

PHYSICS FROM TEACHING TO COACHING!

TESLA *HANDS – ON SCIENCE ACADEMY*

Emad El-Shafey

Glory American Schools, Mansoura, Egypt

HSCI2021 Conference

Full Paper Code No. 20210709162701



19-23 JULY 2021

LEONISA ARDIZZONE

"SCIENCE – NOT JUST FOR SCIENTISTS!"



TESLA HANDS-ON SCIENCE ACADEMY

From switching schools since the pandemic started to pursuing new opportunities, ■

I started – as a Senior Physics Teacher – to think of change and making shift to my career. ■

IT'S TIME FOR A CHANGE!

Now, It's Time for a Change! .. I intended to establish *an academy for Hands-On Science activities.*

I have a good experience in teaching kids and coaching Sc. teachers via *inquiry & project-based learning* as well.

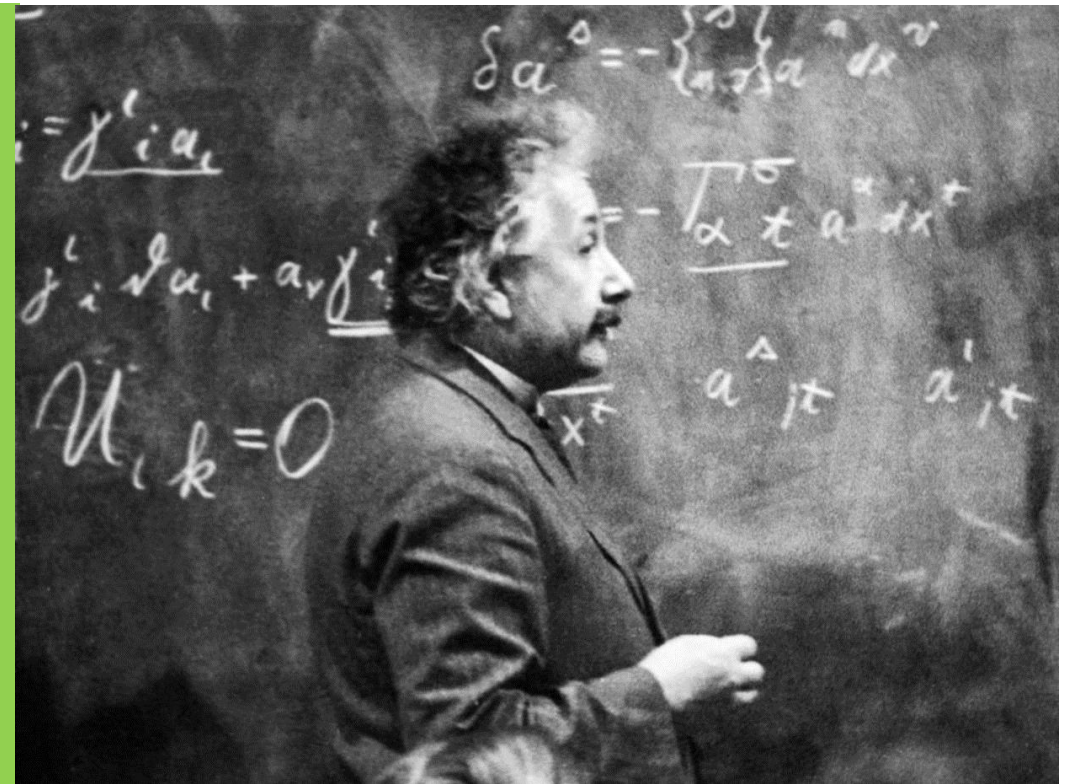


EINSTEIN'S RULE!

In teaching science for kids, I believe in ■

Einstein's Rule:

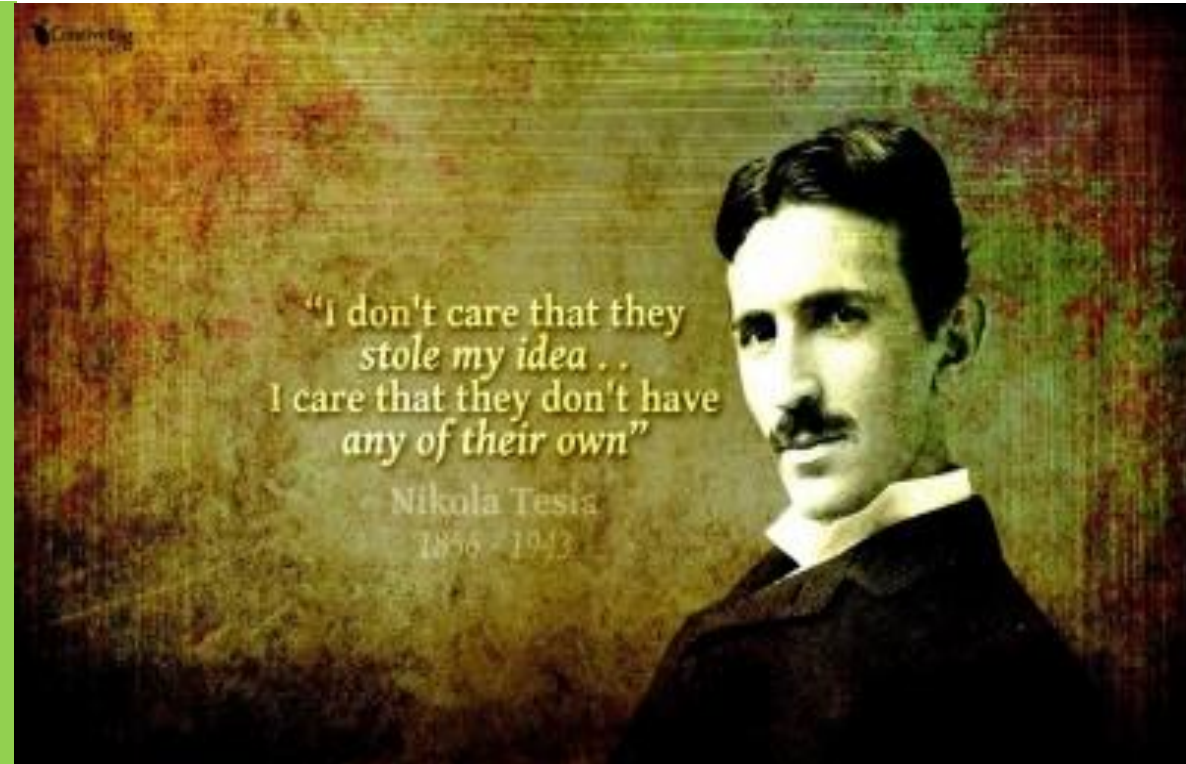
“If you can't explain **it** to a six years old, ■
you don't understand **it** yourself ” !



WHY TESLA ?

Tesla is considered to be one of the greatest physicists, engineers and inventors in history. The unit of magnetic flux density was named in his honor in 1960.

In 1916, he invented the first alternating current (AC) motor and developed AC generation and transmission technology.



TESLA WAS AN AMAZING SCIENTIST !

During celebration of Egypt's National Day in the embassy in Tokyo, I have met *Dr. Drago Stambuk* who told me that he is a physician and poet, and he is the Croatian ambassador in Tokyo.

When I told him that I am an Egyptian physicist and writer too, he asked me if I know *Nicola Tesla* !. I said: Sure! Thereupon, he added with prideful voice: he was a Croatian physicist and Inventor stayed in USA !.



WHY HANDS-ON SCIENCE ACADEMY?

In a bore and so passive educational environment, it is a fantastic opportunity for learners – boys & girls - to explore aspects of science that are always possible within the constraints of a normal school timetable.



VISION

Through the Hands-On Science Academy. ■

1- Pupils / Students will develop scientific attitude and use it in day to day life. ■

2- Pupils / Students enjoy science subject and related activities. ■

MISSION

Mission ■

To establish a Hands-On Science academy, ■
which not only help students in **co-curricular**
and extra-curricular activities,

but also to provide highly support in routine ■
teaching / learning process of science subjects
through its activities and inquiry & project-
based learning (PBL).



OBJECTIVES OF *TESLA HANDS-ON SCIENCE ACADEMY*

To encourage *curiosity* and to create a thematic Hands-on learning experience. ■

Further Objectives. ■

- Publishing and distributing Popular Hands-on Science Books, and related literature.
- Organizing field trips & story telling sessions about great scientists and their discoveries. ■
- Organizing community services, as *Mobile Science lab* - with no fee - for kids in distant regions.



ACTIVITIES ALIGNMENT

Tesla Hands-On Science activities align with the outcomes of National Science Curriculum in Egypt, and blend with both IGCSE and IB Primary Years Program – PYP as well.



LESSONS FROM THE PAST.

In fact, I used to teach science and physics lessons using **inquiry** teaching strategy ;

(guided, directed and full inquiry)

Kids were enjoying science topics and were curiously looking for science sessions. It was so funny periods as I was exploring natural phenomena and science concepts with kids.



THE SELECTED ACTIVITIES

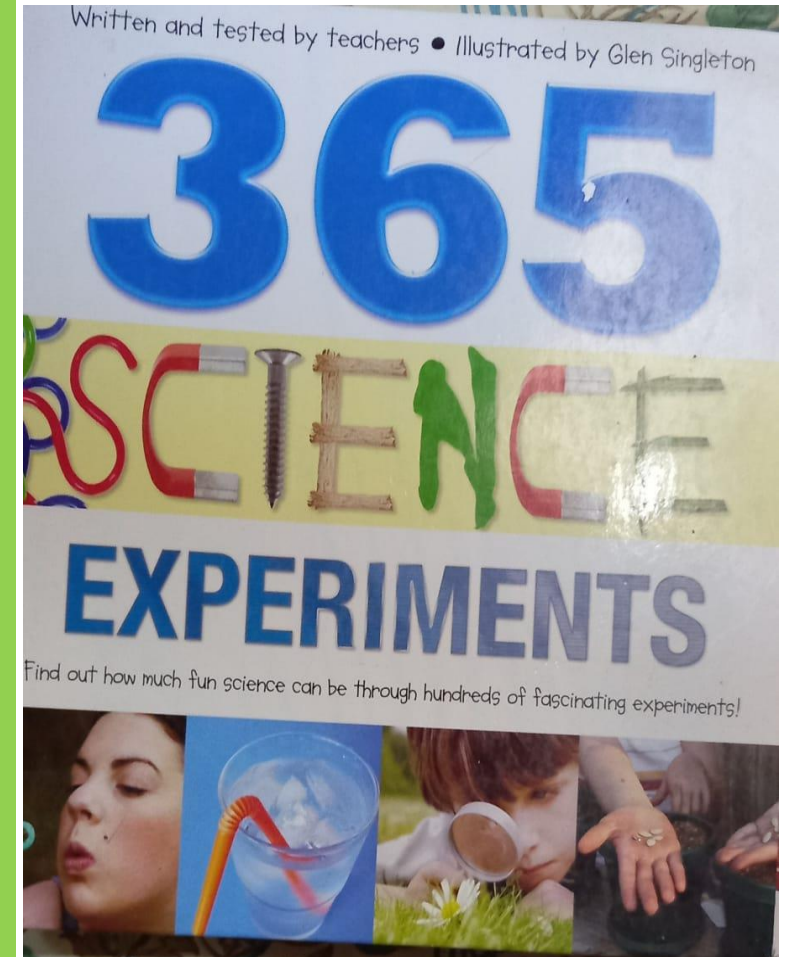
We selected the hands-on science activities from science books, edited in bilingual activity books / booklets (English- Arabic) to suit both national and international curricula as well. Children are classified to two levels;

level-1 for 5-8 years kids (*Junior Explorer*),

Level-2 for 9-15 years pupils (*Junior Scientist*).

The main course duration is three months, 3 sessions weekly, 120 min /session, includes 30 min for a lecture + 90 min for Hands-On Science activities / projects. The kids will be given related assignments to complete further tasks (*at home activity*).

After the child passes Level-1 or Level -2 and has got skills and has the ability to complete studying at lab zone, he/she will be asked to start an advanced course.



STRANDS OF SCIENCE

- **Strands of Science**
- - Life Science
- - Physical Science
- - Earth & Environmental Sciences
- - Energy & Mechanics
- - Space & Technology



SCIENCE PROJECT TOPICS

Physical Science (for instance)

- **Chemistry:** Which plants and vegetables make the best dye?
- **Electrochemistry:** How do the levels of salt and vinegar affect the amount of gas produced by electrolysis of water?
- **Magnetism:** How does temperature affect a magnet?
- **Solar Cells:** How does temperature affects solar cell energy production and storage?



LIFE SCIENCE

- **Life Science**
- **Bacteria:** Does reusing water bottles increase their bacterial content?
- **Bacteria:** How clean are the tops of soda cans, and what is the most effective way to clean them?
- **Ionizing Radiation:** How does ionizing radiation affect the germination and growth of plants?
- **Yeast:** How does the amount of carbon dioxide generated by yeast depend on temperature?



CONCLUSION

I **hope** to see teaching / learning science in all schools to be based on STEM (Science, Technology, Engineering & Mathematics). And to see children use not only "Science text book" but also "Science Kits" as well.

Surely, every student can acquire and effectively apply the **knowledge, attitudes, and skills** necessary to thrive in his/her studies, career, and will enjoy adult life.



REFERENCES

(1) Leonisa Ardizzone. Science – Not Just for Scientists!, Easy Explorations for Young Children, Lewisville - Texas, Gryphon House, 2014

(2) Glen Singleton. 365 Science Experiments, Heatherton-Australia: Hinkler Book, 2010

(3) Stephanie Lerner. Kids who Think Outside the Books, New York, Amacom, 2007

(4) <http://www.hsci.info>

(5) <https://hands-on-science.co.uk>

(6) <https://www.history.com/topics/inventions/nikola-tesla>

(7) <https://www.edutopia.org>



THANKS A LOT ..

Emad El-Shafey ■

Physicist & Writer

Egypt

emadelshafey@yahoo.com ■