

INQUIRY-BASED SCIENTIFIC EDUCATION

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INQUIRY-BASED SCIENTIFIC EDUCATION

There are many science approaches and opinions of what IBSE is.

We only know what IBSE is not

- it doesn't represent a uniform methodology
- it isn't a narrowly defined educational method



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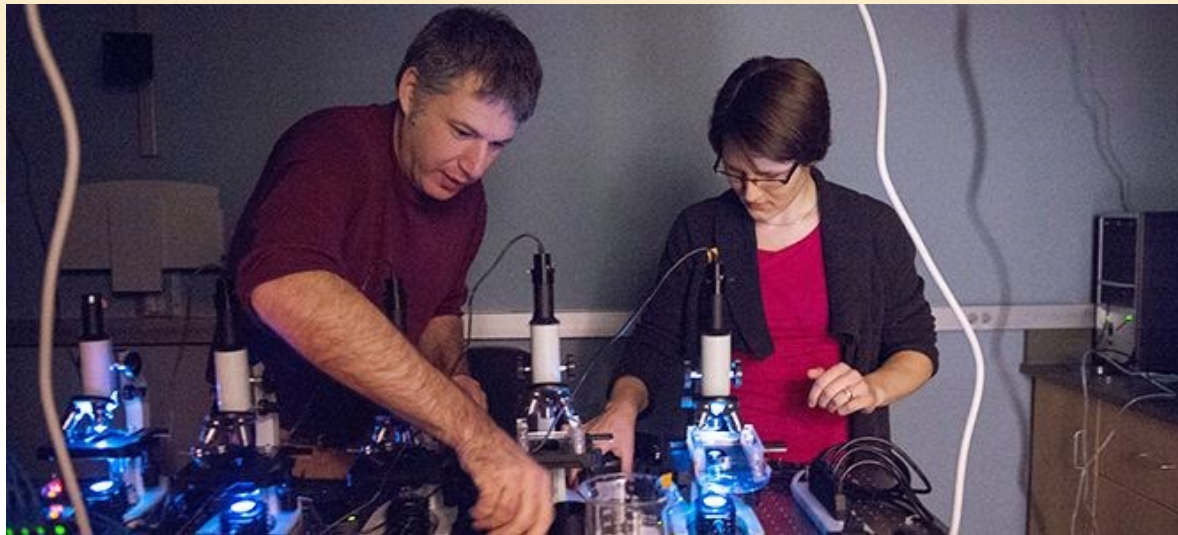
IBSE uses activating teaching methods

- heuristic methods
- critical thinking
- problem-based learning
- experimental learning
- project-based learning
- situated learning

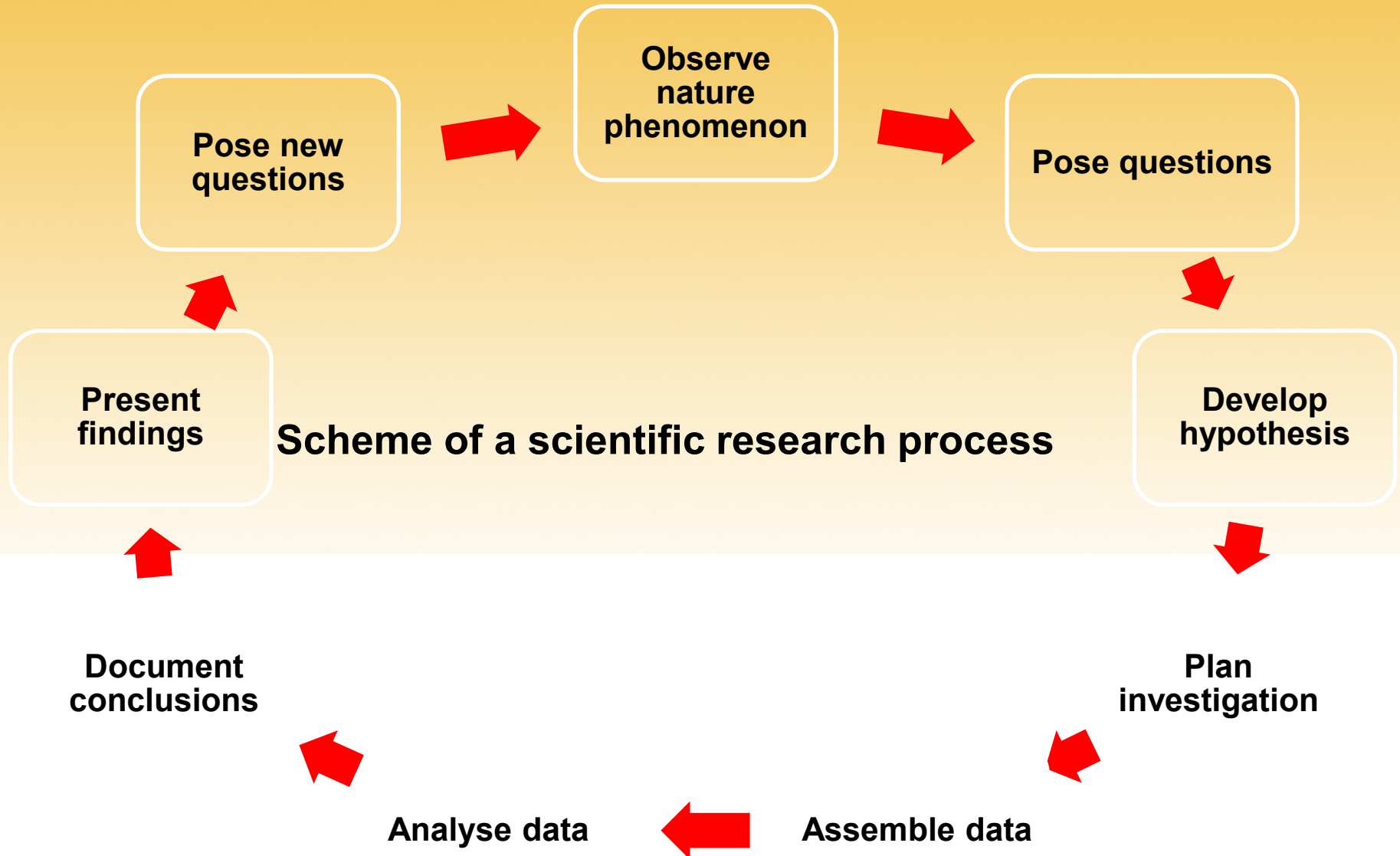
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My approach to IBSE:

How scientists do it.



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Inquiry-based lesson steps

1. Motivation
2. Posing questions
3. Finding information
4. Predicting – developing hypothesis
5. Experiment – planning, preparing, conducting and observation, recording
6. Data analysis
7. Conclusion – return to hypothesis
8. Presentation
9. Reflexion – discussion, new questions

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My tips

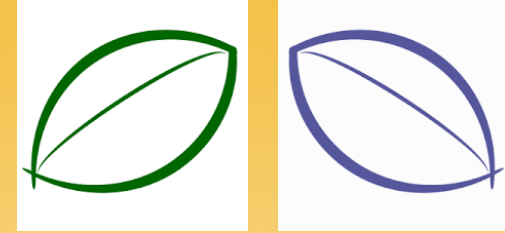
- don't teach, be a guide
- set up a safe environment in the class
- set up atmosphere of cooperation; it is not a competition!
- keep it simple; tools and equipment can be as simple as possible
- don't answer all students questions; do not reply students' scientific questions!
- act as researchers
 - pose questions
 - investigate
 - be enthusiastic to students' discoveries
- don't be afraid of using *new* digital technologies

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COFFEE BREAK



Greenless? No way?



Motivation

- very important beginning of any lesson
- surprising, startling, astonishing activity
- finding out what students know
- let students remind what they have already known about topic

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Posing questions

- create safe and creative atmosphere
- motivate students to try inventing diverse questions
- “why”-questions could be tricky
- “how, what, where, how long ... ”
- use different methods

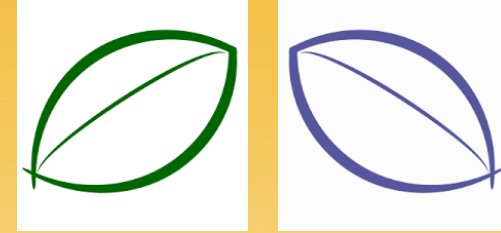
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Research question

- discuss all the students' questions
- let students choose one: the most relevant, important, interesting, ...
- but the one which suits you 😊
- this question is what you are going to do for the rest of the lesson!

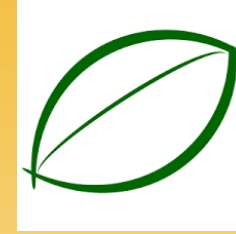
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Formulating a hypothesis

- h. is a proposed explanation for a phenomenon
- h. is a general statement one can decide if it is true or not = confirm or disprove h.
- students can test it
- unambiguous, verifiable, widely applicable, measurable, specific,
- better to formulate an imperfect h. than no h. at all
- students derive h. from the research question

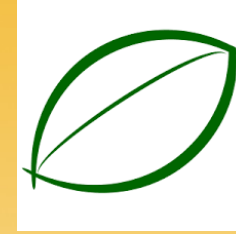
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Experiment

- preparing
- conducting
- recording
- experiment aims for confirmation or disproof of hypothesis

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Data analysis

- Are obtained data reasonable?
- Did you keep right circumstances?
- Can you make a conclusion from the data?

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Conclusions – decision making

- students go back to their hypothesis
- they confirm or disprove their hypothesis
- to disprove the hypothesis is not a fault!

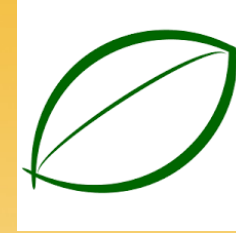
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Presentation

- a very important part of lesson
- don't miss it and try to explain why it is good to tell others about inquiring
- every group should present
- use technology if possible
- use different presentation forms

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Posing new questions

- research is a never-ending story
- new questions can
 - develop the topic
 - open new horizons
 - stir up students' interest
 - bring the topic for next class 😊 THE BEST END!

The scientific research circle is closed and you are at the beginning of a new challenge.

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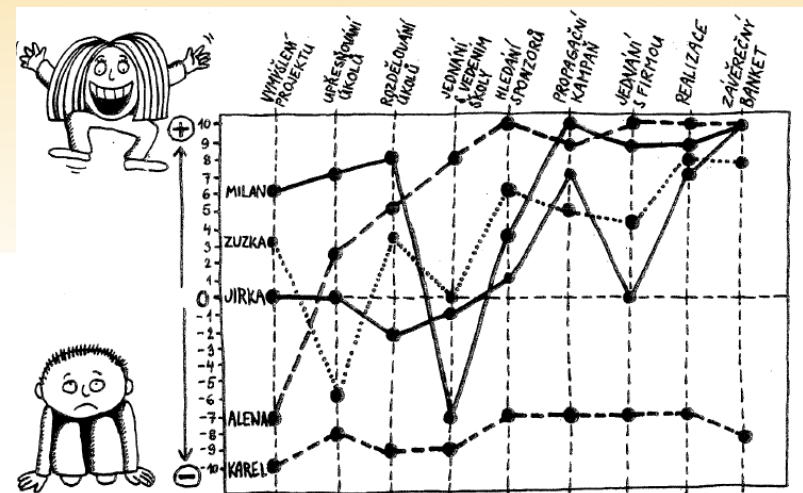
Evaluation

a questionnaire

a chart of feelings

very good

very bad



Did you notice how many times I used
The Beatles songs' names?



P. S. I Thank You!