SCIENCE ON STAGE Deutschland

HPI Hasso Plattner Institut

THINK AND BUILD BRIDGES

Linda Giannini e Carlo Nati

Berlin,–2008/10/23 -

We did not explain students (aged 3 to 16 years) what a bridge is, but we have been watching how they have built bridges, while playing, and what their idea of bridge was.

The survey upon the idea of bridge was also addressed to several adults of different nations, aged between 20 and 70+.

Among the materials used, plastic blocks, wood sticks, simulation software, 3D environments chat and Kit Lego Mindstorm.

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To involve in the "Build a bridge!“ path classes of children from kindergarten, primary and secondary school, in addition to those of high school of art of Latina,

we proposed activities neglecting the initial study of what a bridge is, but that stress on the idea of bridge, its mental, physical and real representation, by models co-assembled, co-constructed by recycled material, simulation software and programmable Lego bricks.

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To directly experiment the problems associated with a bridge, we started the representation from the personal concept, to motivate students on the objective observation of items and – then - of physical phenomena related to its structure.

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Depending on the age of the students, different tools and models were used with the aim to extrapolate problems related to disciplines that allow a theoretical solution and a operational verification following an iterative sequence like this: theoretical model, verification of effectiveness of the model, new model revisited…

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Our activity had requested a longer time compared to the one initially forecasted by the group: from September 2007 to December 2007.

During the progress we collected the material produced by classes and documented it online[i] so to share it with other partners and with girls and boys of the several schools involved in the path. This is how our Think & build bridges was born!

[i] On line documentation Teaching Science in Europe Pagina WEB.doc

The assigned problem, to find a solution, was, for instance:

"How can we move from one edge to another?"

[i] Bridges with various materials
http://www.descrittiva.it/calip/0708/costruzioni/costruzioni.htm

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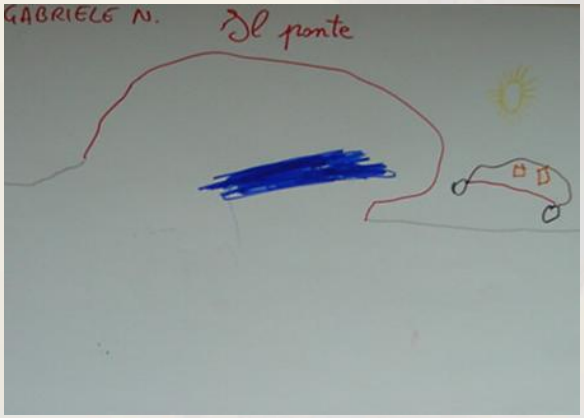
Each discovery was then communicated to others, socialized, shared and again re-tested in small and large groups of girls/boys.

Together with the direct manipulative-practical experiences, individual interviews were proposed during which it was asked: "Do you know what a bridge is? If you know, can you describe it? And sketch it?"



It serve us to pass with the car. Cars pass on the bridge. Under the bridge there is water and if the car drop down It get wet and broken.

Along our way we met the free software Crayon Physics with which girls/boys 3 and 4 y. o. have been playing, virtually and empirically applying the laws of physics on PC.

Crayon Phisics free software
http://www.kloonigames.com/crayon/

Among the virtual experiences, it is worth to mention the ones in ActiveWorlds, 3D chat. Girls and boys 3 and 4 years old searched for bridges in the virtual worlds, and their avatars crossed them, while partners from other countries offered their help to guide the children.

ActiveWorlds http://www.activeworlds.com/

The question we asked was: “When you think about a bridge, what story would you invent?” The stories were invented then read and told to childhood school children.

<u>Sharing of stories of bridges: primary and childhood school</u>

Obviously the graphical representations were different and so were the descriptions and the definitions. While with the younger children the main aspect was the one related to the experience, for the older ones other aspects were recalled: the social, the emotional, the metaphoric, the symbolic, the sentimental and the metaphysical ones.

<u>Secondary schools: first degree (11-14 y.o.)</u>

These data appear more clearly in the answers from the girls and the boys of second degree (secondary school).

In our case the ones examined are the students from the first years of high school for arts. It appears more strongly the idea of the bridge as a link between abstract concepts.

A bridge is a chance between life and dead.

The bridge depends on people, it is link between people.

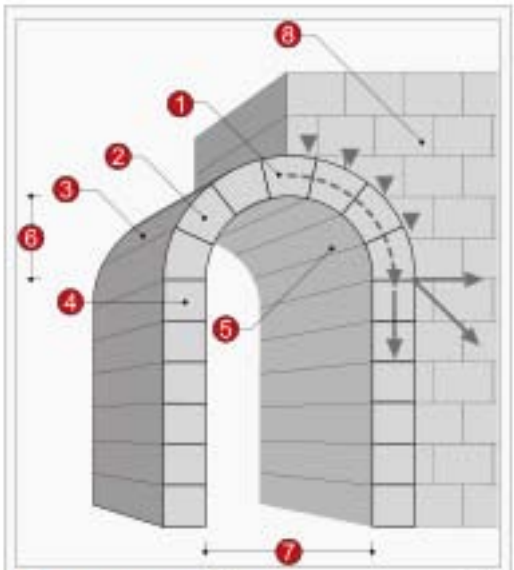
Secondary schools: second degree (14-19 y.o.)

few proposal of topics related to bridges

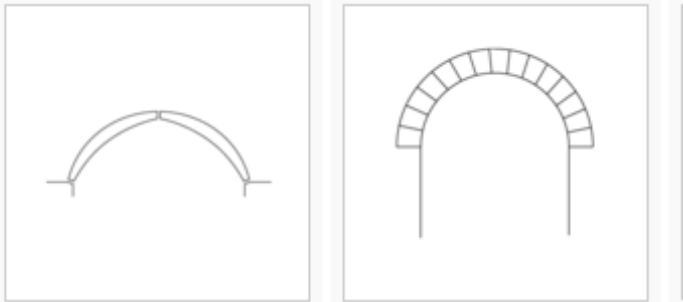
ROMA'S ROMAN BRIDGES

Secondary schools: Art history and Technical drawing

The Arch

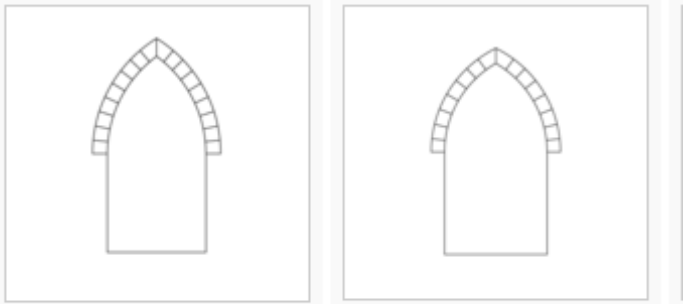


A masonry arch
1. Keystone 2. Voussoir 3. Extrados 4. Impost 5. Intrados 6. Rise 7. Clear span 8. Abutment



Triangular arch

Round arch or Semi-circular arch

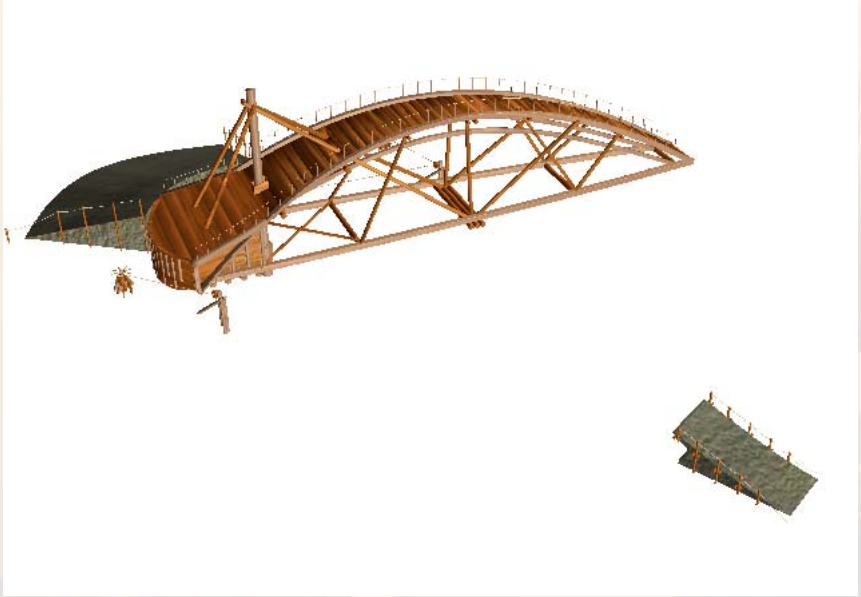


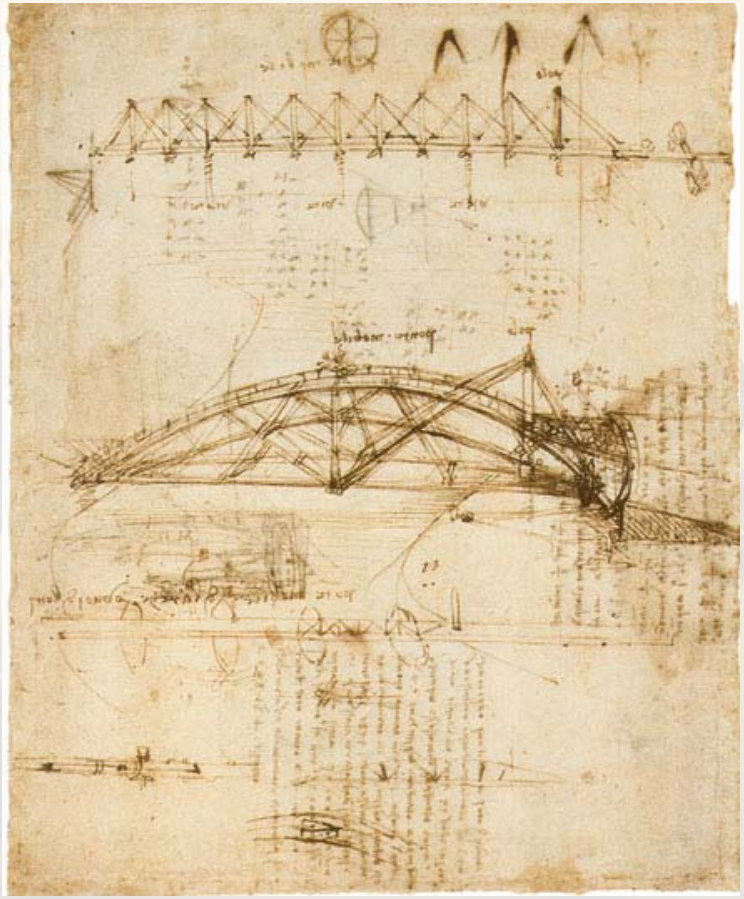
Lancet arch

Equilateral pointed arch

Secondary schools: Art history and Technical drawing

Leonardo’ bridges

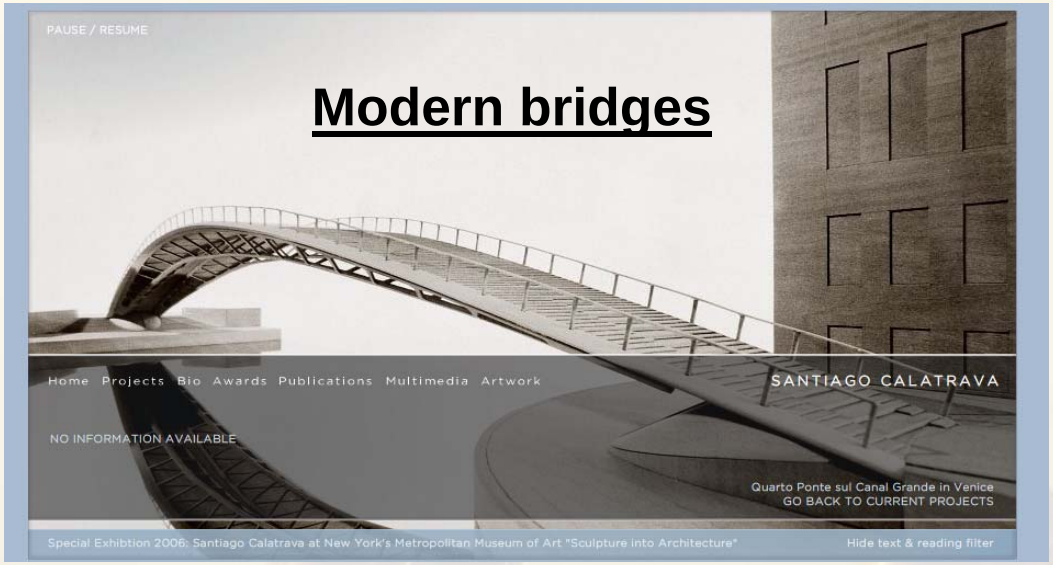




Secondary schools: Art history and Technical drawing

I Ponti di Venezia

Modern bridges



Ancient bridges

Secondary schools: Art history and Technical drawing

Ernst Ludwig Kirchner, the leading spirit of **Die Brücke.**

He wanted German art to be a bridge to the future, between *traditional neo-romantic German painting and modern expressionist painting*.

Ernst Ludwig Kirchner –
- Marcella – 1909-10

Secondary schools: Art history

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