

Explorer activity - O3: Parabola and parabolic motion

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What curves are represented in the following images?

Take a few minutes to look at the images shown on slide 3 to slide 9. After familiarizing with the images, analyse this discussion carried out by students to answer the leading question:

«Gianni argues that the trajectory of the second image certainly represents a parabola while we cannot sav anything for sure about the others, but Francesca is not convinced: she says that we do not have enough information to establish that the second is a parabola, as well as in the first one, while the others are surely parabolas. Amina intervenes by saying that, without knowing what context the images are placed in, we can never conclude; in particular in the third and in the last cases."





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Sottotitolo della slide Helvetica Light Ξ







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What curve is represented in the following images?

Do you agree with one of the three? Which aspects of each position (of Gianni, Francesca, Amina) can be interesting and which are questionable? How would you enter the debate and how would you make it evolve to take a position?

Discuss with your group, make comments and observations about the students' debate and take your position about the guiding question.

Post your comments and your personal answers in the Jamboard of your Group.

https://jamboard.google.com/d/1smkOwamEtc_c5rKZvT54MVzH63C5w9VG_Dztz5CtT9Q/edit?usp=sharing



Starting from the images that you are analysing, now you are guided to reflect on the following aspects:

- 1. Which are the main questions/topics/themes that you discussed in the analysis of the images?
- 2. Which disciplines can you detect that have contributed to your discussion?
- 3. In your group discussion, did you identify elements of the epistemic core of the disciplines, boundaries or resemblances between disciplines?
- 4. Have these disciplines interacted? Did you identify learning mechanisms?

Post your answers, screenshots/picture of your working sheets and notes of your reasoning in the Jamboard at this link:

https://jamboard.google.com/d/1HkaKVmIARAri15MYCvxxmTwJkYwzEzzRNYi1p8RbNDA/edit?usp=sharing





The "disciplinary issue"

School science, through habits, textbooks and school practices, has consolidated two DIFFERENT disciplinary NARRATIVES.

These narratives:

- leave up to the teacher the role to exploit the inner epistemic cores of physics and mathematics as disciplines;

- short circuit the historical and cultural relevance of these themes. Indeed, the discovery of parabolic motion represents a crucial step in the historical co-evolution of physics and mathematics and in the establishment of physics as discipline (Renn et al., 2011)





IDENTITIES 14th ESERA Conference (2021)

Parabola in the history of physics





IDENTITIES 14th ESERA Conference (2021)

Parabola in the history of mathematics









