Teacher-Scientist-Partnership

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Circello

The Circello School and the territorial school system

- Circello's middle school is a seat apart belonging to the comprehensive institute of Colle Sannita (another municipality of the province) that has other separate seats in Colle Sannita, Castelpagano and Castelvetere in the Fortore Valley. That structure holds 308 pupils from the age of 3 to 14 years old. In the territory are also present higher Secondary schools: Liceo Scientifico, Istituto Alberghiero, Istituto Tecnico per Ragionieri, Istituto Professionale per il Commercio, l'Istituto Tecnico Commerciale. In Circello there are also a Nursery school and an Elementary school depending on another institution, the Didactics Direction of Colle Sannita
- Circello's secondary school has 82 pupils arranged in 5 classes (two first year classes- pupils age of 11/12; ne second year class – pupils age of 13; two third year classes –pupils age of 14). During the first year of the TSP project (school yaer 2007/2008) just some pupil of the 3rd and the 2nd year got involved. The project developed in the sphere of the ordinary curriculum subjects such as Geography and Civic-mindedness (3 teachers)and Maths (1 teacher). And expert choreographer consultant helped pupils during the making of the musical.

1. Short description of the module (abstract)

The module has been structured in the aim of integration of subjects and deepening of themes which are often left aside. The fulcrum of the module had been "Climate change": the module lead to the good interaction of teachers (Science and Technology, Geography, History, Civic-mindedness) and allowed the conception of new unconventional pedagogic tool to involve pupils and convey knowledge.
The module aim has been to raise pupils' involvement in having a critic socio-ecological consciousness.
Activities has been made up of frontal lessons, hand on activities (laboratories), active research on territory, tests and self-evaluations during each working step, conception and production of educational tools both of traditional and innovative kind.
Activities have lasted for two years. The first year of activity was spent structuring the module and identifying strengths and flaws concerning didactics, contents and approach. During the second year of activity, the model has been employed with a different group of pupils ad classes, in order to test the effectiveness of the model previously hypnotized.

2. Preconditions

2.3 Integration of TSP into the school curriculum

2.3.1 Greenhouse effect and school curriculum

"Climate change" and "Greenhouse effect" essays is usually deal with Geography or Math teachers. In particular at the secondary school, that topic is taught in order to the causes of the green house effect, analysis of different pollutions and their effects (e.g. enhancing of CO_2 level...). Course books report just information about climate change and its rebounds at a global scale.
During the fist and the second year classes the goals are as follows:

1st Class for Science: knowledge about fundamental organisms' mechanisms, global change related to natural systems of the Earth and the role of Man in their shift
2nd Class for Geography: get the relation between human action and a change in landscape
3rd Class: evaluation of possible effects on territory due to human actions and decisions.
Those themes has been developed during frontal lessons, sometimes through screening of simple documentary movies concerning that topic.

Circello is a small village of 2700 inhabitants in the middle of Beneveno province, at the altitude of 650 a.s.l. Its territory area is about 45,4 km^2. The ancient part of the village is built on the rim of a steep cliff, dominated by Circello's Norman castle (XI Century). The village has a rural-based economy, and its main resource is wine and food (production of meat, cheese, cold cuts and honey), an healthy place, history, culture and a great potential for eco-rural-tourism. The village was well known for its craftsmanship, which is nowadays fading away. The young generations are moving away in order of work or studies.

3. Attainment targets

3.1 Objectives for pupils

a. Development of a socio-ecological consciousness
b. Appreciate the significance of "global" and "local" concepts
c. Approach the concept of "sustainable development"
d. Gain knowledge concerning clime, weather, green house effect related to the territory they live in
e. Focus on territory and the weather phenomena that define it
f. Interpretation of natural phenomena
g. Learning though game activities, models and hands on activities
h. Learning, trough research/action paths, human role and influence on environment

3.2 Objectives for teachers

a. Arouse pupils' curiosity towards a topical issue which has a feedback in everyday's life
b. Make pupils aware about the green house effect and themes related to it
c. Make the "green house effect" theme and the TSP project become a chance to teach different concepts belonging to the curriculum subjects
d. Test the efficacy of new educational strategies and method approach
e. Comparison with researcher/scientist who would have carried new information, methods and thematic approach into school

f. Build a multi-disciplinary module to use as a didactic model and can be replied to approach the same topic or that could be useful for other ones.

3.3 Objectives for scientists

a. Test and enhance the efficacy of methods and techniques concerning science dissemination among young generations
b. Consider the teachers' experience to point out element of interest to communicate to pupils
c. Enclose the TSP "Changing" experience into other researches such as Sustainable Rural Development
d. Create a new partnership with Institutions and people who can play a role in planning future activities
e. Disseminate results of research and the initiatives lead on territory.

4. Sequence of activities

A. First meeting with scientist and with other involved schools
At the beginning of the project, scientist organised an informal meeting with the different teachers of the different schools of Benevento province who were going to join TSP network. Aims, methodology and background of the project were presented. Some teachers from Circello school had previous cooperation experiences with the scientist, even if not in the school context (rural tourism development projects) This represented a facilitation for the TSP process.

B. Coordination meetings between teacher project leader and scientist
After the first "institutional" meetings, other 2-3 coordination meetings were realized with the aim to identify the general structure of the TSP module, the main objectives and a general plan of activities

C. *Participation to the "field day" "Sustainable agriculture vs. Greenhouse effect"*
Teachers and pupils involved in TSP participated to an event organized by another Benevento Province school involved in TSP. This school, the professional school for Agriculture "Vetrone", actually, organized a dissemination event during the seeding procedures to set up experimental fields for testing the cultivation technique of "Sod Seeding System"

D. Questionnaires for general knowledge upon GHE
Before TSP got started, questionnaires were posed to understand pupils' background concerning weather, climate and greenhouse effect. This action have been carried out to plan teaching strategies and to calibrate the contents of the module
E. Frontal lessons about climate, weather and greenhouse effect
During the module activities, 20 hours frontal lessons (splitted in 10 different times) have been carried out to give pupils the basical knowledge concerning the topic. These lessons were realized by the scientist (15) and by teachers (5).

F. Video, multimedia and internet researches
During the module activities, teachers and scientist used video, multimedia and internet as tools for dissemination and for attracting pupils' attention

G. Lab activities: setting up instruments to measure weather parameters

A specific frame of activity has involved pupils in setting up (using recycled materials) instruments for measuring weather parameters (rain, wind, temperature). This has been considered a way to introduce specific topics (waste recycling), to deal with specific themes (weather), to introduce the important concepts of monitoring, of data collection and of the accuracy of the observation.

H. Lab activity: lets play creating the greenhouse effect

In the frame of lab activities, pupils have been involved in setting up three little greenhouses (made of wood and Plexiglas). The aims of this activity have been a) arise pupils' interest; b) create a little experiment of artificial greenhouse for monitoring temperatures in different "artificial" conditions

I. *Monitoring weather parameters at home*

Pupils were asked to use the instruments set up at school (see G.) to collect at home daily data of temperature and rain. This activity has been planned not only for the data collection but, mainly, to stimulate discipline (in daily collection) and participation to the project. Pupils, as a matter of fact, felt "involved as active part of the experiment".

J. Hosting Swedish TSP partners

Circello school hosted a group of teachers (with the scientist) coming in Italy from Sweden to exchange experiences concerning sustainable agriculture.

K. Active participation to dissemination events

TSP group from Circello school have joined the event "province scientific week". During this event students have been called to talk about their activities to other students belonging to other classes and/or schools. First of all pupils looked really proud of their project, and this has helped the following development of TSP. On the other hand, this participation played the role of evaluation experiment. Teachers and the scientist, actually, looked at the experiment from afar. The experiment, on the one hand, showed the general level of students' knowledge (stressing where to integrate information and explanation) but also represented a good way to increase the level of participation and the sense of awareness about what pupils were studying and doing.

L. Setting up the musical "climate is going crazy"

With the aim to identify new strategies for education, the creation of a musical involving pupils has been considered a good and innovative tool to disseminate knowledge concerning global change.

L *Paticipation to the "energy saving day"*

M. Post activity questionnaire questionnaires for general knowledge upon GHE

N. Interviewing grandparents to know "how were thing in the past"

O. Photographing the effect of "crazy climate" on landscape and territory

P. Participation to end-school year events

Q. Participation to Pistoia meering

5. Results

- For teachers: discover a new approach to teach very different from frontal lessons (implicating more working efforts)
- For pupils: learning more about green house effect
- For pupils: to better realize how each one can play a role in contrasting global climate change
- For pupils: raise their own socio-ecological consciousness
- Musical "Climate is going crazy"
- Documentary about landslides due to the "mad climate"
- Pupils attainment concerning specific communication skills (they became able to explain both to adults and other coeval children what the learned)

6. Valuation of results

6.1 Teacher's view

a) Laura Caruso, geography and citizenship&constritution teacher

TSP module for puplis' training

- ✓ Approaching actual themes though an innovative and involving method
- ✓ Experiments
- ✓ Observation
- ✓ Considerations on actual topics which have an echo on pupils' lives
- ✓ The chance of acting brain storming as a method of growth and comparison
- ✓ Interaction with researchers and experts within symposium (pupils are emotionally involved in that kind of activity because they are very curious about scientists talking with them)
- ✓ Positive expectations discovering other school realities
- ✓ Substitution of frontal lessons with hands on the activities which awaken children's curiosity and attention
- ✓ Learning through questioning
- ✓ Understand the reality of phenomena through an active research and comparing it with the recent past one (compare 2008 metereological data) or make a comparison with yesteryear (interviewing old people about remarkable weather phenomena)
- ✓ Expose the climate change using different communication skills (graphic charts, slideshow, role play).

Teachers' "relapse"

- ✓ The urge to "interrupt" traditional geography lesson scheme to deepen actual themes trough multi-disciplinary connections (history, science, informatics...)
- ✓ The chance to develop critical thinking
- ✓ Appreciation of the cultural/didactic exchanges between them and the researchers who propose a new involving approach
- ✓ A long lasting project allows a slow but continuous reflection on themes faced during the project, that process lead to a better understanding of the topic.

b) Arcangela Grimaldi, history teacher

the project acted in 2008 and 2009 straightened knowledge and specific skills concerning geography and science.
Pupils had the chance to reflect on the factors that influence climate change and their consequence. This processing was certainly due to practical activities lead by experts that perfectly fit in the school context.

Pupils were involved in hypothesizing fixes for the protection both of their territory and Earth.
This is a pathway to make their green-consciousness grow which would be useful to choose a correct behaviour after (... I hope!).

c) Clementina Politano, science teacher

Strong points

Hands on activities: pupils were enthusiastic in building tools (barometer, pluviometer, anemometer, small green houses): they took part at the afternoon activities (even if, for some of them, this meant to the 4th afternoon spent at school in a week). They were amazed of building tools with such simple materials. They had the chance to satisfy their curiosity asking to the researcher.

Positive consequences:
Pupils became able to collect data using instruments (such as a pluviometer to collect rainwater, the thermometer to collect the daily temperature...).
A better understanding of the greenhouse effect by leading measures of temperature in and outside the small green houses.
They get to interpretation of data and their own charts.
Pupils were able, during the "Week of Science", to debate properly about scientific facts (using the right words and overcoming shyness).
One of the most positive effect has been that all of pupils were involved, even those who usually are inattentive during the school lessons.

6.2 Student's view

This project is very useful for us because we are learning some correct behaviours. We like the methods used to make us learn in a more funny and easy way (the role play, research on territory, scientists who explain us natural phenomena through simple examples). Those methods arose our interest and understand topics is a great satisfaction and motive for us all.
That way we really fit and feel actors because of the tasks we have: collecting daily temperatures, searching data, taking pictures, interviewing people. We like discussing in the classroom because we are always asked to say what we think and to explain our ideas. The Pistoia conference has been a really exciting experience because of the interaction we had with other foreign students. After the conference we understood better how protect the environment is important: pollution is a risk for everyone! Building industries and using fuel is dangerous, so we realized that human activity has to be contained.

Former TSP pupils (today in the upper school)

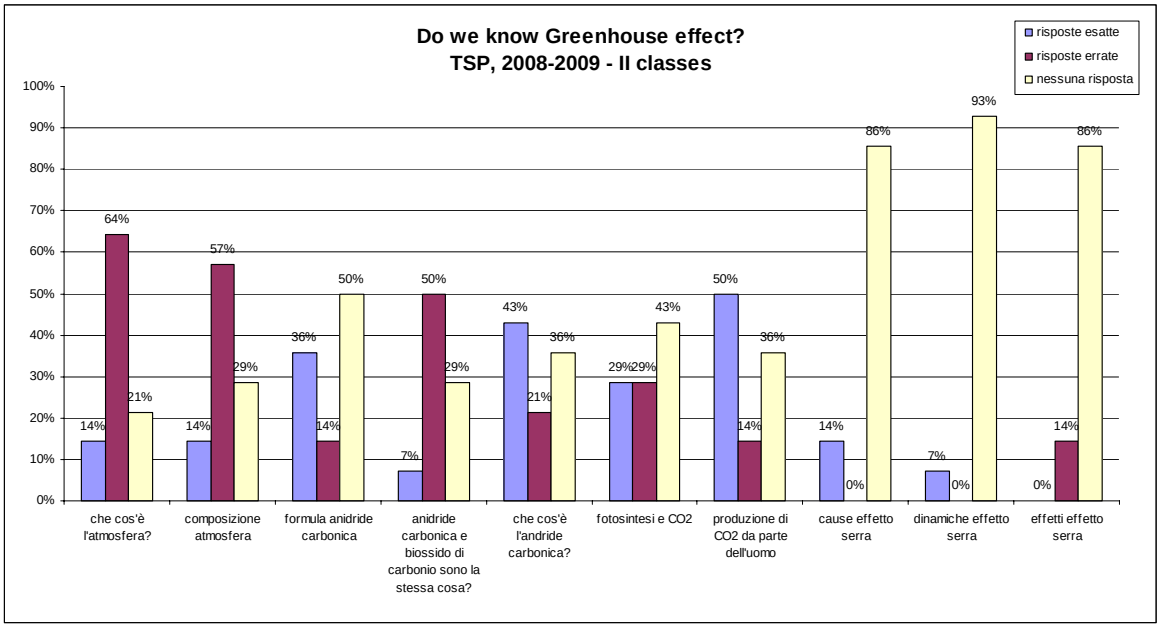
The project acted at the middle school "opened" my mind. Now my perspective is different so my day life. This project really helped me studying geography and now I understand the real meaning of staying at school until 8 in the evening and working hard. I really loved organising the musical and the Science Week. I learned a good method, I had some good times with my class mates, teachers and researchers.

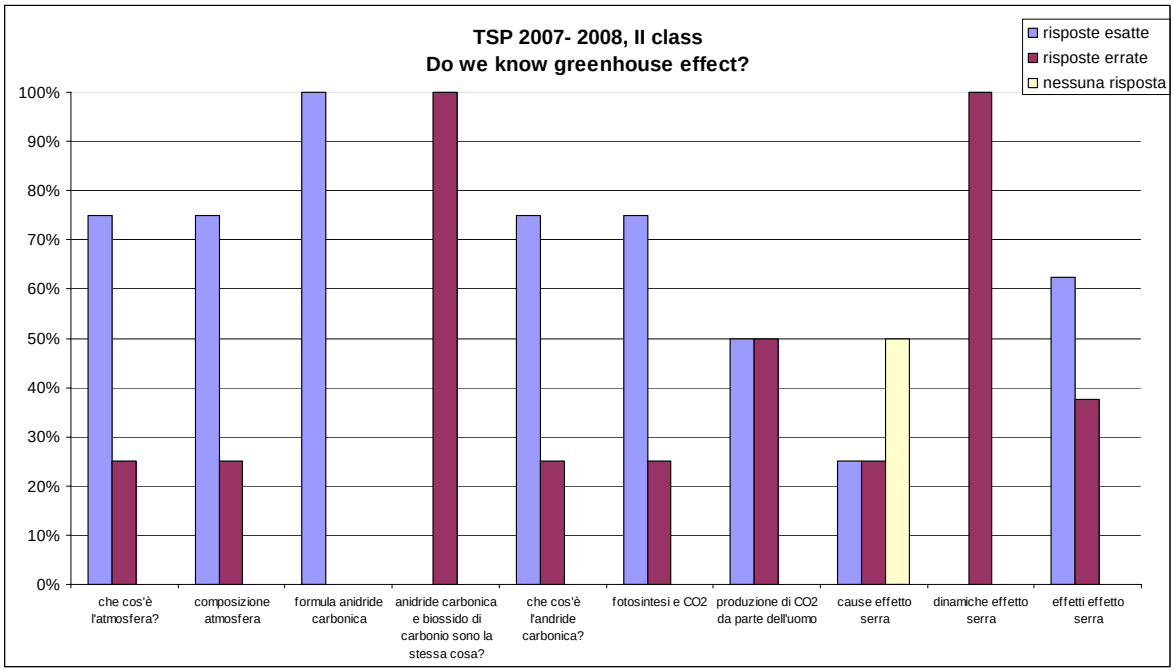
The project has been a good experience to me because I had the chance to meet people and to focus my attention on Earth problems. My mates and I learned how to build an instrument with simple stuff, and moreover, to communicate through ballet the significance of that project.

7. Generalizations

After the project we proceeded with an evaluation to let us understand how successful the work has been. It goes without saying that our satisfaction is high and our will to improve is strong. To test pupils' knowledge about the topic, we submitted them a questionnaire. The following charts represent a great result.

. Pupils evaluation concerning greenhouse principles




TSP 2007- 2008, II class
Do we know greenhouse effect?
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fotosintesi e CO2
produzione di CO2 da parte dell'uomo
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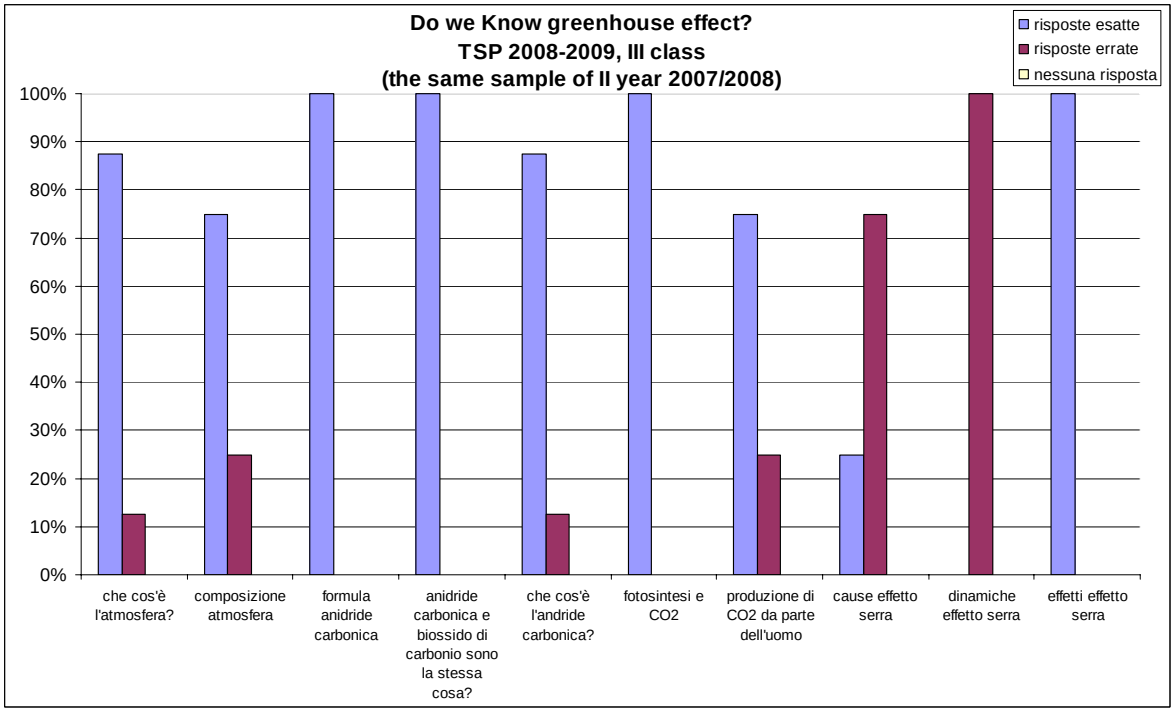
Do we Know greenhouse effect?
TSP 2008-2009, III class
(the same sample of II year 2007/2008)
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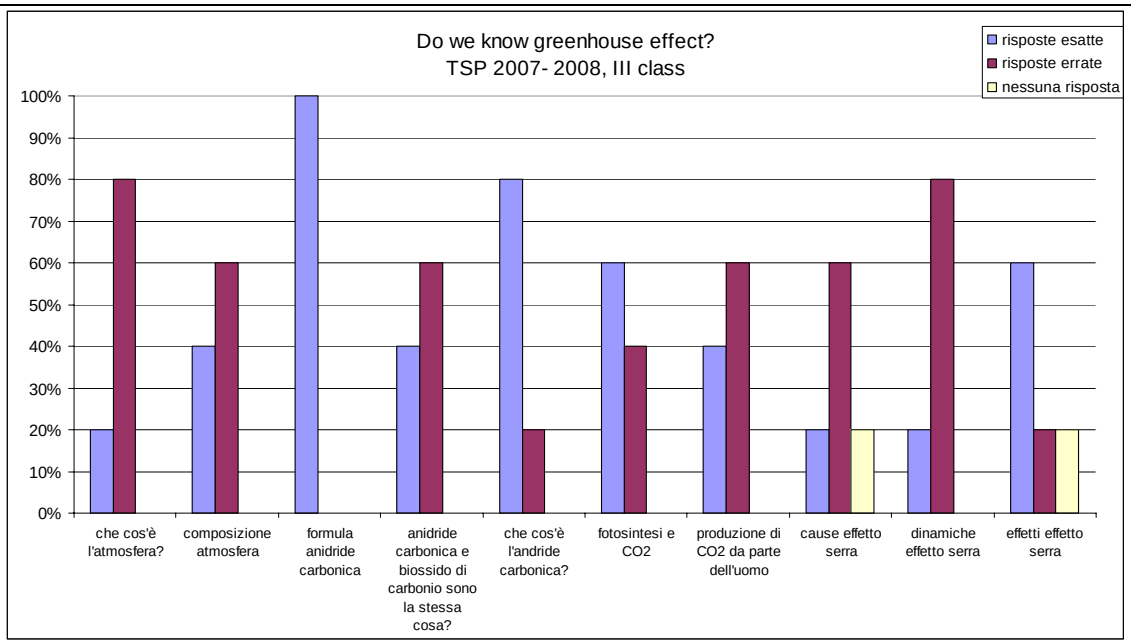
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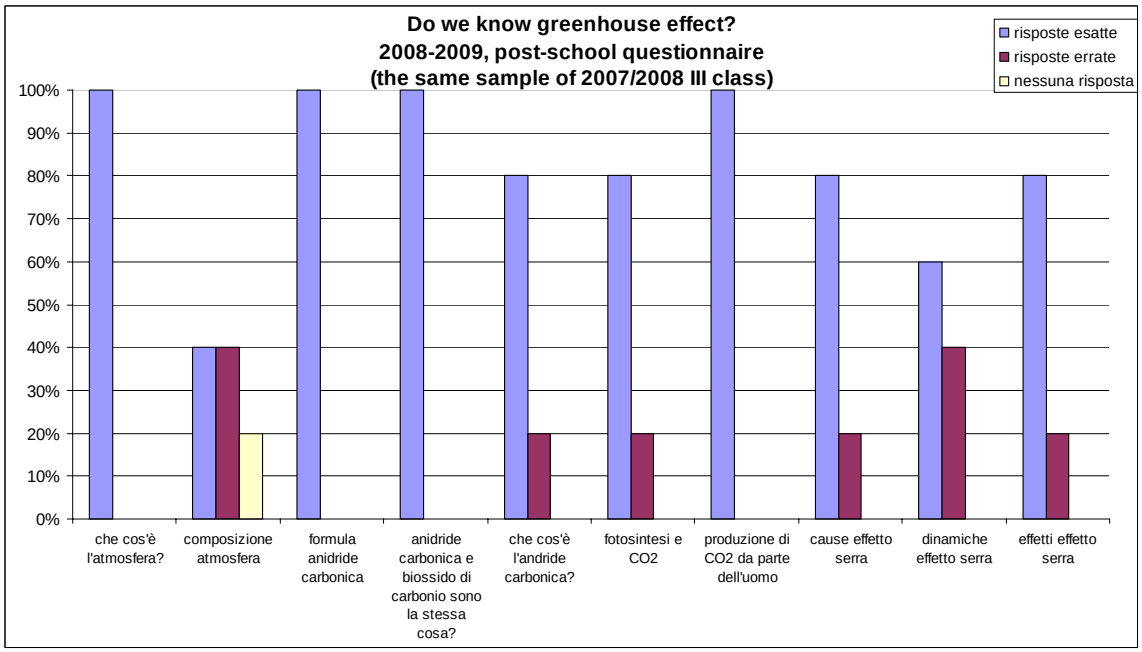
Do we know greenhouse effect?
2008-2009, post-school questionnaire
(the same sample of 2007/2008 III class)
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