MATHEMATICS  2017-18	**Naestved Gymnasium OG HF / LP2I Collaboration in Mathematics** **Proof you said ?** **Plan sheet**

Goals :

- **Deliver a "mathematical proof" experience for all : create a video, a play, a presentation, a poster,... that helps understand a specific way of proving in mathematics**
- **This will lead to :**
  - Practice basic vocabulary on proving and arguing
  - Have on overview over different kind of proofs in maths.
  - Acquire advanced knowledge and skills on one specific kind of mathematical proof (topic of the presentation)
  - Reflect on the differences between proving scientifically, mathematically, demonstrate , convince, argue...
  - Create a mixed exhibition on maths proofs and argumentations.
  - Collaborate across Europe

Language content :

- **Oral presentation / interactions in English**
- **Debating, arguing**
- **Web Quest, Synthesis**

Mathematical content :

- **Proof : vocabulary, definitions**
- **Ways of proving in mathematics**

Task Organisation for the* Proof you said ? *project

Task	Each group has to create an *experience* to be shared with the others. The *experience* can be **a video, a play, a presentation, a poster, or anything that helps understand a specific way of proving in mathematics.** The experience must present a particular mathematical proof that has come out to be somehow important may it be in the Maths field, the History or because of its "Real Life" consequences.
Requirements	**The *experience* must include**… • A presentation of the historical background and the human context. • The statement of the theorem. • A visual way to either prove the theorem or give ideas about the proof(s). It has to be interactive and involve the audience.

	The overall experience shouldn't last more than 7 minutes.
Working methods	**Group work :** • Work in bi-national groups of 5-6 • web quests, select information, solve proof problems... • find or select in the list below a topic • choose a production (an experience : video, presentation, play, poster,...) • use your category in the blog to collaborate : http://blogpeda.ac-poitiers.fr/naestvedgym-lp2i-scienceproject/
Example of possible Topics	• The Four Colour Theorem (proved with computers, is it a proof ?) • Proof by Case (ex : For every integer x, the integer x(x+ 1) is even) • Proof by contradiction (ex : sqrt(2) is not rational and the Pythagoreans' decline) • Proof by induction (ex : The Famous 1 + 2 + … + n = n(n+1)/2 and the Gauss Story : example of a source : http://www.math.umaine.edu/~farlow/sec16.pdf) • Fermat Last Theorem Timeline (From Diophantus to Wiles and nowadays consequences in research) • 0-knowledge proof and the Ali Baba cave (in cryptography : https://en.wikipedia.org/wiki/Zero-knowledge_proof – example of application to Nuclear Disarmament here (!) : https://www.pppl.gov/news/2016/09/pppl-and-princeton-demonstrate-novel-technique-may-have-applicability-future-nuclear) • False proofs (Maths and Jokes ? (example of a resource http://www.math.utah.edu/~cherk/mathjokes.html#topic8) • 8. 9. 10... : See more projects here http://www.cut-the-knot.org/proofs/index.shtml). • more if you wish...
Resources	Internet, libraries, "resources" category of the blog, ...
Schedule	• **Wednesday, march 14th** : Form groups, project start, exploring topics • **Monday, march 19th : FD in France** - Bi-national group working (selecting topics, exploring, choosing the shape of your final product) • **Tuesday, march 20th : FD in France** - Bi-national group working (deeper understanding of the topic, start creating, sharing the tasks for distant working) • **Wednesday, march 28th :** Distant working on the blog • **Wednesday, april 4th :** Distant working on the blog • Monday, april 23rd : **FD in Denmark** - End of the creation process • Tuesday, april 24th : **FD in Denmark** - Finalising the product • Wednesday, april 25th : **FD in Denmark** - Presentations