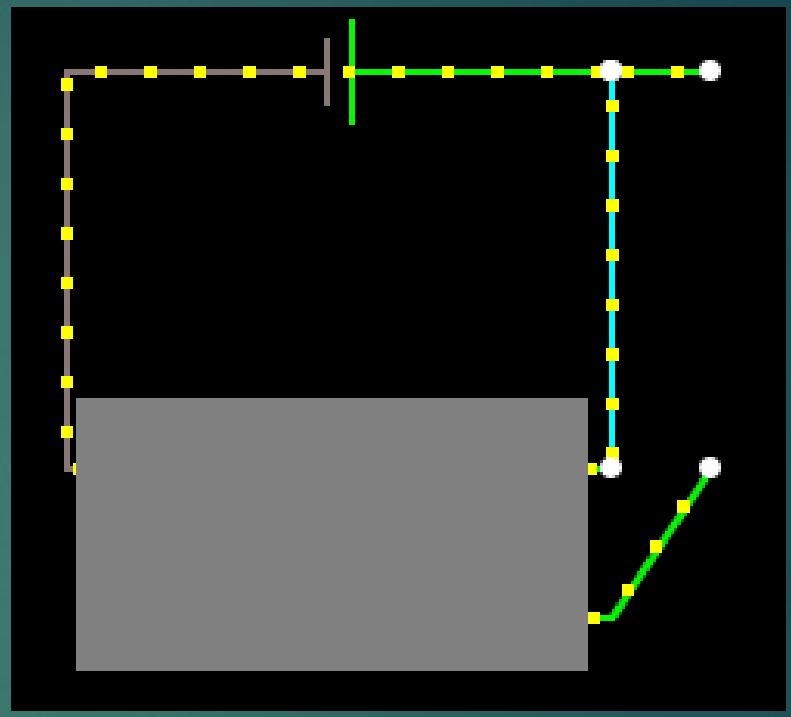
How to start with IBL?

- Progessively
- Facts or Methods
- Partition of the IBL circle

Black-Box problem



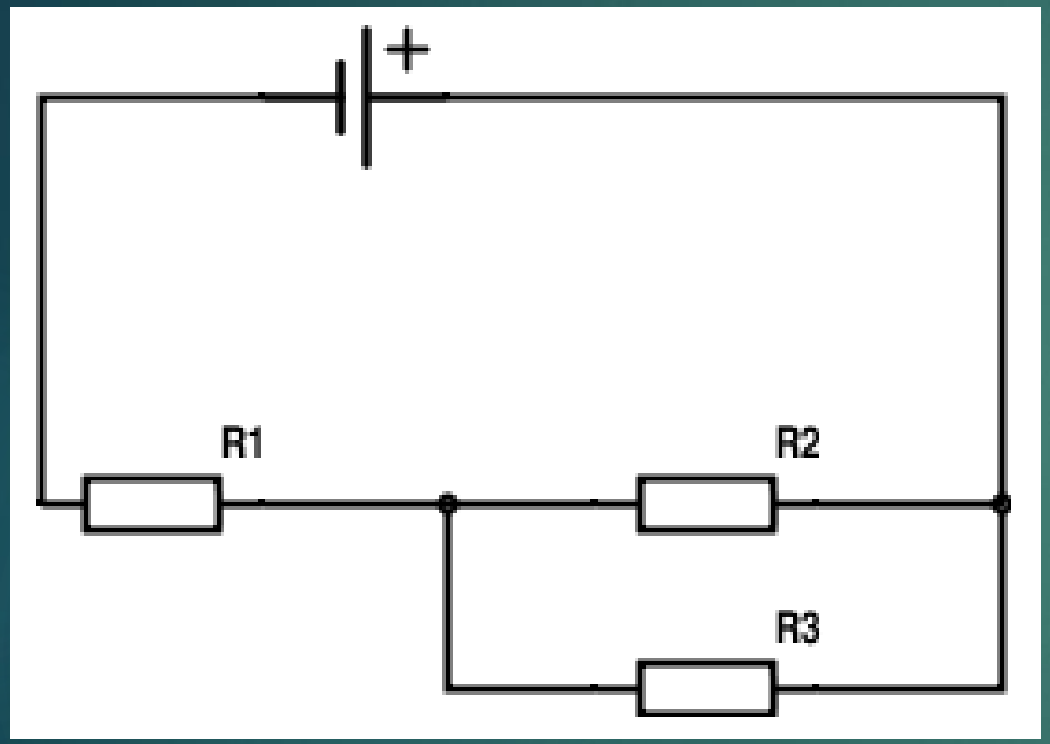
U = 5 V
I = 25 mA



U = 5 V
I = 50 mA

Circuit : http://www.falstad.com/circuit/

Step I.- Analyze



$$I.\, R_1 + R_2 = 100\ \Omega$$

$$II.\, R_3 + R_1 = 200\ \Omega$$

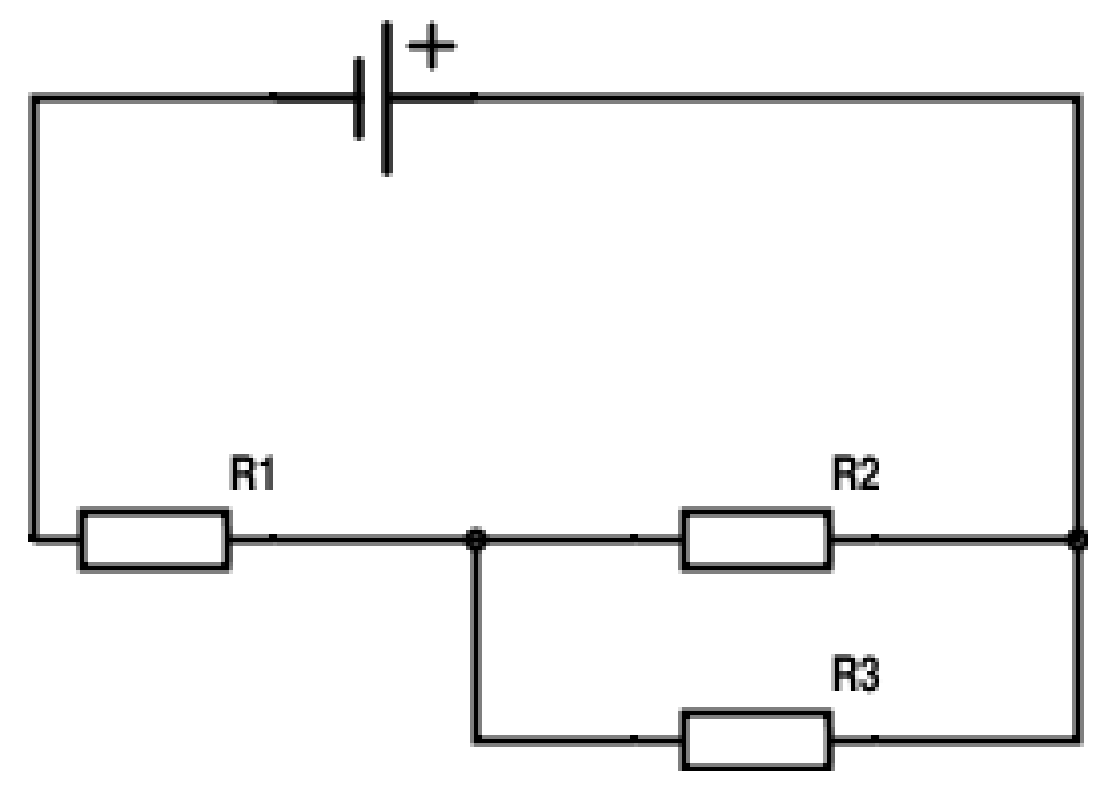
$$R_2 = 100\ \Omega - R_1$$

$$R_3 = 200\ \Omega - R_1$$

$$0 \leq R_1 \leq 100\ \Omega$$

Step II. - Predict

$$I_0 = \frac{U}{R_1 + \frac{R_3 \cdot R_2}{R_3 + R_2}}$$



Step III. - Check

In the classroom

- 10th grade
- One class for interested students
- One „normal” class
- After introducing
  - Current, Voltage
  - Ohm’s law
  - Paralel and linear connection

In the classroom

- Analyzing
- Predicting
- Checking

- No full theoretical solution
- Usually 1 sometimes 2 numerical modell
- Hard to rethink when checking destroys the theory

Results (?)

Thank you for your attention!

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