Tools for Materials Science -Challenge n°1 - 40'

TESTING OLIVE OIL WITH LIGHT

✋ **CAUTION! Laser beam.** Do NOT shine into eyes! Do NOT stare at the bright spot or reflections! CLOSE the box BEFORE turning the laser on!

You want to bring back from Italy good olive oil and now you are in the supermarket in front of a full rack of bottles. Are you sure that what you get is exactly what you are going to pay for? Is it REALLY good olive oil ?

On the desk there are three test tubes filled with Extra-virgin Olive oil (n°1), Common Olive Oil (n°2), Mixed Seeds Oil (n°3). Can you distinguish between the three?

Most probably the answer is positive and based on colour. However it may not be always so simple. Actually many frauds have been reported in the Extra-virgin olive oil market. Therefore we want to test the oil samples with light using first a red and then a green laser.

1. Put the test tubes in the rack inside the box (row next to the side window) and insert the laser.
2. Close the box and turn the laser on.
3. Check and adjust the laser beam alignment from the side window.

What's the colour of the beam in the three test tubes? Write down your observations:

	Extra-virgin Olive Oil	Olive Oil	Mixed Seeds Olive Oil
Red laser			

4. Repeat with the green laser

	Extra-virgin Olive Oil	Olive Oil	Mixed Seeds Olive Oil
Green laser			

Q1. What's really happening when you use the green laser and why it's not happening with the red one?

Q2. Now take the additional samples numbered 4, 5, 6 and test them with the green laser. One of the samples is genuine extra-virgin olive oil, the other two have been adulterated mixing extra-virgin with a different kind of oil. Find the genuine one and order the remaining samples from the least to the most adulterated. [*NOTE: the percentage of adulteration are written on the sheet on the table; obviously NOT in the correct order.*]

Extra-virgin	Less adulterated	Most adulterated
Sample N°	Sample N°	Sample N°

Q3. Finally using the previous observations try to "guess" the percentage of not extra-virgin oil added to the last sample (n° 7).

Q4. Write down a specific strategy to deduce the correct answer to Q3. (No simple guessing!)

👉 **OUTPUT WANTED:**   **Answer to Q1, Q2, Q3, Q4 + at least 3 pictures (choose the most meaningful and most beautiful ones)**

Answer sheet   GROUP N°_____

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Q1

Q2

Extra-virgin	Less adulterated	Most adulterated
Sample N°	Sample N°	Sample N°

Q3

Q4

PICTURES   [*Sent by Whatsapp to your group – See general instruction to share pictures or files*]

- **Picture1 description:**

- **Picture2 description:**

- **Picture3 description:**