

Tools for Materials Science - Challenge n°2 - 40'

SEEING DIFFERENT FREQUENCIES

On the desk you have three welding goggles which have been adapted (so they are no more the original ones used for welding), one of them is marked with a red strip of tape.



CAUTION! Careful as you move around with the goggles on!
Take care **NOT TO** bump into anything!



CAUTION! When wearing the infrared goggles, **DON'T LOOK AT THE SUN!!!**

- Put the goggles on and look out of the window and around the room.

Q1. What do you think is happening? What is exactly that you are “seeing”?

- Now let's have some tests in order to either confirm or reject your hypothesis.

Test 1

The goggles NOT marked with the red strip have the visor made with two sheets: a red and a blue filter. The marked goggles instead of these two sheets use a piece of special acrylic plastic (commercial name: plexiglass) with the same result

Q2. What's their function? Maybe you can say now what is it that you DON'T see through the goggles...

Test 2

Q3. Look at the room lights: what's their colour? Now look at the candle flame with and without the goggles. So what do you think you are “seeing”?

Test 3

Q4. Watch the UV lamp (don't stare into it!): what do you see? Do you think the visor is filtering UV? Test it with the UV reacting beads! If the beads DO NOT turn from white to coloured, then UV radiation is NOT transmitted!

- Now connect the webcam on the desk to the PC and start Microsoft LifeCam program. The software allows you to take both videos and pictures. This camera has been adapted: the built in IR filter has been substituted with 6 sheets of blue filter plus 6 sheets of red filter (something similar to the welding goggles). However there's a difference:

Q5. How do you “see” things now? (*suggestions: watch the welding scalpel when you have just turned it off. **BE CAREFUL NOT TO TOUCH IT! IT'S HOT!!!***) Is there still a mix of different reddish hues? Do you think the adapted webcam lets you see exactly the same frequencies as the goggles?

- Go outside and look around at objects through both goggles and LifeCam: take significant pictures [or videos] and post them in a cartel on the PC with the name of your group.

Q6. How do you “see” leafy trees and bushes? How do you see the sky? And clouds? Why?

Q7. What does the different intensity of “white” in the images stand for? What does dark mean? And a very bright light?



OUTPUT WANTED:

Answer to Q1, ..., Q7 + at least 3 pictures [or videos] (choose the most meaningful and the most beautiful ones)

Answer sheet

GROUP N° _____

Ch.2 --- SEEING DIFFERENT FREQUENCIES

Q1

Q2

Q3

Q4

Q5

Q6

Q7

PICTURES [Copied on the PC connected to the Camera]

- **Picture1 description:**

- **Picture2 description:**

- **Picture3 description:**

- **[Additional Pictures description:]**



Co-funded by the
Erasmus+ Programme
of the European Union

This project has received funding from the European Union's Erasmus + Programme for Education under KA2 grant 2014-1-IT02-KA201-003604. The European Commission support for the production of these didactical materials does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



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