



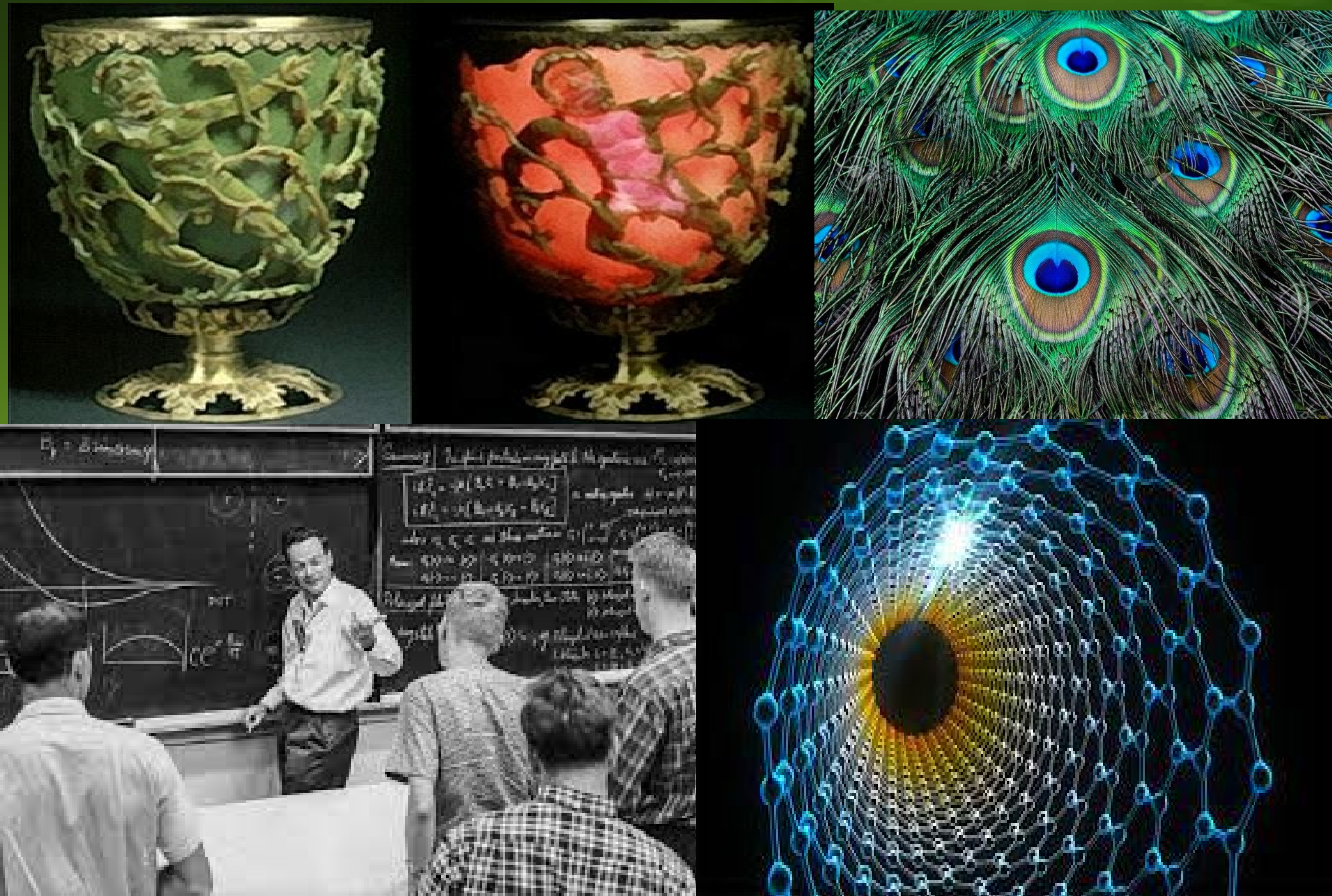
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### INTRODUCTION

"Integrated Nanoscience activities" with social elements of "educational technological humanism" in which it is increasingly important for everyone to reason in critical thinking about the usefulness, the safety, the perspectives, the limits of new nanotech scientific discoveries.

In the Nanoscience *Blanded Learning* innovative methodology of STEM disciplines were created in integrated learning activities with digital communication products realized using IBSE Methodologies.

From interdisciplinary to transdisciplinary didactic approaches, reasoned connections not only between physics, chemistry, biology, engineering but also with human and social sciences



### RESULTS

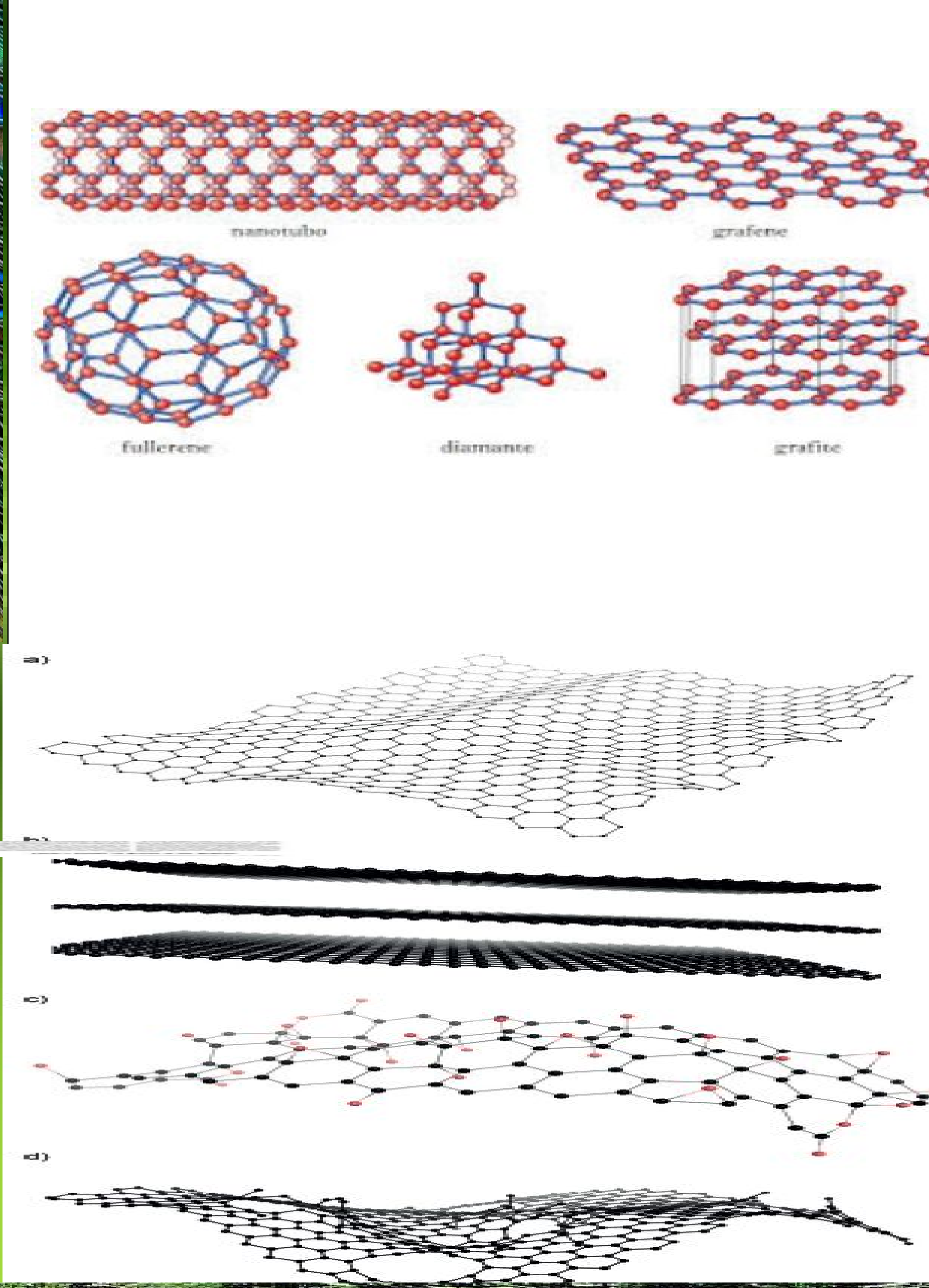
Didactic STEM didactic products realized with IBSE research methodologies:

Interactive Nanoscience Cooperative STEM works about History and Evolution of Nanoscience

Remote distance NanoQuestions Cooperative Works

Safety Nanoscience Project Learning

Nanoscience Communication for Society



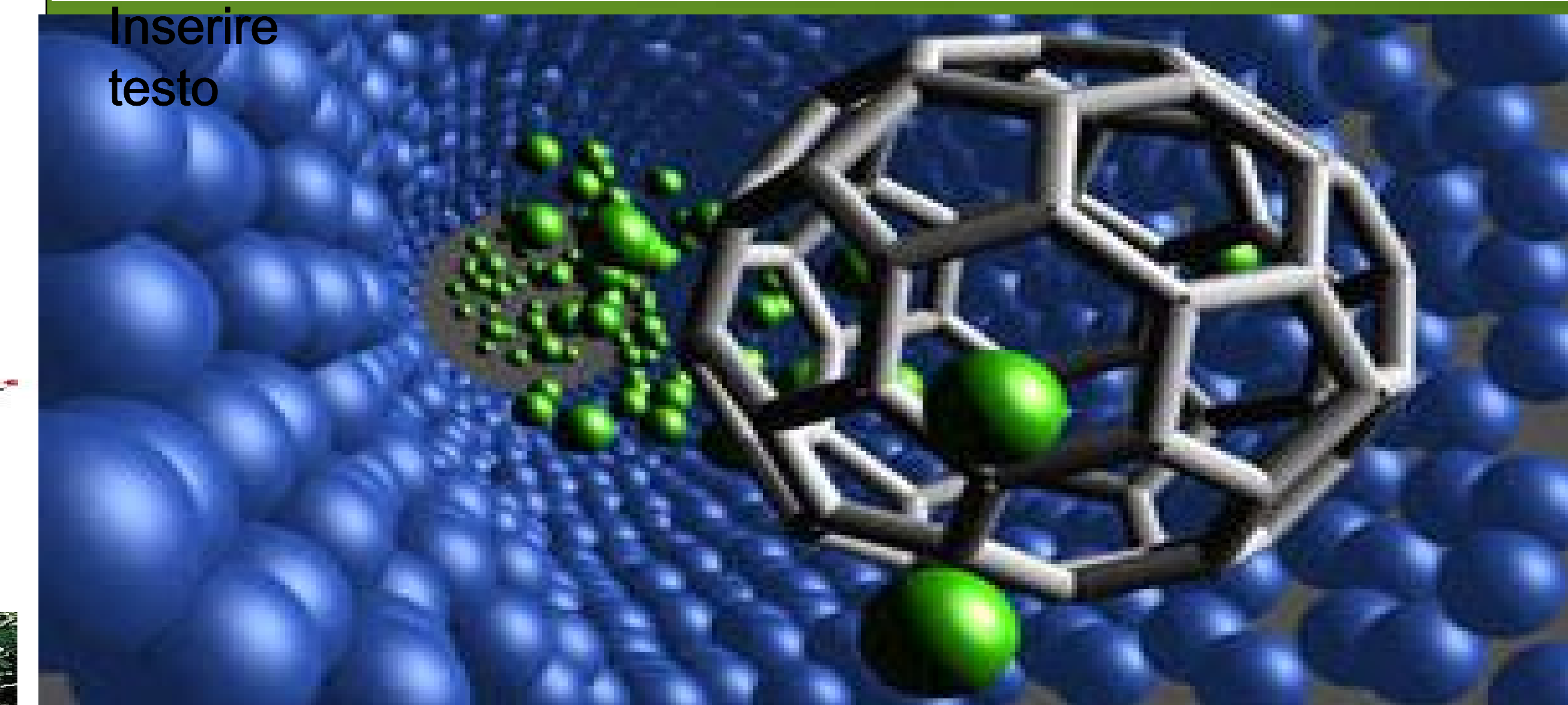
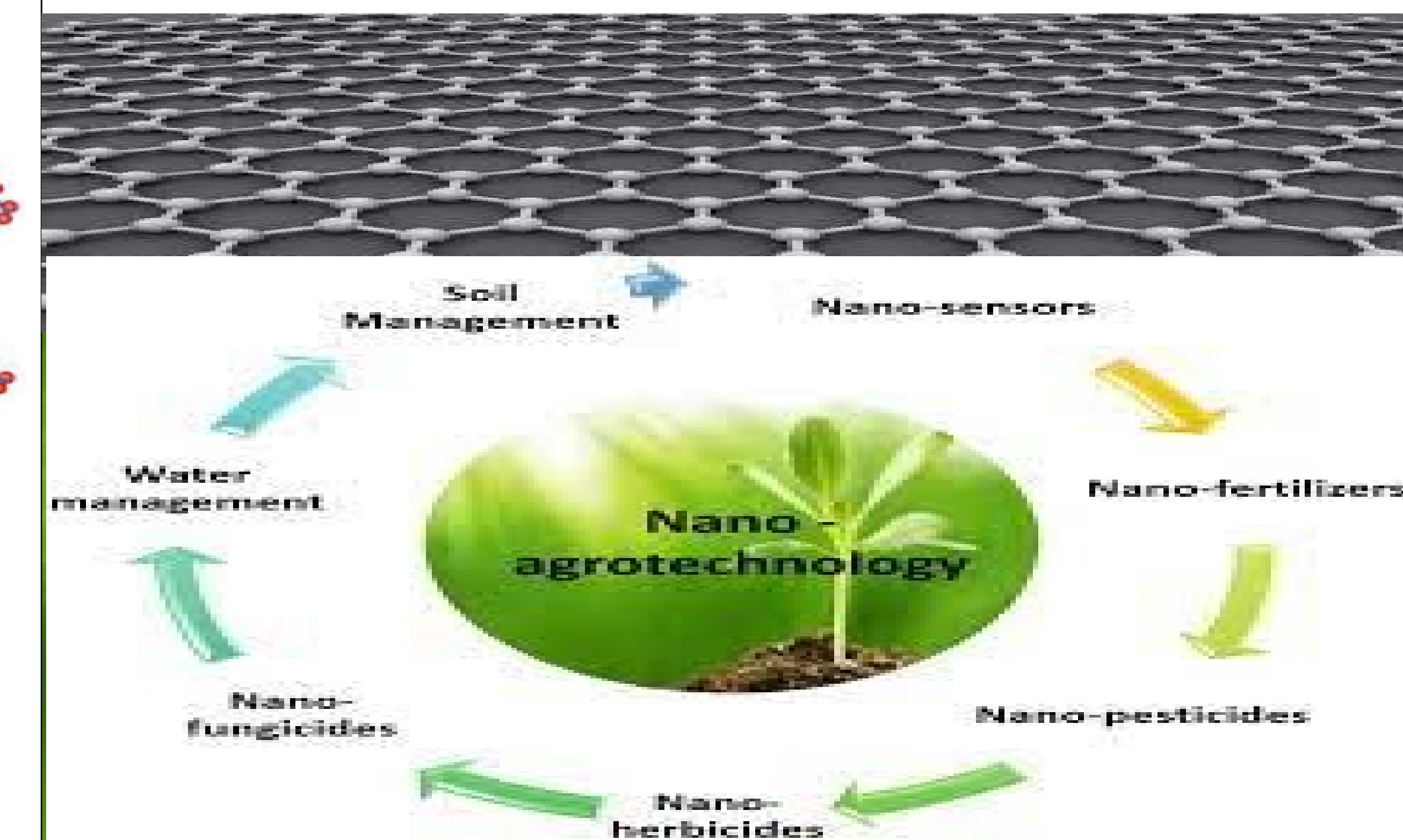
### DISCUSSION

NanoBiomedicine for Health Group 1

Benefits and limits of Graphene' research Group 2

Nanoscience for the Environment Group 3

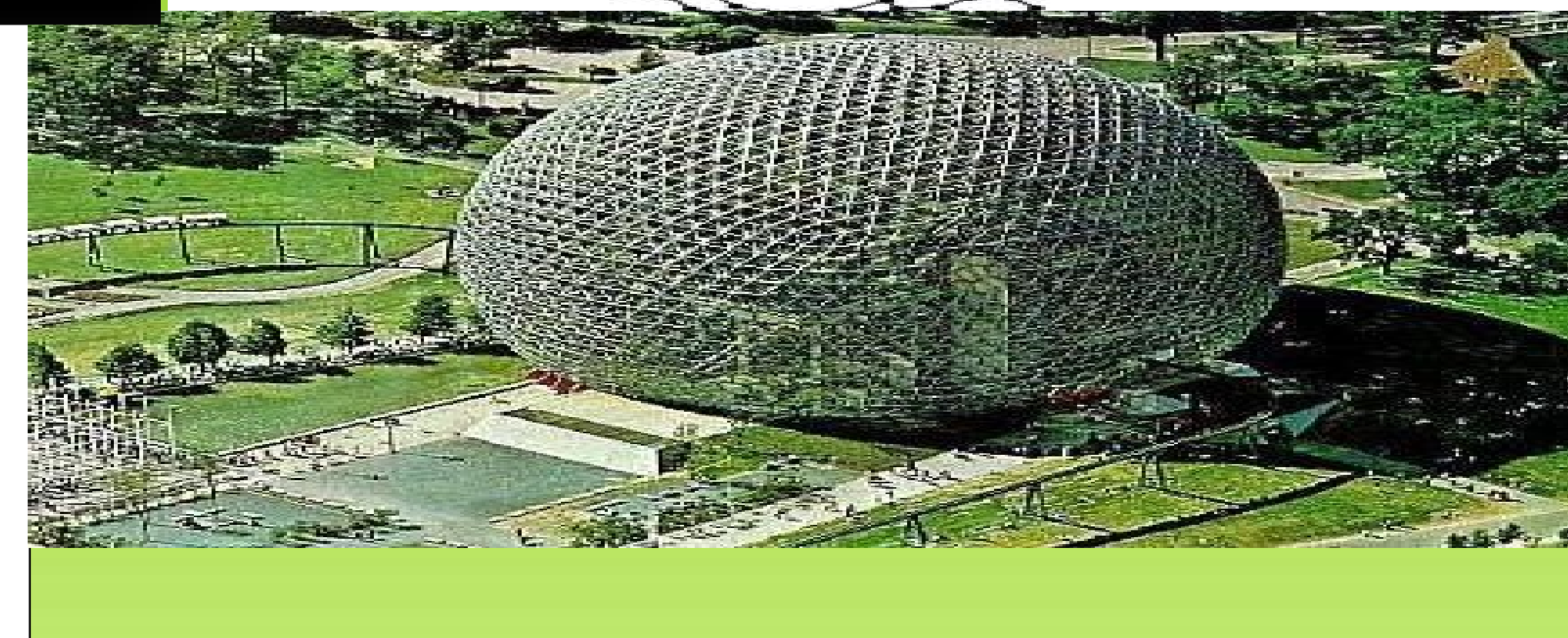
Nanoscience for Agriculture Group 4



### MATERIALS AND METHODS

Promotion of Nanotech Culture in High School for non passive acceptance of knowledge relating to the various technological achievements

- \*TEACHERS STEM Nanoscience ACTORS with IBSE methodologies
- \*GROUPS OF STUDENTS are guided to carry out nanoworks in some interdisciplinary Nanoscience areas in cooperative working
- \*REMOTE Learning STEM Nanoactivities – Nanoscience and Neuroscience
- \*Comparative analysis of scientific perplexities and positive results obtained with interconnection between disciplines



Biology, Chemistry, Physics for  
Nanoscience Life Long Skills  
in Teaching and Learning

REASONED

MULTIDISCIPLINARY

NANOLEARNING DIDACTIC



### CONCLUSION

In these STEM research education itineraries was possible to guide students with motivating strategies to work also analyzing biophysical and chemical innovative dates, relationship between different sciences, learning by doing also with interesting elements about history and evolution of nanoscience. For better learning Nanoscience was important to realize a modern STEM path with multidisciplinary and digital approaches

*CRITICAL THINKING FOR AWARENESS, DIFFUSE DEEP , NANOKNOWLEDGE FOR SOCIETY*

Didactic actions in research to create active digital nanolessons, to solidify learning and aware communication with cooperative STEM class group-work. Innovative elements of Nanotechnology with historical and interdisciplinary approaches integrating STEM enquire project methodologies and debate strategies.

### REFERENCES

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### Nanoscience Nanotechnology

What is it?

