

# UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA

# SYLLABUS DEL CORSO

# Chimica e Didattica della Biologia

1718-4-G8501R036

# **Course title**

Chemistry and learning biology

# **Topics and course structure**

Main concepts of modern chemistry: macroscopic versu microscopic, matter composition and staes of matter. Concept of chemical elements and atoms, molecules, organic and inorganic molecules.

Main topics in biology: DNA, digestive enzymes, plants role...; the topics will discussed with an interdisciplinar approach, capitalising on the chemical topics.

Several activities useful for teaching chemistry and biology at the elementary school will be proposed.

# **Objectives**

Backgroung and training in multidisciplinary approach towards science teaching at the elementary school.

# **Methodologies**

Main part of the module will be organised as classroom lectures. A limited section of the course will be proposed by the e-learning modality through the Moodle platform. E-activities flanked by written reports and group discussions and forum will train students in developing lab activities dedicated to elementary school students.

# Online and offline teaching materials

#### online resources:

#### **Chemistry:**

http://www.middleschoolchemistry.com/ (lesson plans and activities for teaching basic chemical concepts to elementary school students)

https://www.acs.org/content/acs/en/education/whatischemistry/adventures-in-chemistry.html\_(activities for teaching basic chemical concepts to elementary school students)

http://www.compoundchem.com/ (chemistry and everyday life).

#### **Biology:**

http://didascienze.formazione.unimib.it/biovisione/index.htm

http://www.bbc.co.uk/science/humanbody/

http://www.innerbody.com/htm/body.html

http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/learnem/learnit.htm

offline resources:

#### **Chemistry**

Laura Cipolla. I quaderni della didattica. Metodi e strumenti per l'insegnamento e l'apprendimento della chimica. EDISES

- Philip Ball, Elementi

- Peter Atkins, Il regno periodico

#### <u>Biology</u>

Main textbook: fondamenti e Didattica con laboratorio.

- Gambini A., Galimberti B. Ipertesto Ambienti, animali e piante nella scuola dell'infanzia Linee-guida per progettare e realizzare percorsi di biologia con bambini da 3 a 6 anni. Edizioni Junior, 2010.

-Arcà:ll corpo umano Carocci editore 2005

– Longo C., Didattica della Biologia. Ledizioni, 2013. [capitoli III, VII, VIII, I]

# Programme and references for attending students

- Chemical elements, atomic structure, matter comosition, significance of the periodic table. Main elements found in Nature
- Complexity levels in biology. How to introduce living organism study to elementary school students.
- Towards molecular structure of matter: chemical bonds (ionic, metallic and covalent): examples from daily life.
- · Our body as living organism: different teaching approaches
- Introduction to cells and their relationships. Examples
- Macroscopic properties of matter: hydrophilicity/hydrophobicity, solubility, osmosis
- Fundamental molecules in/for living organisms
- Metabolism and cellular respiration and nutrition
- Oligoelements, vitamins, proteins and amino acids, nucleic acids, carbohydrates
- Digestion and assimilation of nutrients
- The scientific lab: how to organise it for elementary school students
- Photosynthesis, gerination, solute diffusion
- Phototropism and ecological interrelationship between plants and animals, fungi and baceria
- · Colours: chemical basis and biological significance

# Programme and references for non-attending students

the same as attending students

# **Assessment methods**

# **Office hours**

Annastella Gambini: wednesday 11.00-12.00, building U16, office n. IV-3A

Laura Cipolla: on demand by request at laura.cipolla@unimib.it

# **Programme validity**

The teaching program last for one year

# **Course tutors and assistants**