

## 2. Liquid layers

Team Croatia

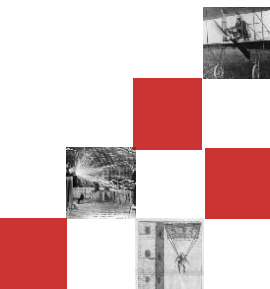
Opponent: Ema Novak



# Problem statement

Water and vegetable oil **do not mix** and form two **layers** in a beaker. It is possible to fill the beaker with many more layers of **immiscible fluids**. **How many layers** can you obtain? Investigate the motion of the interfaces if the beaker is **disturbed or shaken**.

problem solved: fully, partially, not solved



# The solution: Theory

## Pros:

mentioned and explained  
polarity

- mentioned polarity - explained
- measure of polarity - later could be used in experiment

## Cons:

- did not mention why do layers mix
- didn't mention when liquids are miscible
- did not mention density
- did not mention that "like dissolves in like"



# The solution:

## Experiment

### Pros:

- used a syringe - good control

### Cons:

- did not explain why did he use those liquids
- did not define what is “many”
- in the hypothesis states that he will obtain many layers
  - has only 5 and still confirms it
- did not say how he made sure that layers are/aren't mixed
- did not state if he had repetitions
- no quantitative hypotheses



# The solution:

## Results and conclusion

### Pros:

- did mention possible errors
- calculation of max numbers of layers

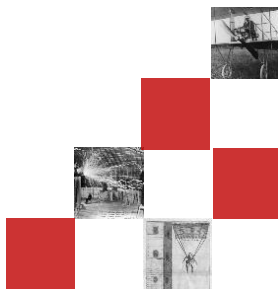
### Cons:

- no graphical results
- no quantitative results
- did not define partially stable
- did not define what is “light” vs “hard shake”
- did not mention temperature
  - explained in clarifying questions



# Points for discussion

- share same number of electrons - share? do they have at the same time
  - maximum number of layers
  - how did they pour new layers nice shaking - bubbles
- determination if liquids mixed - no quantitative results?
  - colours to determining mixing
  - color only mixes with polar liquids
  - analyzing colours
  - clear non polar layers
- If there are 87 possible layers why did you only have 5?
- why last hypothesis was wrong



# Thank you!

Team Croatia

Opponent: Ema Novak

