Figure 4. Study of the Black Box, using the bulb as an instrument:

0-60 min: Students work in groups, handle materials, discuss, keep notes			**60-90 min: Discussion in the plenary, conducted by the instructor**		
Points connected on terminals 1 & 2	**Observations**	**Desired/ideal inferences from students**	**Questions to unveil students' inferences from observations**	**Key points resulting from plenary discussion on students' inferences**	**NOSK aspects brought out from key points**
A-B	Illuminates intensely	• Points A-B, B-C, A-C (through B), E-I, I-H are conductively connected. Due to the last two connections, it is deduced that E-H are also connected, but the bulb is not illuminating due to high resistance. • It is unknown whether points without indication are not connected, or the bulb is not illuminating due to high resistance between them. • We assume that there is a relation between points' distance and illumination brightness as well as the intervening resistance.	• Are E-H conductively connected? • Are E-G conductively connected? • How can we be certain whether E and G are connected or not? • What is the reason of alteration in bulb's illumination brightness?	• Concern on the existence of more possible connections, not observed with the bulb (useful for next steps) • From the same observation (bulb not illuminating) arise different inferences (connected/not connected/not sure). • The instrument is not able to provide all information, a more suitable one is essential • Some students might relate distance to brightness.	• Same observations might result to different inferences (A1) • "Evolution in technology" (A4) and budget for its supply (A5) is needed • Creative though – if done – (A2), is useful for next steps
B-C	Illuminates intensely				
A-C	Illuminates little				
E-I	Illuminates slightly				
E-H	No indication				
E-G	No indication				
I-H	Illuminates intensely				
I-G	No indication				
G-H	No indication				