Tools for Materials Science - Challenge n°5 - 40'

BOUNCING BALLS

On the desk you have two black rubber balls with H and S painted in white to distinguish them.
Q1. Observe the balls: do you notice any difference?

Q2. Drop them on the desk (be ready to catch them!). Do you notice any difference now? Can you offer any explanation for what you saw?

Q3. Use the weighing scale on the desk and write down the weight of each ball. Is the explanation you gave in Q2 still a good one?

Q4. Put them in the water. Do you notice any difference? Is the density of the two balls different?

Q5. Do you think the bouncing behaviour of the two balls is affected by temperature? If yes, how? Do you think that if you increase the temperature will the balls bounce less or more? They will both bounce less? Or they will both bounce more? Or what else? And what if you decrease the temperature? Write down your prediction with an explanation based on the expected behaviour of the two balls depending on their temperature.

Q6. In order to test your previous prediction, first put the two balls in very hot water for a few minutes and then drop them. What about the bouncing behaviour of the two balls now?
Now ask the teacher for a new couple of H and S which have been stored in the freezer for some time and drop them! What happens now? Fill in the following table with your observations. (*focus on the following fact: is there any bouncing or not? Is the bouncing higher/lower/the same compared to room temperature? Are the bounces of the two balls (if any) the same? If not which one is higher?*)

Bouncing Behaviour	Room temp.		Heated		Cooled	
	Bounce (Y/N)?	Which is higher?	Bounce (Y/N)? Compare to Room Temp.	Which is higher?	Bounce (Y/N)? Compare to Room Temp.	Which is higher?
Ball H						
Ball S						

Q7. Can you give an overall explanation of what you observed ?

Q8. On the desk you also have some Didò (this is a soft modelling paste for kids) and some other "magic stuff": both materials are plastic ones, you can easily model them: try it! Can you guess what their bouncing behaviour is? Explain your answer.

Q9. Now model them with your hands into two balls and drop them: Both Didò and "magic stuff" are ***plastic***, but only one of them is ***elastic***. Which one? Explain your answer.

Q10. Discuss with your team possible applications of "magic stuff" and write down at least one innovative idea.

☞ **OUTPUT WANTED: answers to Q1 … Q10**

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Answer sheet **GROUP N°_____**

Ch.5 --- BOUNCING BALLS

Q1

Q2

Q3

Q4

Q5

Q6

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	Bounce (Y/N)?	Which is higher?	Bounce (Y/N)? Compare to Room Temp.	Which is higher?	Bounce (Y/N)? Compare to Room Temp.	Which is higher?
Ball H						
Ball S						

Q7

Q8

Q9

Q10

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