Vilnius Pedagogical University (Lithuania)

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SCIENCE HITS 4 KIDS
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Vilnius Pedagogical University

- The biggest higher educational establishment training teachers for Lithuanian schools;
- ~12500 students;
- 13 faculties;
- ~600 university teachers.

Main aims of the university

- future teacher training,
- improving school teachers' qualification,
- organizing their re-qualification,
- scientific research.

Some words about yourself?

Integration of Biology, Chemistry and Physics

Is Nature similar to a cake?

- How to eat it?

Inanimate environment & biotic environment => Natural Studies

- *Natural studies:* Biology, Chemistry and Physics (and Geography).
- Mathematics.
- Other subjects?

Is it necessary to integrate science subjects?

- Or discrete subjects should be taught without integration?
- E.g., integration of science in Lithuanian schools started only after 1990`s.

Integration

- *Inner integration* (e.g. relation between animals and plants).
- *Interdisciplinary integration* (relationships among Biology, Chemistry and Physics).
- *Sociocultural integration* (understanding of harmony in nature, balanced consumption, etc.).

To integrate or not?

- The task for you is to discuss about and give ideas on:

Advantages of integration	Disadvantages of integration

But…

- The nature is not a cake divided into small pieces.

So…

- A pupil should understand nature as a whole unity.
- He /she should understand the complexity and harmony of the world.
- To understand phenomena and processes of nature.
- To educate himself as a friendly consumer of natural resources, etc.

What is the system of integration of science subjects in your country?

- Discussion and short report paying attention to:
- Primary school (age ? – age ?);
- Basic school (age ? – age ?);
- Secondary school (age ? – age ?).

Primary school

- The integration of science is necessary.
- Pupils should acquire some basic knowledge about nature as an integrity.
- Get acquainted with basic concepts.
- To know the world around us: I can see/ I can touch…
- Engagement and curiosity to natural studies should be developed.

Basic school

- Lower classes (e.g. 5-6 forms) – integration is necessary.
- Pupils study processes and concepts of science more deeply.
- They recognize objects of inanimate and alive nature.
- They raise questions and hypotheses, plan some experiments.
- Form their world-view.

Two ways of realization

- integration of concepts
- integration of phenomena.

Integration of concepts

- Movement.
- Energy.
- System.
- Evolution.
- Variation.

Integration of phenomena

- *E.g. "Respiration"*

Respiration in Chemistry

- Chemical composition of air we breath

Respiration in Biology

- Physiological processes of breathing as biological sphere.

Respiration in Physics

- Physical processes during respiration (diffusion, pressure, etc.)

Integration of Physics and Biology

- Microphone and ear

Integration

A microphone

- Operation of a microphone
- Transfer of a signal
- Frequency
- Sensitivity

An ear

- Structure of an ear
- Perception of a sound
- Directional hearing
- Boundary of pain

Upper grades of a basic school

- In Lithuania, Biology and Physics appear as discrete subjects from the 7th grade.
- Chemistry – from the 8th grade.
- In 9th and 10th grades pupils study generalizing courses of Biology, Chemistry and Physics.

Secondary school

- Pupils think about their future profession (?).
- They can choose to deepen their knowledge in Biology, Chemistry or Physics.

Motivation of pupils is very important, but…

- A big decline in interest in science subjects throughout the whole Europe…

The task for all of you

- If I am a Minister of Education, what should I do for the favor of science subjects?
- Let's think 4-5 main things.

Thank you!