



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 versus microscopic, matter composition and states 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 be discussed with an interdisciplinary approach, capitalising on the chemical topics.

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

Objectives

Background 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/html/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

Biology

Main textbook: fondamenti e Didattica con laboratorio.

– Gambini A., Galimberti B. *Iper testo 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:Il 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 composition, 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, germination, solute diffusion
- Phototropism and ecological interrelationship between plants and animals, fungi and bacteria
- 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
