Science projects and pupils competences

Urszula Utnicka
Publiczne Gimnazjum Nr 1 w Krempachach

Science, environment and entrepreneurship in eTwinning projects, Warsaw 8-11 October 2015

Why do we need competences ?

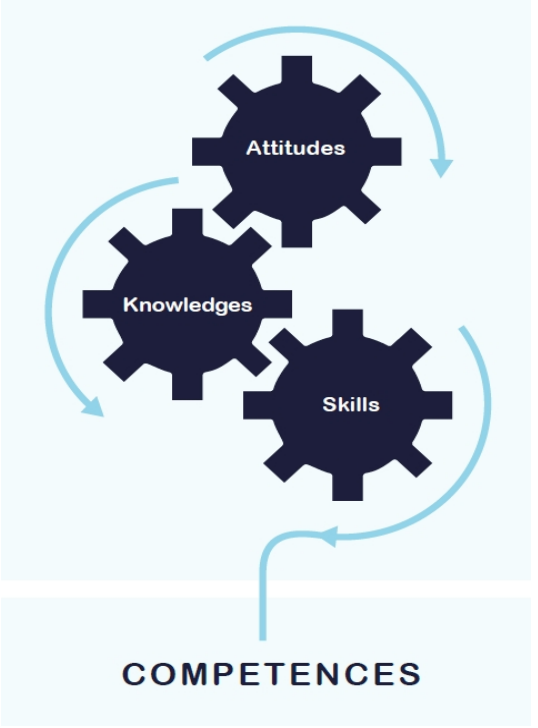
- Good jobs need people who can put knowledge to work.
- New workers must be creative problem solvers and have the proper skills and attitudes.
- Traditional jobs are changing and new jobs are created everyday. Highly payed but unskilled jobs are disappearing.
- Pupils must develop a new set of competences and foundation skills if they want to enjoy a productive, full, and satisfying life and to face the complex challenges of today's world .

Competences

A competency is more than just knowledge and skills.

Competences = a combination of knowledge, skills and attitudes appropriate to the context.

Key competences = competences which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment.



Recommendation 2006/962/EC of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning [Official Journal L 394 of 30.12.2006].

Key competences for lifelong learning in the EU

1) Communication in the mother tongue;

2) Communication in foreign languages;

3) Mathematical competence and basic competences in science and technology;

4) Digital competence;

5) Learning to learn;

6) Social and civic competences;

7) Sense of initiative and entrepreneurship;

8) Cultural awareness and expression.

Transversal skills

8 key competences are all interdependent, and the emphasis in each case is on:

- **critical thinking,**
- **creativity,**
- **initiative,**
- **problem-solving,**
- **risk assessment,**
- **decision-taking,**
- **constructive management of feelings.**

Learning environment

'An ideal' learning environment should have (at least) the following features:

- **active and experimental learning, where learners' individual development and personalised learning is supported,**
- **teaching and learning with subjects and cross-curricular elements are well coordinated and teachers collaborate effectively,**
- **leadership that builds on a common vision of school development, and a shared/ distributed approach that encourages teachers to work in teams rather than only alone.**

European Commission/DG EAC: *Education and Training 2010 Work Programme. Cluster Key: Competences – Curriculum Reform. Synthesis Report on Peer Learning Activities in 2007*

KeyCoNet recommendations

KeyCoNet - European policy network focused on the implementation of key competences in primary and secondary school education.

To deepen and sustain key competences at the school it is important to:

- **allow time for teachers to develop and deepen their practice,**
- **modify learning environments to better support project-based and interdisciplinary learning,**
- **improve communications on the objectives to build broader support,**
- **highlight key competences as a priority in school plans,**
- **monitor and evaluate at school level.**

J.Looney, A.Michel KeyCoNet's *Conclusions and Recommendations for strengthening Key Competence Development in Policy and Practice EXECUTIVE SUMMARY,* European Schoolnet 2014.

eTwinning Collaborate

eTwinng supports implementing key competences in the projects.

Project Gallery

The gallery showcases some of the best-practice examples available, to inspire you when you run your own eTwinning project.

https://www.etwinning.net/en/pub/collaborate/project_gallery.cfm

Project kits

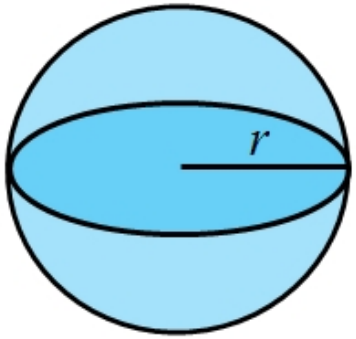
Ready-made project kits are step-by-step guides to successful eTwinning projects.

https://www.etwinning.net/en/pub/collaborate/kits.cfm

Why projects ?

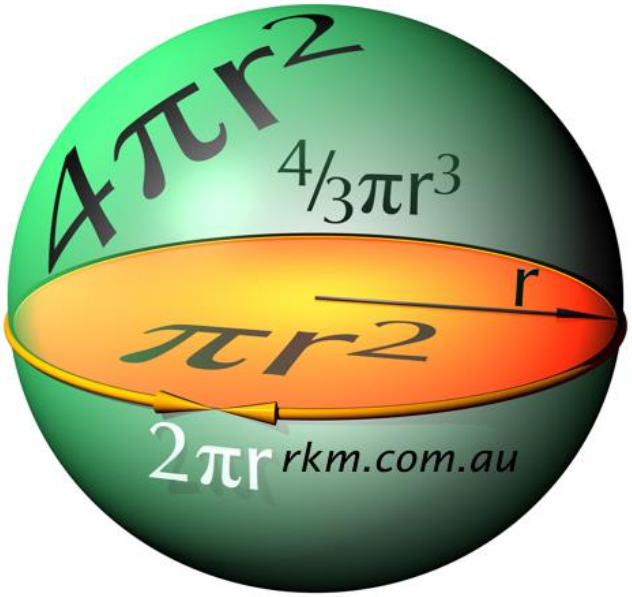
Activity 1A:

Calculating a surface area of a sphere:



$$A = 4 \cdot \pi \cdot r^2$$

$$\pi \approx 3$$



☼

Find the surface area of a sphere with a radius r = 4 cm.

Σ

Why projects ?

Activity 1B:

☼

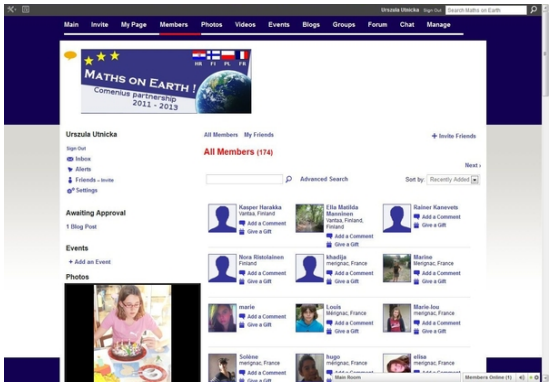
Find out the surface area of this ball.

Σ

Cooperation

eTwinning projects demand international cooperation. It usually starts from knowing each other. Popular tools are:

- e-mails, chats,
- social networks,
- YouTube, Picasa, Flickr, Issuu (content),
- working environments e.g. Google Disc, Wikispace, Moodle.



A Social network NING dedicated to the project.

Knowing each other

Some methods involve pupils more deeply, create environment to involve students' engagement and openess. Such attitude enhances learning competences.

- **letters, portfolio,**
- **videoconferences with dancing, singing songs, presenting traditions, food,**
- **parcels sent via post,**
- **comparing daily life.**

Example:
eTwinning project „Statistics and you”
- comparing pupils' daily life in Italy, Poland and Spain. Students did videos, PPpresentations, questionnaires etc.

Virtual mobility

Interdisciplinary activities, especially „virtual mobility”, can improve pupils' competences, for example:

- planning a trip around Europe, e.g. using the European Route of Industrial Heritage

http://www.erih.net/welcome.html

- cooking & cuisine,
- sport and leisure,
- knowing/learning partner's language,
- writing dictionaries or guides.

A trip

Activity 2:

☼ **Work in a group. Plan a trip around Europe.**

Members of a group try to propose one place in every partner's country (NOT own country!).

Try to chose places related to Maths, Science, Technology (MST).

Σ

Knowing Europe

Example:
eTwinning project „Maths and Earth”

Activities were targeted to the main aim: suitability of Mathematics and its coincidences with Earth exploration and other branches of science.

Helpful tools:

- **Geogebra,**
- **Wiris,**
- **GoogleEarth,**
- **APSalin.com**

www.apsalin.com

Outdoor activities

Example:
eTwinning project „GOAL! Go Outside And Learn”

- **A main idea of the project:**
  outdoor lessons.
- **Teachers and pupils from 6 schools planned lessons outside and implemented into lesson timetables.**
- **Topics of these lessons were implemented into curriculums and led by teachers in Poland, Finland, Croatia, France, Spain and Slovenia.**

http://new-twinspace.etwinning.net/web/p34220/welcome

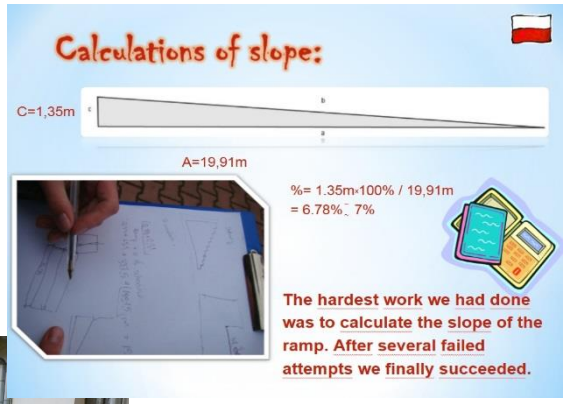
Lesson „Solids”

Pupils divided into groups had to:
- discuss and choose solids to work on,
- make solids of snow on a school court,
- measure necessary dimentions,
- calculate volume and a total area of solids,
- do drawings and calculations on a paper,
- do slide presentation in Polish or English,
- present the results of their research during a lesson.

Lesson „Ramps”

Students' tasks:

- find information, use word editors, PP presentations,
- communicate via e-mails
- calculate a slope of the ramp (with and without Geogebra aplet),
- learn and use Geogebra,
- do the project of the ramp
- take photos and resize them
- understand the problems of the handicapped people,
- cooperate in the group,
- present results of work, evaluate themselves and collegues. ∑



http://new-twinspace.etwinning.net/c/portal/layout?p_l_id=10564575

GOAL! - pupils' achievements

Beside subject new knowledge and skills pupils enhanced:

- **solving problems in a real situation,**
- **joining knowledge and skills,**
- **better language skills,**
- **effective use of ICT,**
- **interdisciplinary learning,**
- **ability to discuss and present own ideas, assertiveness,**
- **creativity, taking decisions,**
- **better attitude to learning,**
- **social awareness, working in groups,**
- **cultural awareness, openness to other countries.**

Dictionary

Activity 3:

☼ **Work in a group. Write the short dictionary (up to 5 terms) for one of subjects you teach. Translate English terms into national languages.**

Σ

Labour market

- All key competences and transversal skills are important for future employment – they are crucial in most of pupils' future professions.
- Activities which familiarise pupils with labour market can be helpful, for example:
  - debates e.g. „Women in science - pros and cons”,
  - visits in factories and companies,
  - knowing professions better.

Summary

- Project-based learning is a good method to develop students' competences.
- Most of the projects develop more then one key competence, as well as the transversal skills which cut across all of them.
- Educational projects are related to real life issues.
- Interdisciplinary learning and cross-curricular elements make