TSG 22
Interdisciplinary mathematics education

INTERDISCIPLINARY
ACTIVITIES IN CONTEXT

Maite Gorriz
Santi Vilches
Optimization problem
Reinventing Cartons: The research on the optimum shape
Which carton uses less material?
Analitzem el problema

- En desplegar un Tetra Brik observem que queda un cartró rectangular:

\[ S = (2a + 2b) \left( \frac{1000}{ab} + b \right) \]

Sabem que el volum és \( V = a \cdot b \cdot h = 1000 \text{ cm}^3 \)
Each student works with a different $a$ value

Superfícies pel valor $a = 10$

Minim = 723,71429
We look for the minimum of the minimum
Making a collective graphic
And finally, we obtain the solution....
STEM Interdisciplinary

- The carton problem is a good STEM interdisciplinary problem.

- It’s easy to found STEM interdisciplinary problems but what happens with the other disciplines?
Interdisciplinary

- Interdisciplinary approaches not only in the context of Science, Technology, Engineering and Mathematics, but also related to other disciplines

- Mathematics is essential in every area of knowledge
EMOTIONS MOVE THE WORLD

LOVE

HATE
Happiness
Fear
Loneliness
Shame
Anger
Courage
Safety
Happiness
Fear
Loneliness
Shame
Anger
Courage
Safety
How to improve 3-point shots in basketball?
Kinovea software:
Dynamic geometry software:
Maths and music:
Inventing a new musical scale
Students' age: 16-17 years

Nowadays we use the exponential function in order to produce music.
But what happens if we use the lineal function?
Or the parabolic function?
• Or using the golden section?
• Or number pi?
• Or perhaps the Fibonacci sequence?
...

• Or another different mathematical ideas?
Student's example using the alphabet in geometrical progression

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Maths and music: Building musical instruments
Students' age: 12-13 years
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We know what we think when we see what we wrote

E. M. Forster
Guidelines for creating a definition

- Word in bold lowercase.
- Grammatical category: in italic lowercase.
- Word of the same category (name).
- Verb which introduces the features.
- Features indispensable and necessary.

- An example.
- A counterexample

*Study “Talk and write about Maths” by Isabel Cerdà.*
Guidelines for creating a definition

Example: Triangle

- **Triangle** *nm*. Plane figure having three sides, three vertex and three angles.

- A set-square is a triangle

- A counterexample: bicycle wheel
«Squares with Concentric Rings», Wassily Kandinsky
«Squares with Concentric Rings», A. Kerry Mitchell
Maths, English, History and Philosophy: The imitation game
Students' age: 16-17 years
Maths and Cinema: Special effects in films
Students' age: 12-13 years
“Thirsty Thales” Eulalia Arrizabalaga. Aged 13. 2nd Award 2015
distancia ma = 5.8

distancia noia = 15.1

midarelativa = 72.05 cm
Interdisciplinary activities should be:

- close to students
Interdisciplinary activities should have:

• an end product
Interdisciplinary activities should be:

- developed in cooperative learning, but each student has to make his/her own object.
Interdisciplinary activities should require:

- the coordination and involvement of several teachers.
Interdisciplinary activities should be:

• assessed throughout the learning process
And.... we must recognize and promote the creativity of each student
Thank you for your attention

Interdisciplinary activities in context

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