



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?

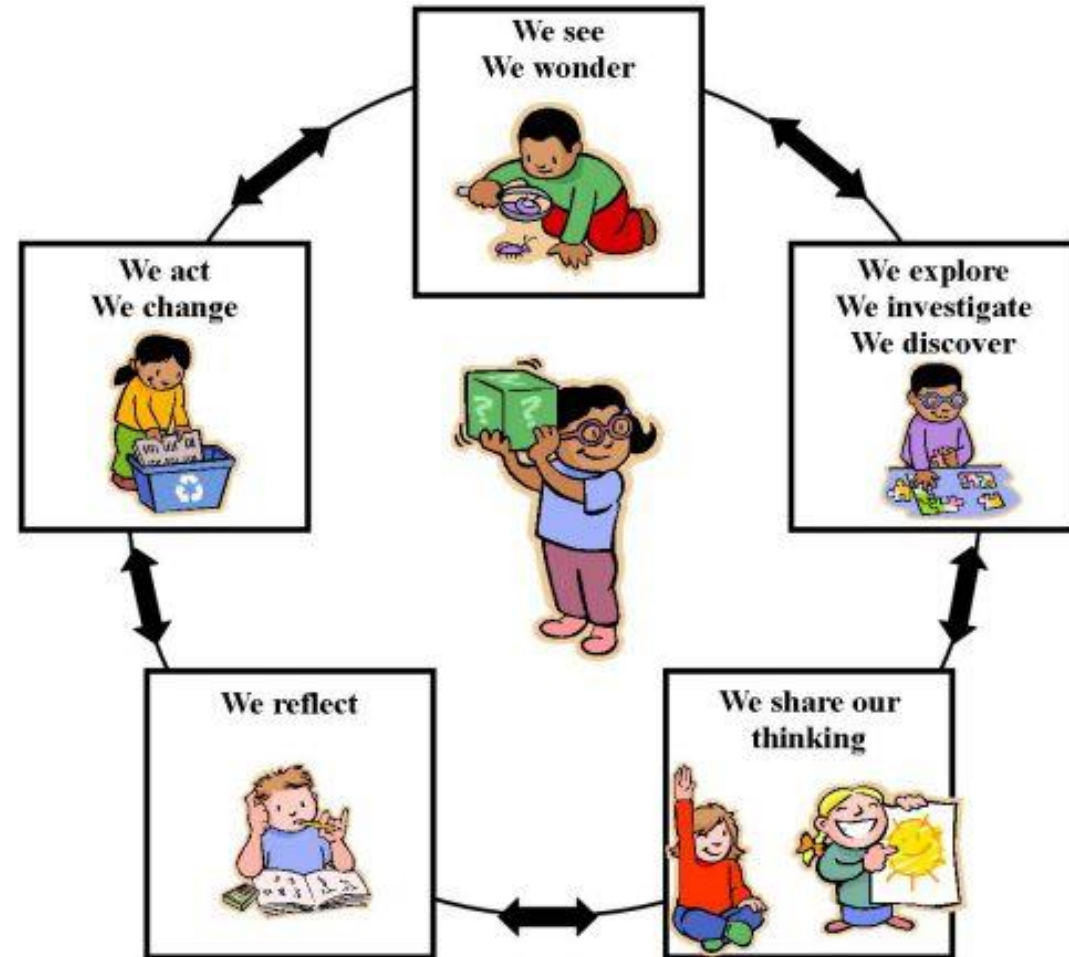
IBL for everyone!

Not just for the privileged ones!

IBL not for everytime!



What is the inquiry cycle?

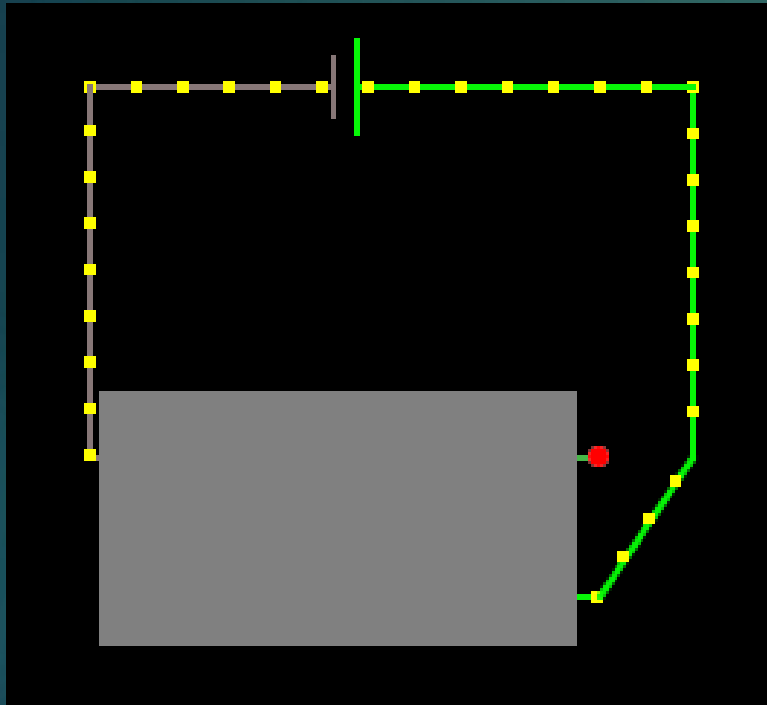




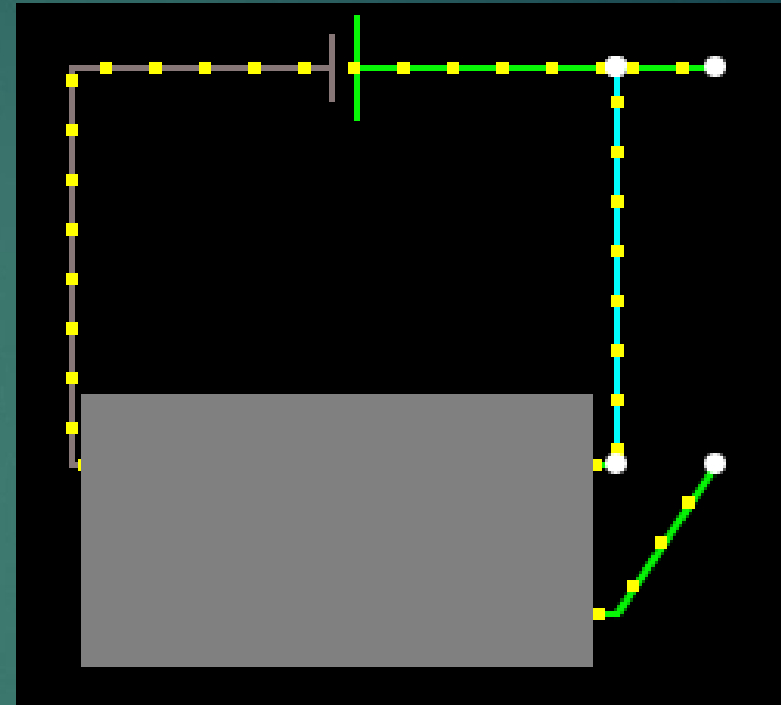
How to start with IBL?

- ▶ Progressively
- ▶ Facts or Methods
- ▶ Partition of the IBL circle

Black-Box problem



$$U = 5 \text{ V}$$
$$I = 25 \text{ mA}$$



$$U = 5 \text{ V}$$
$$I = 50 \text{ mA}$$

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

Step I.- Analyze

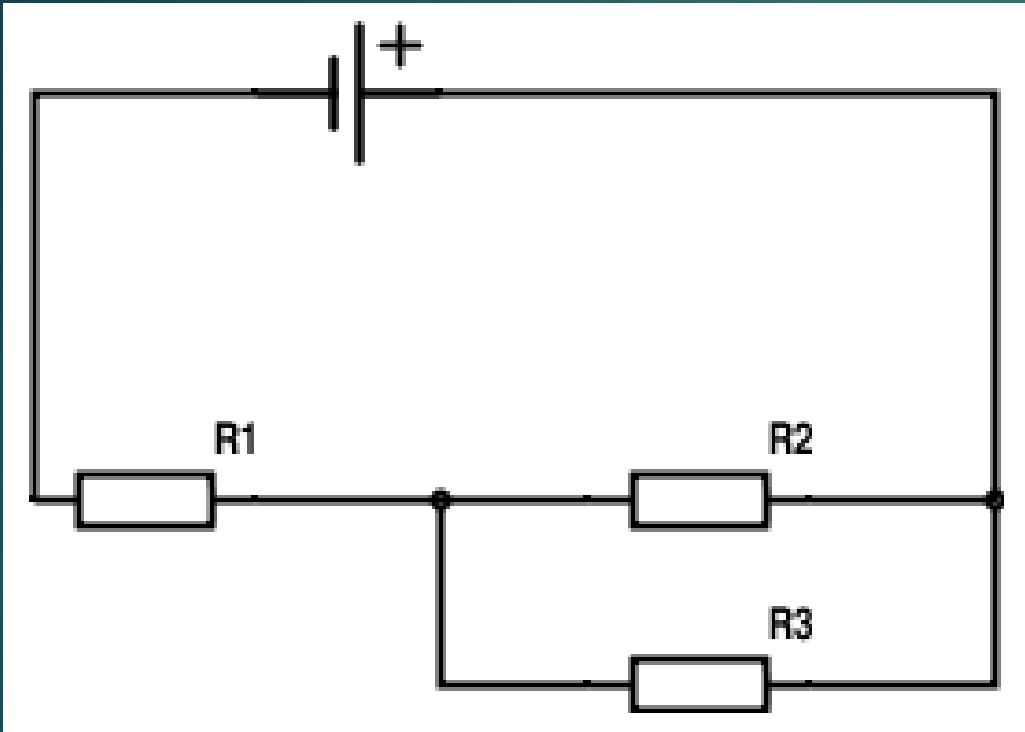
$$I. R_1 + R_2 = 100 \Omega$$

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

$$R_2 = 100 \Omega - R_1$$

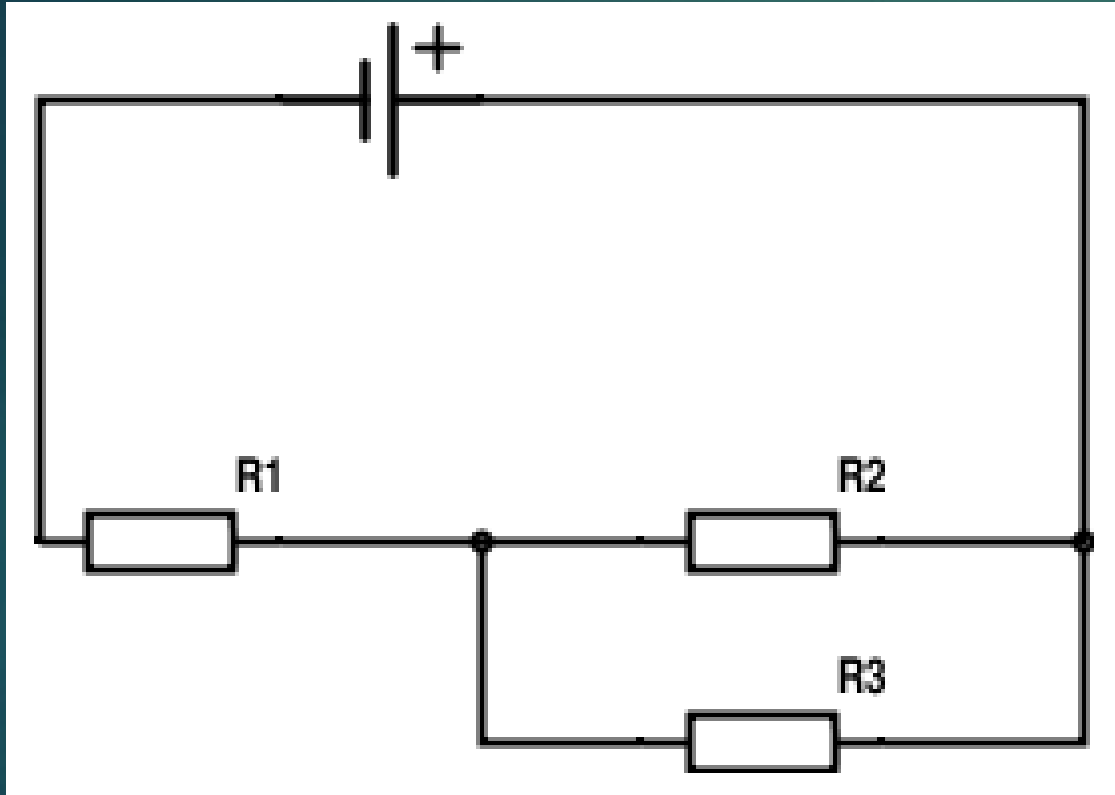
$$R_3 = 200 \Omega - R_1$$

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



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 modells
- Hard to rethink when checking destroys the theory

Results (?)

Thank you for your attention!

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