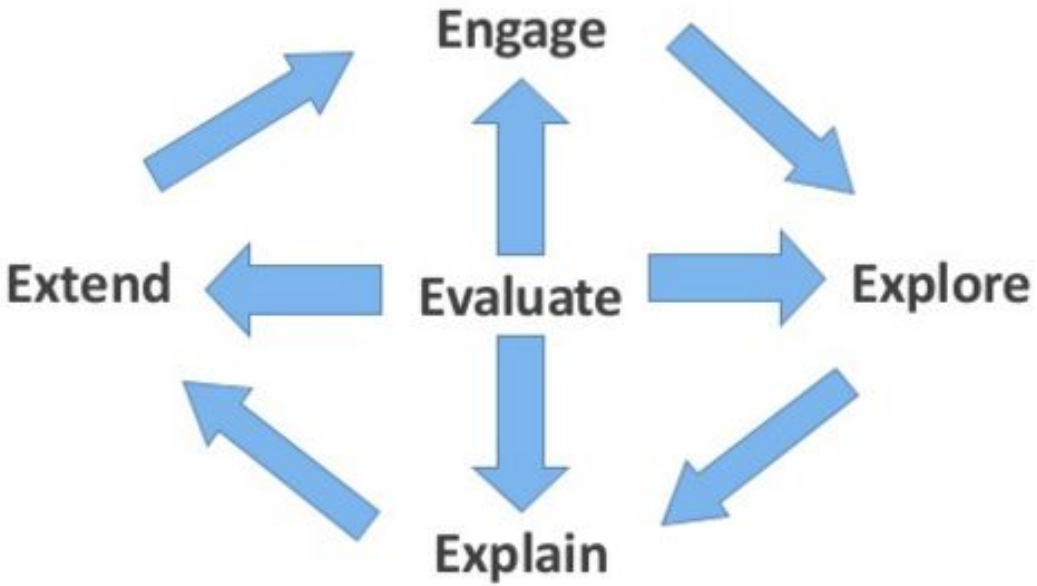
Physics Education Laboratory
Lecture 14
IBSE for Electricity

Francesco Longo - 23/11/21

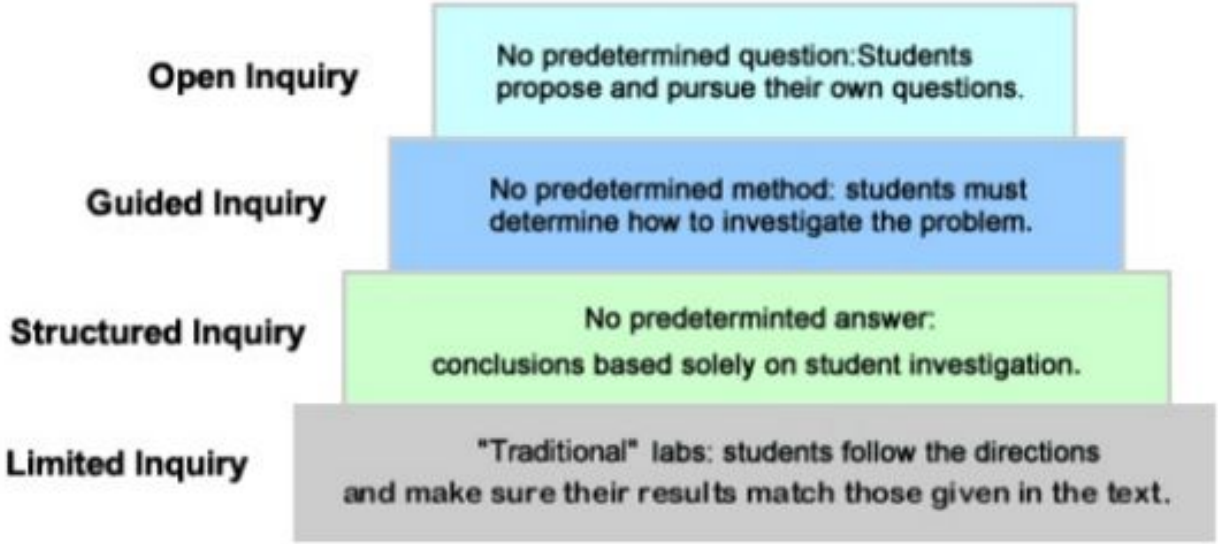
Engage examples

- Carica cellulare - Wifi - Piastra induzione
- Fulmine in Auto
- Scossa in giornate secche
- La scossa
- Display pixel
- Carica e scarica batteria

Learning Cycle



Inquiry Levels



Confirmation inquiry

It is based on confirmation or verification of laws and theories. Confirmatory inquiry is appropriate at the beginning of IBSE implementation, when the teacher aims to develop observational, experimental and analytical skills of the students. When conducting experiments, students follow teacher's detailed instructions under his/her guidance.

Structured inquiry

The teacher significantly influences the inquiry at this level and helps students by asking questions and providing guidance. Students look for solutions (answers) through their inquiry and provide an explanation based on the evidence they have collected. A detailed procedure of experiments is defined by the teacher, but the results are not known in advance. Students show their creativity in discovering laws. However, they are conducted by teacher’s instructions in the research. This level of inquiry is very important for developing students' abilities to perform high-level inquiry.

Guided inquiry

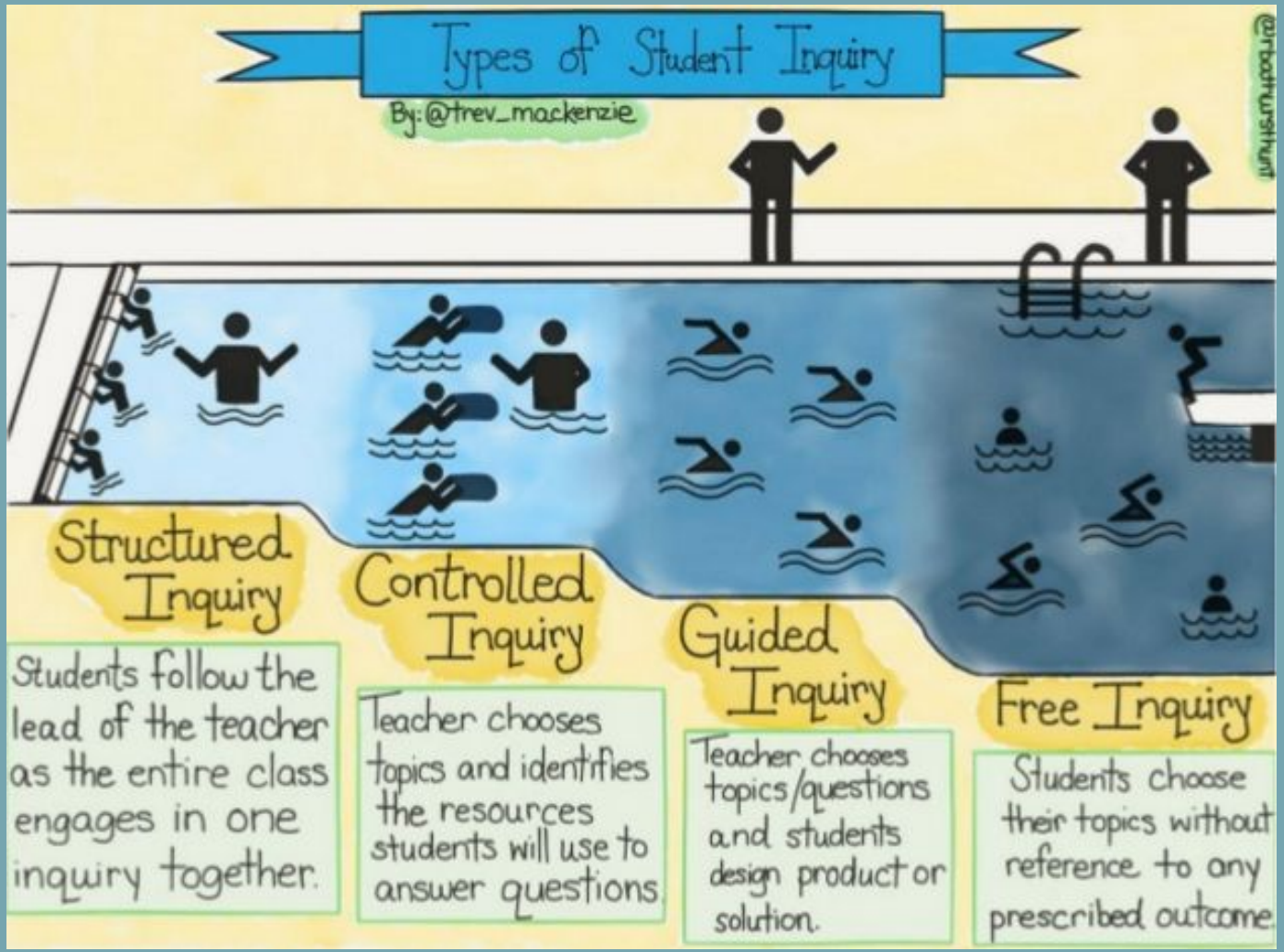
The third level of IBSE changes the role of the teacher dramatically. The teacher becomes a students´ guide. He/she cooperates with students in defining research questions (problems) and gives advice on procedures and implementation. Students themselves suggest procedures to verify the inquiry questions and their subsequent solutions. Students are encouraged by the teacher much less than in the previous two levels, which radically increases their level of independence. Students should have previous experience of lower levels to be able to work independently.

Open inquiry

This highest level of IBSE builds on previous three inquiry levels and it resembles a real scientific research. Students should be able to set up their inquiry questions, methods and procedures of research, record and analyze data and draw conclusions from evidence. This requires a high level of scientific thinking and places high cognitive demands on students, so it is applicable for the oldest and/or gifted students.

Inquiry Levels

	Traditional Hands-on	Structured Inquiry	Guided Inquiry	Student Directed Inquiry	Student Research Inquiry
Topic	Teacher	Teacher	Teacher	Teacher	Teacher/Student
Question	Teacher	Teacher	Teacher	Teacher/Student	Student
Materials	Teacher	Teacher	Teacher	Student	Student
Procedures/ Design	Teacher	Teacher	Teacher/Student	Student	Student
Results/ Analysis	Teacher	Teacher/Student	Student	Student	Student
Conclusions	Teacher	Student	Student	Student	Student


Types of Student Inquiry
By: @trev_mackenzie
@trbathurstHunt
Structured Inquiry
Students follow the lead of the teacher as the entire class engages in one inquiry together.
Controlled Inquiry
Teacher chooses topics and identifies the resources students will use to answer questions.
Guided Inquiry
Teacher chooses topics/questions and students design product or solution.
Free Inquiry
Students choose their topics without reference to any prescribed outcome.

LAB ACTIVITY

1) Explore the ESTABLISH WEB SITE
2) Identify the main activities for electricity IBSE LAB
3) Choose your experimental setting, looking to the Electromagnetic Lab
4) Try to elaborate your own activity in the shared whiteboard according to IBSE guidelines (deciding which concept you would like to focus on)

http://www.establish-fp7.eu/resources/units/direct-current-electricity.html

https://webwhiteboard.com/board/4Kl0w0sRpN5xTorshGYgLoxgQTmxpc0l/

Creating an IBSE for Electricity - share your ideas