

ABE Italy IBSE team



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IBSE...Why?



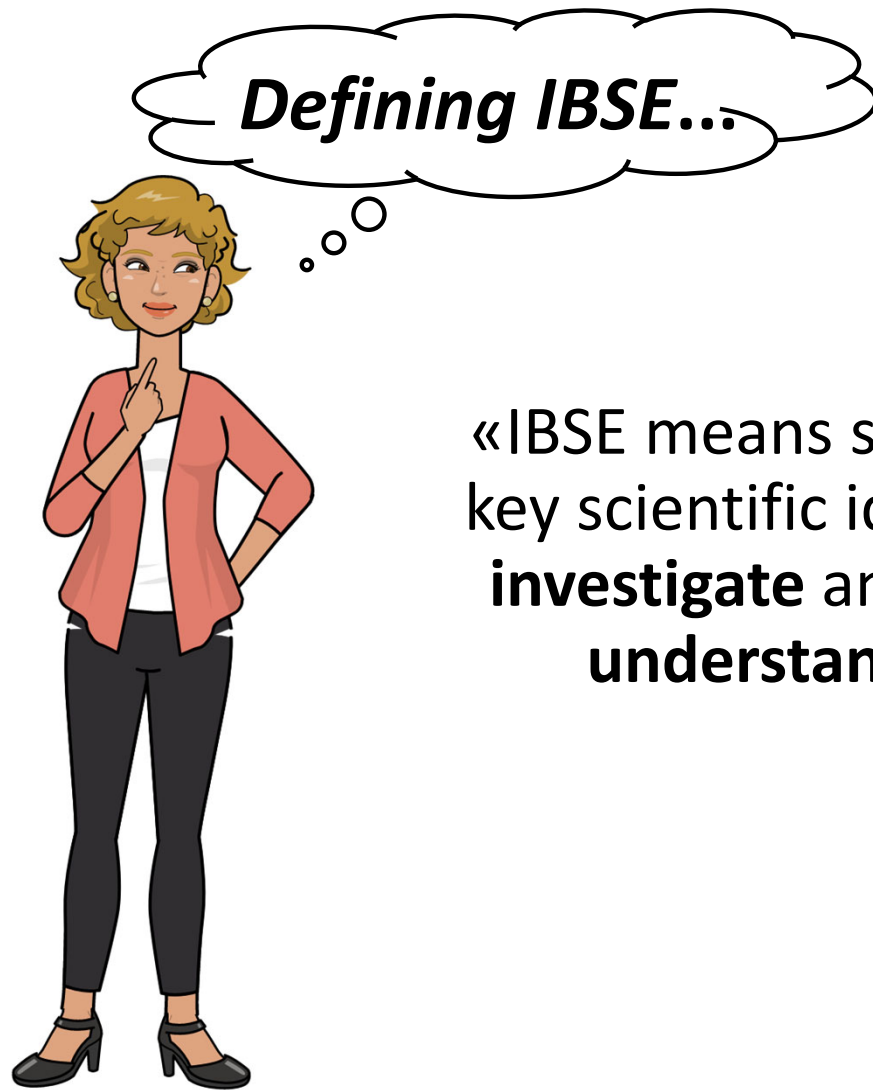
- Students evaluate and make decisions based on the best **evidence**.
- Learning through scientific inquiry may be synthesized as : **the process of building understanding through collecting evidence** to test possible explanations and the ideas behind them with a scientific manner.



IBSE... Why?

- It develops in students a **basic understanding of what science is, how it works and its strengths and limitations**
- Therefore not only ideas **OF** science but also **ABOUT** science





«IBSE means students develop *progressively* key scientific ideas through learning **HOW to investigate** and **build their knowledge and understanding** of the world around.

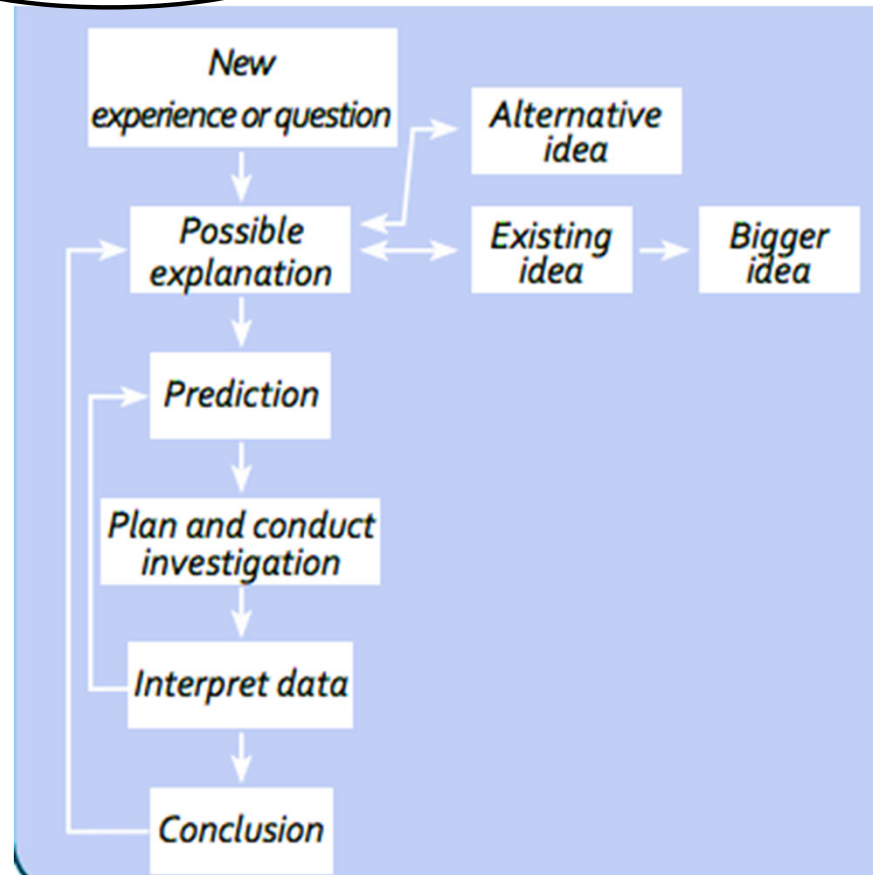
Defining IBSE...



- Students **use skills employed by scientists** such as
- **raising questions**
 - **collecting data**
 - **reasoning and reviewing evidence**
 - **drawing conclusions and**
 - **discussing results.»**

(W. Harlen, IAP 2011)

Learning through scientific inquiry



Myths about IBSE



- It is alternative name for practical work
- It is all about developing ideas **about** science and not **of** science
- It is about 'discovery'
- It is appropriate only at the primary or lower secondary school level (up to age 11 or 12).
- IBSE and traditional deductive approaches are mutually exclusive

To really understand
WHAT IBSE is....

It is necessary to **PLUNGE INTO** it
and live it **AT FIRST PERSON!**

It's like diving into the blue sea...

You need:

- not to be alone → learning community
- selected tools → strategies & resources
- opportunities → PDIs for IBSE

IBSE is an intense and addictive experience ..AMGEN® Biotech Experience

Scientific Discovery for the Classroom
Italy



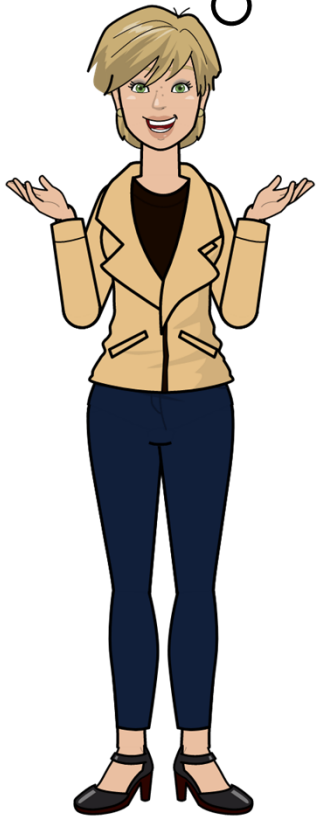
Inquiry /Investigable questions



- lead students to action
- require to use process skills (observe, measure...)
- **allow to collect and analyze data to find out the possible answers** (based on available evidence)

*“A good inquiry question **asks students to show rather than to say the answer**” (W. Harlen, 1985)*

GOOD Inquiry questions



- not simple requests for **information**
- neither **too general nor too complex**
- not **“YES or NO”** answers
- **Simply formulated** questions
- referred to **real context** and **meaningful to students**
- **challenging**
- **new** to students

“What happens if a chemical reaction occurs with an enzyme?”

“Is cell membrane semipermeable?”

“Why are enzymes essential for cells?”

“How can I determine if cell membrane is impermeable?”



Don't worry... take the plunge!



- there are effective techniques to turn non-investigable questions in investigable questions (*'Variable scan'* ...)
- PDI on inquiry based teaching and learning
- belonging to learning community
- **take action at first hand**

IBSE...What different?



Students are **involved actively**
They experience **key aspects of scientific processes**
It fosters critical thinking
«How and why»: the process of building and making decisions

The role of the teacher



Teachers build new relationships with students

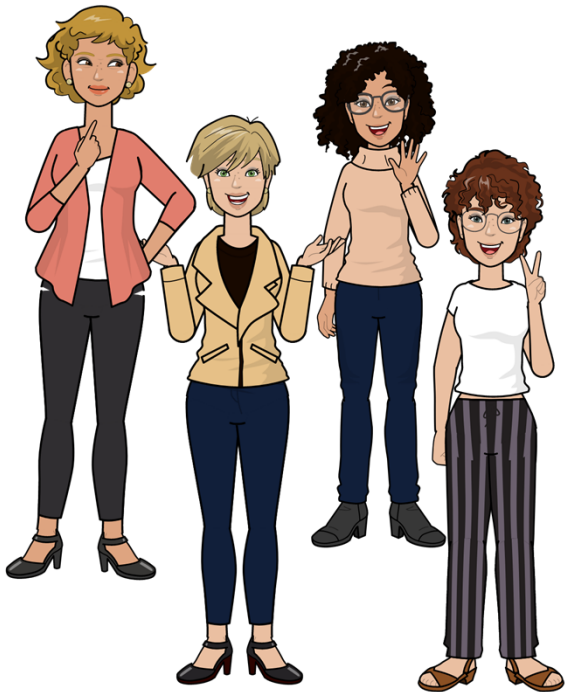
Teachers foster **group work, argumentation** and **discussion**

Teachers **lead students to develop inquiry skills**

Students become independent learners and develop their own ideas

Teacher as facilitator

PD for IBSE...GOALS and DESIGN



“... innovation succeeds when teachers feel a sense of **ownership of the innovation**: it belongs to them and is not simply imposed on them.”

(Ogborn, 2002)

Promote teachers' commitment to change

PD for IBSE AS PROCESS OF CHANGE

UNDERSTANDING

Teachers know about inquiry



*inquiry as a **teaching method***

AWARENESS

Teachers know how inquiry works



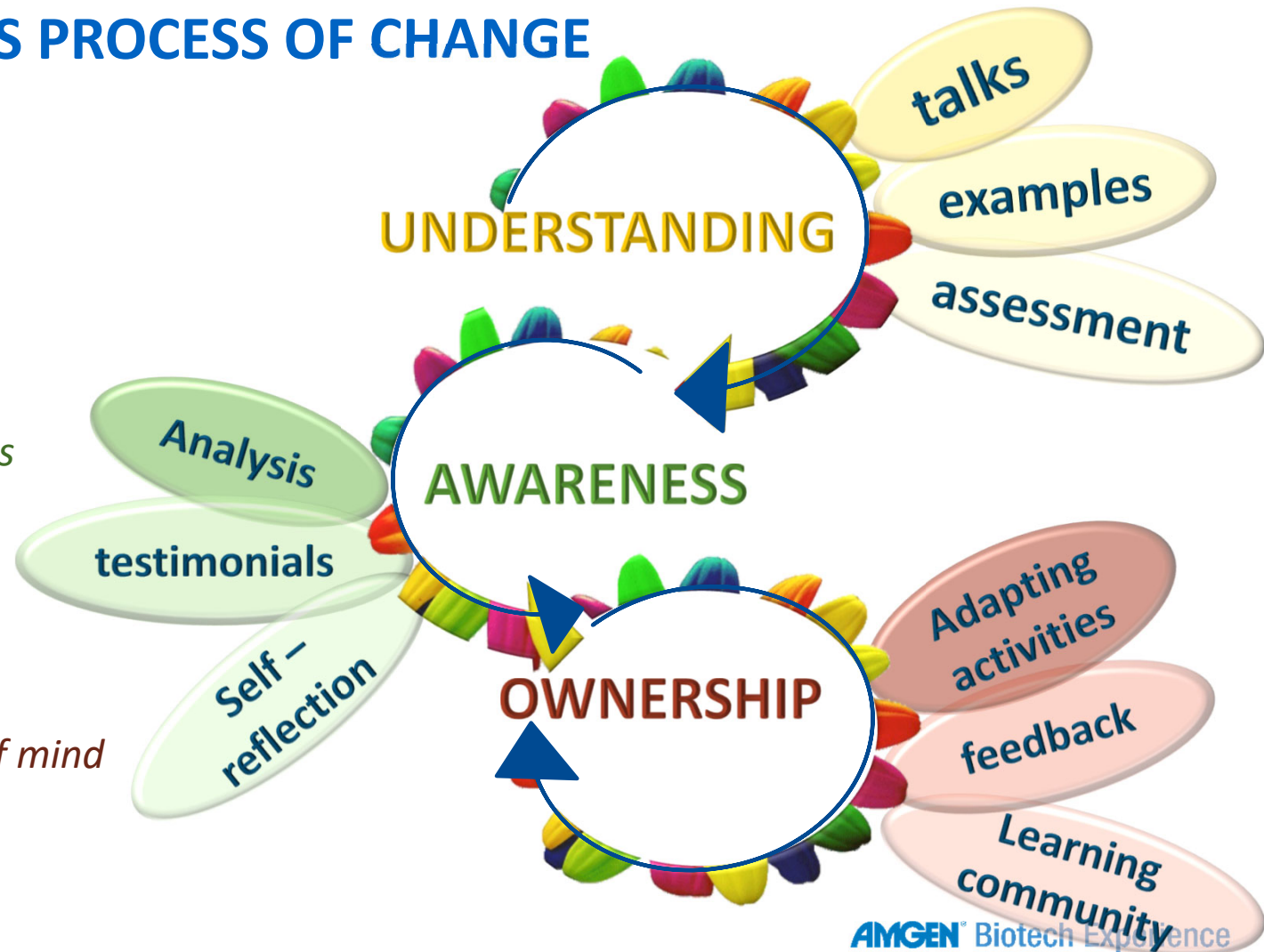
*inquiry as a **practice***

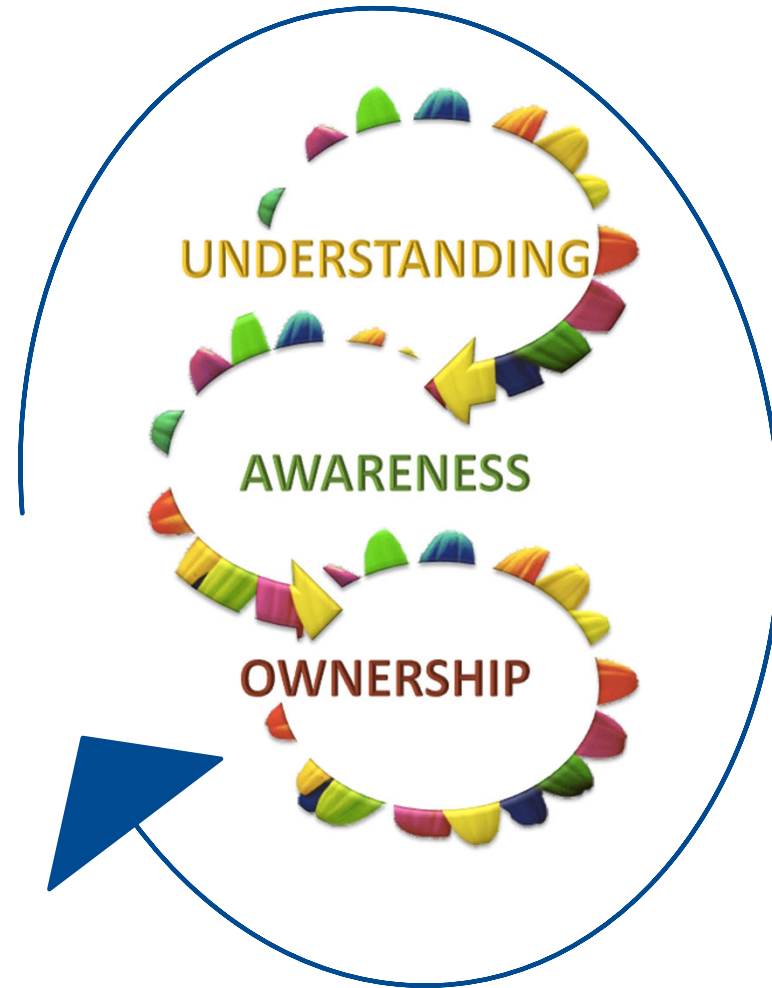
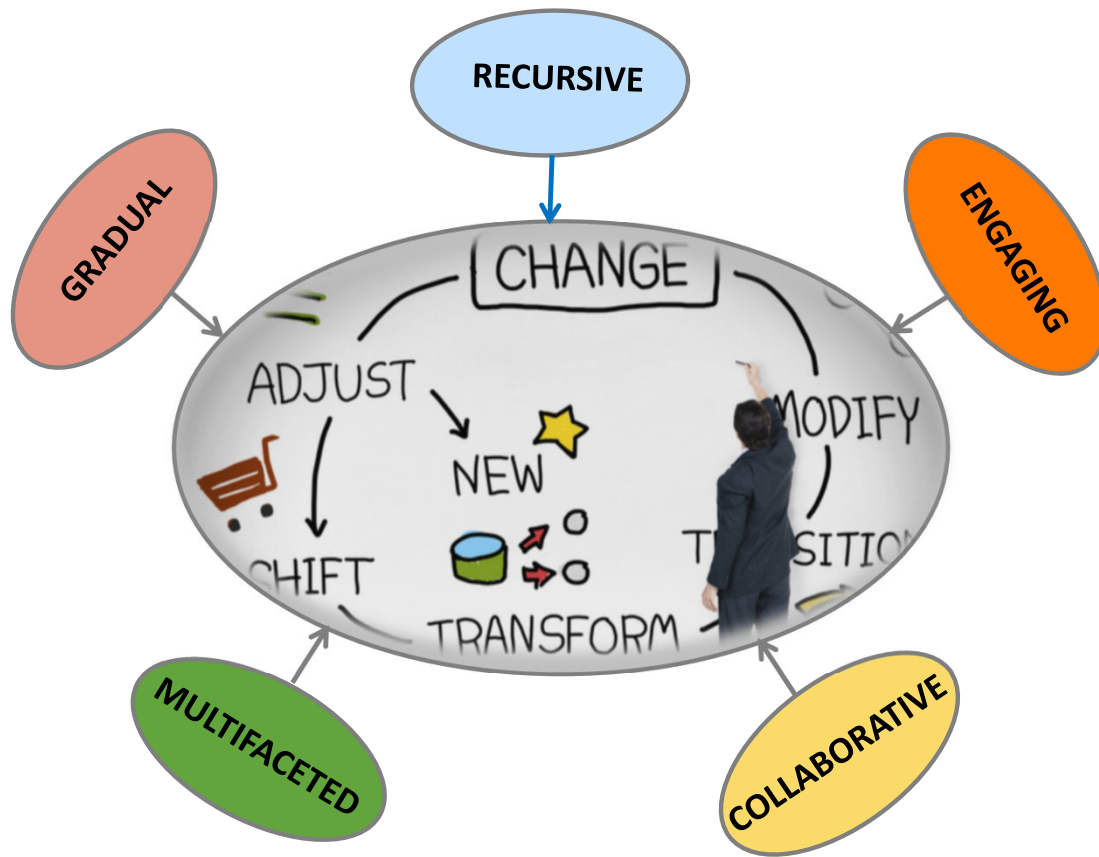
OWNERSHIP

Teachers get inquiry as a habit of mind

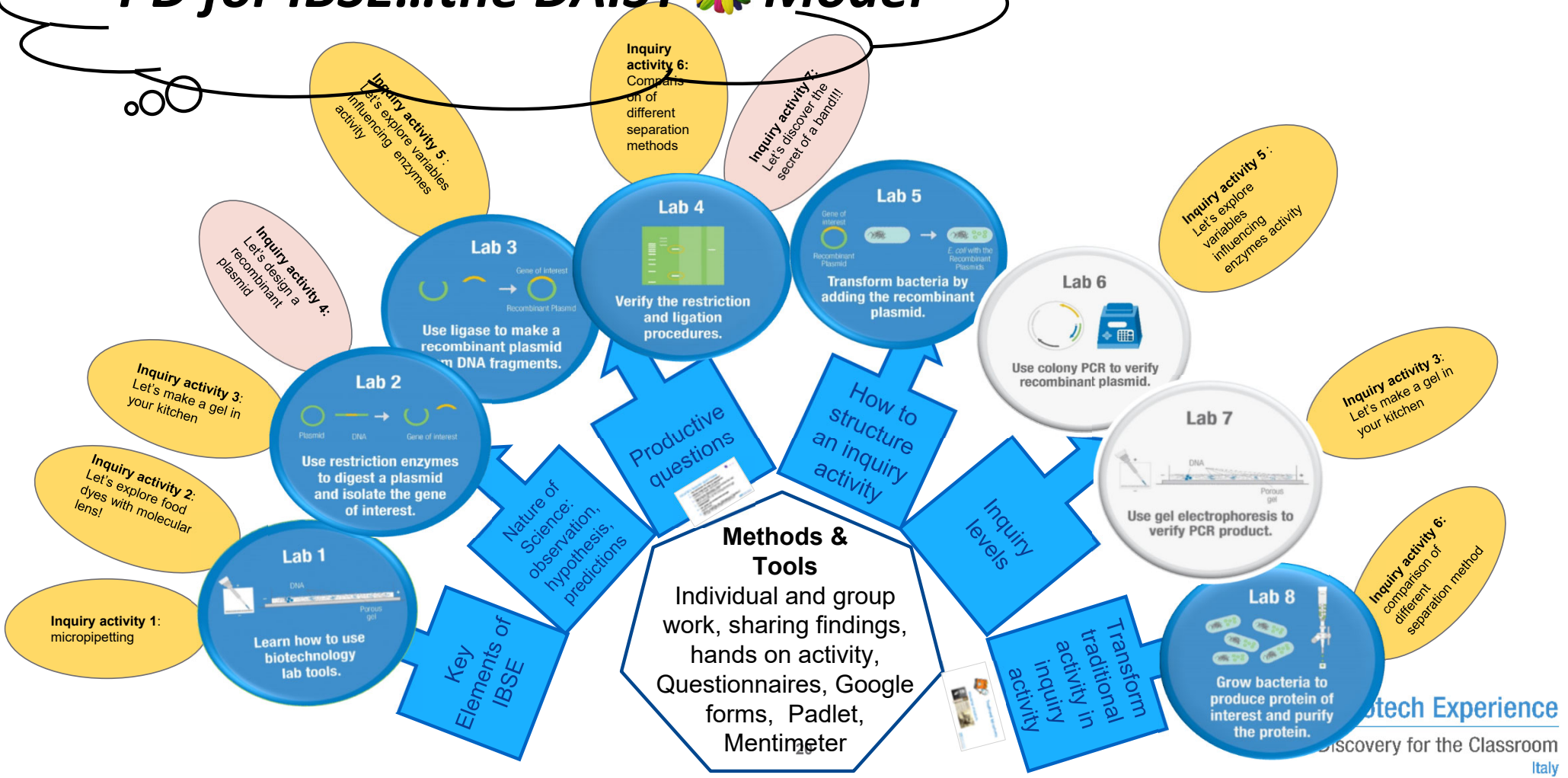


*inquiry as an **approach***

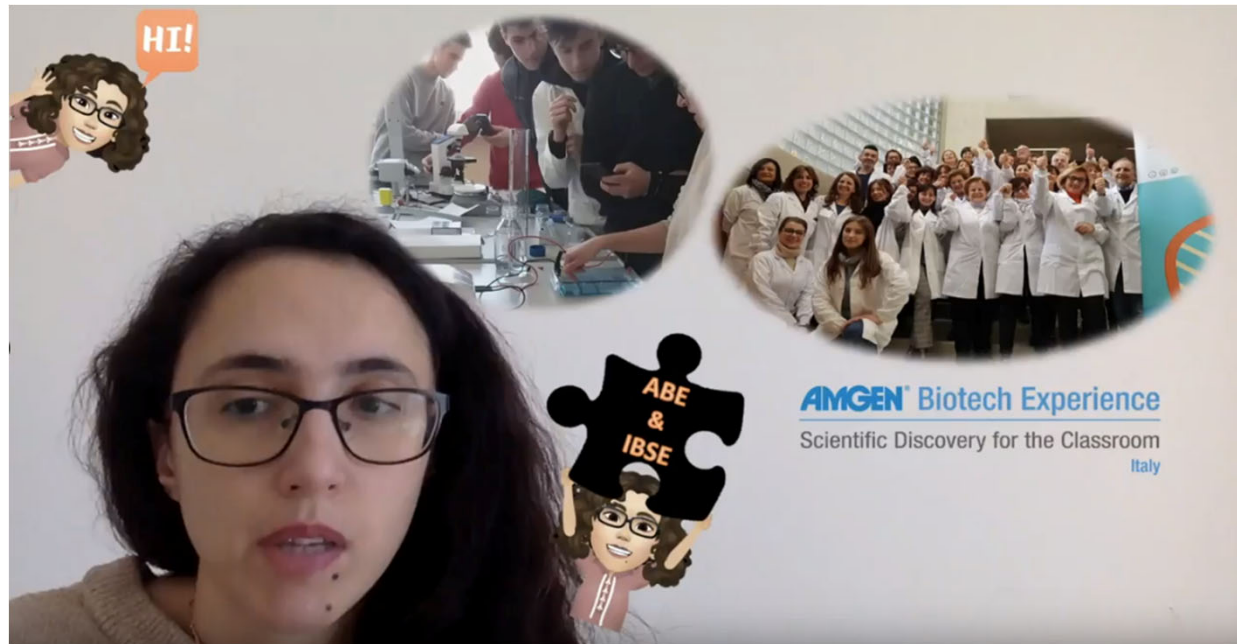
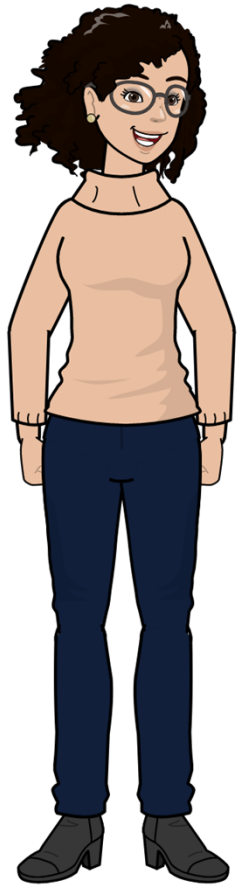




PD for IBSE...the DAISY Model



IBSE...How with students?



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