

Antimatter

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Curriculum And Classroom Connections

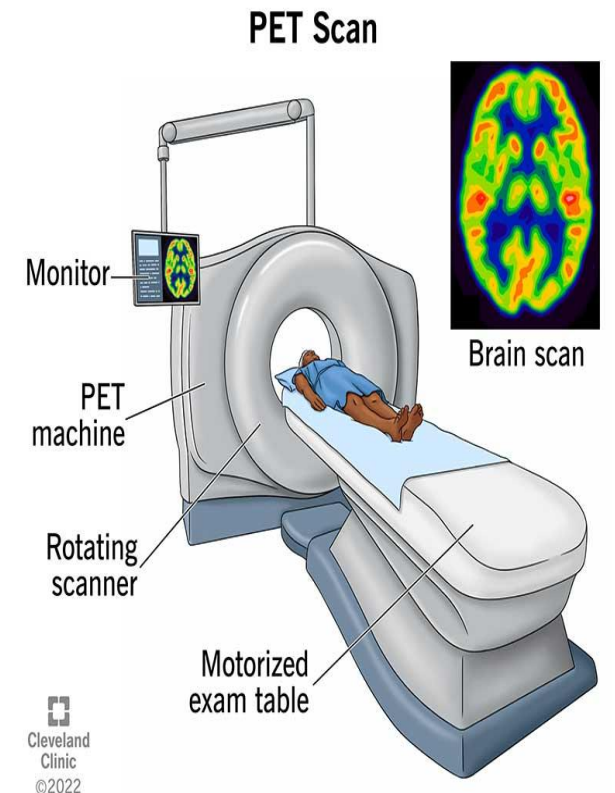
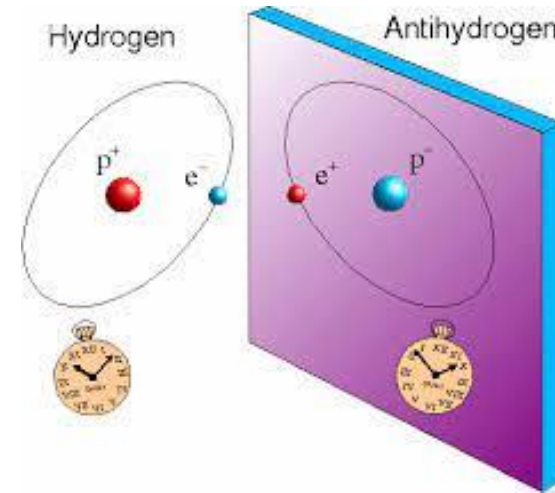
The only curriculum where antimatter is included from our group is in Turkey's Grade 12 Physics Curriculum. Turkish students are asked to explain the concepts of matter and antimatter. No formulas are utilized.

Curriculum And Classroom Connections

Despite this, due to the importance of our topic in our understanding of the universe and the Big Bang, we still want to include it in our lessons and discuss it whenever possible. This way, students may become interested in further researching it.

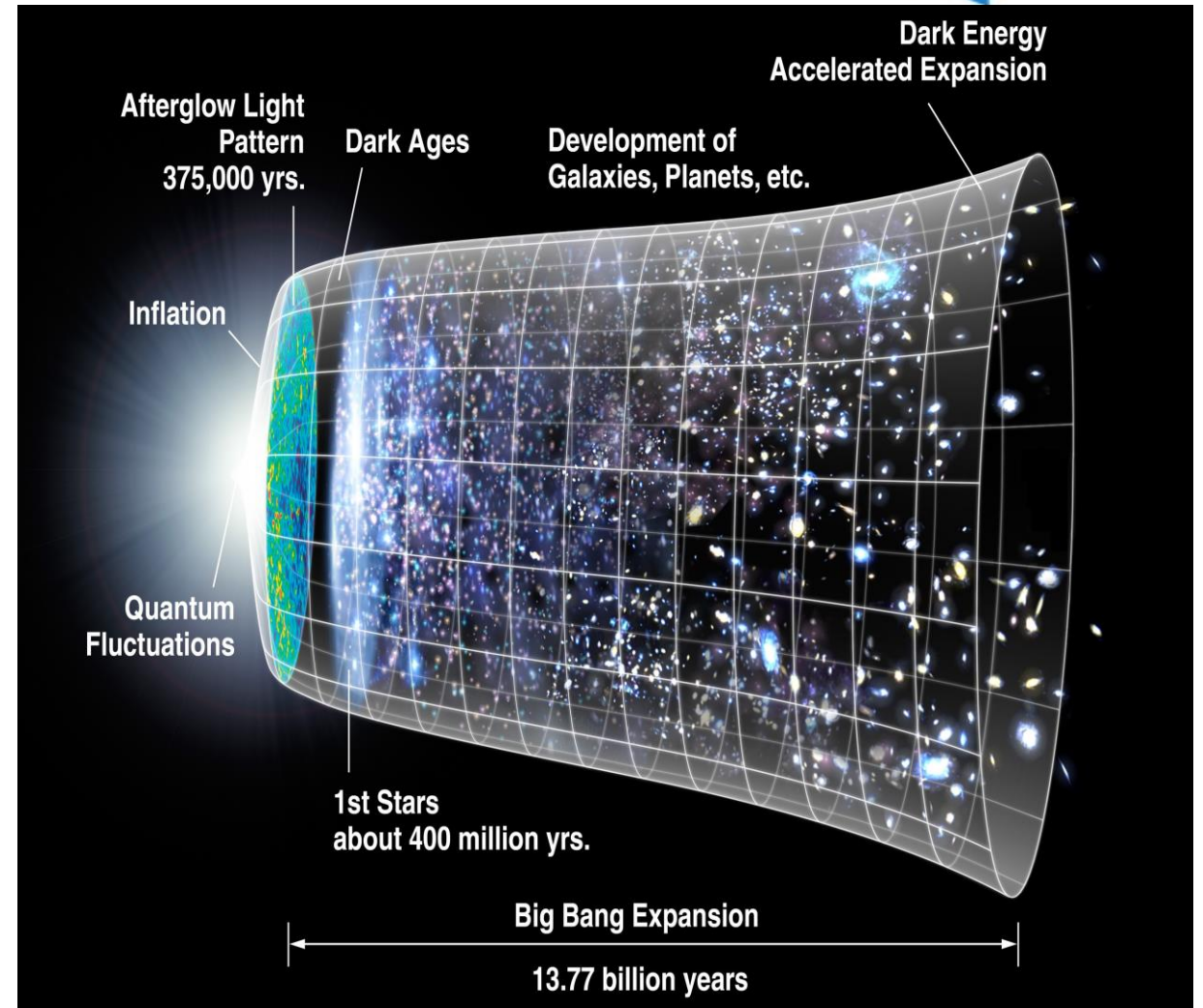
Key Ideas

- Identify particles classified as antiparticles
- Discuss current antimatter (antihydrogen)
- Highlight practical applications of antiparticles/antimatter.



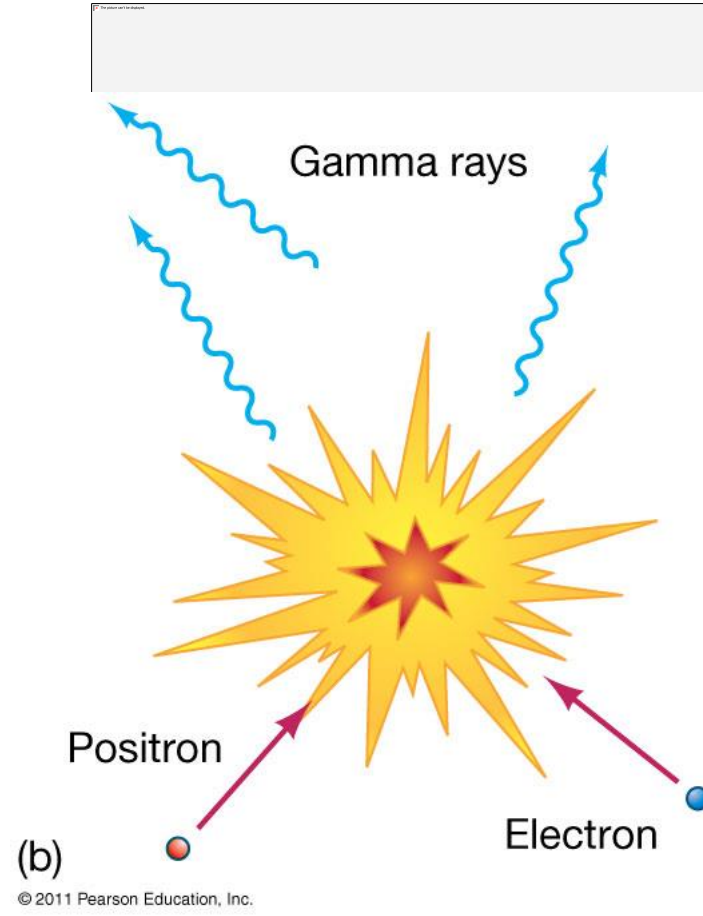
Key Ideas

- Describe the problem with making and storing antiparticles/antimatter (antimatter trap)
- Discuss the benefits of continuing research on antiparticles and antimatter.



Potential Students' Conceptions And Challenges

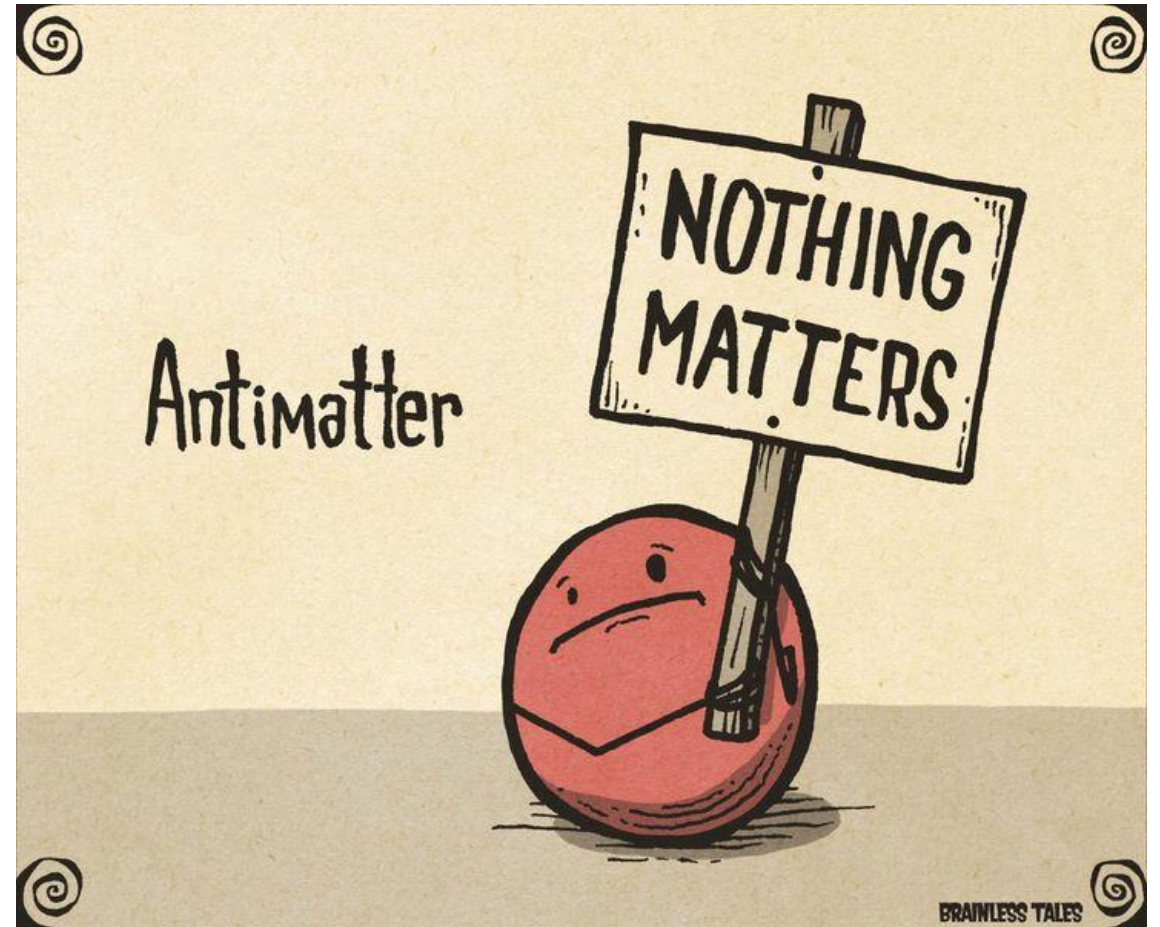
- Particle
- Antiparticle



- Annihilation
- Creation from energy

Potential Students' Conceptions and Challenges

- They may confuse dark matter and antimatter.
- Misconceptions from movies and books.



Best Practices

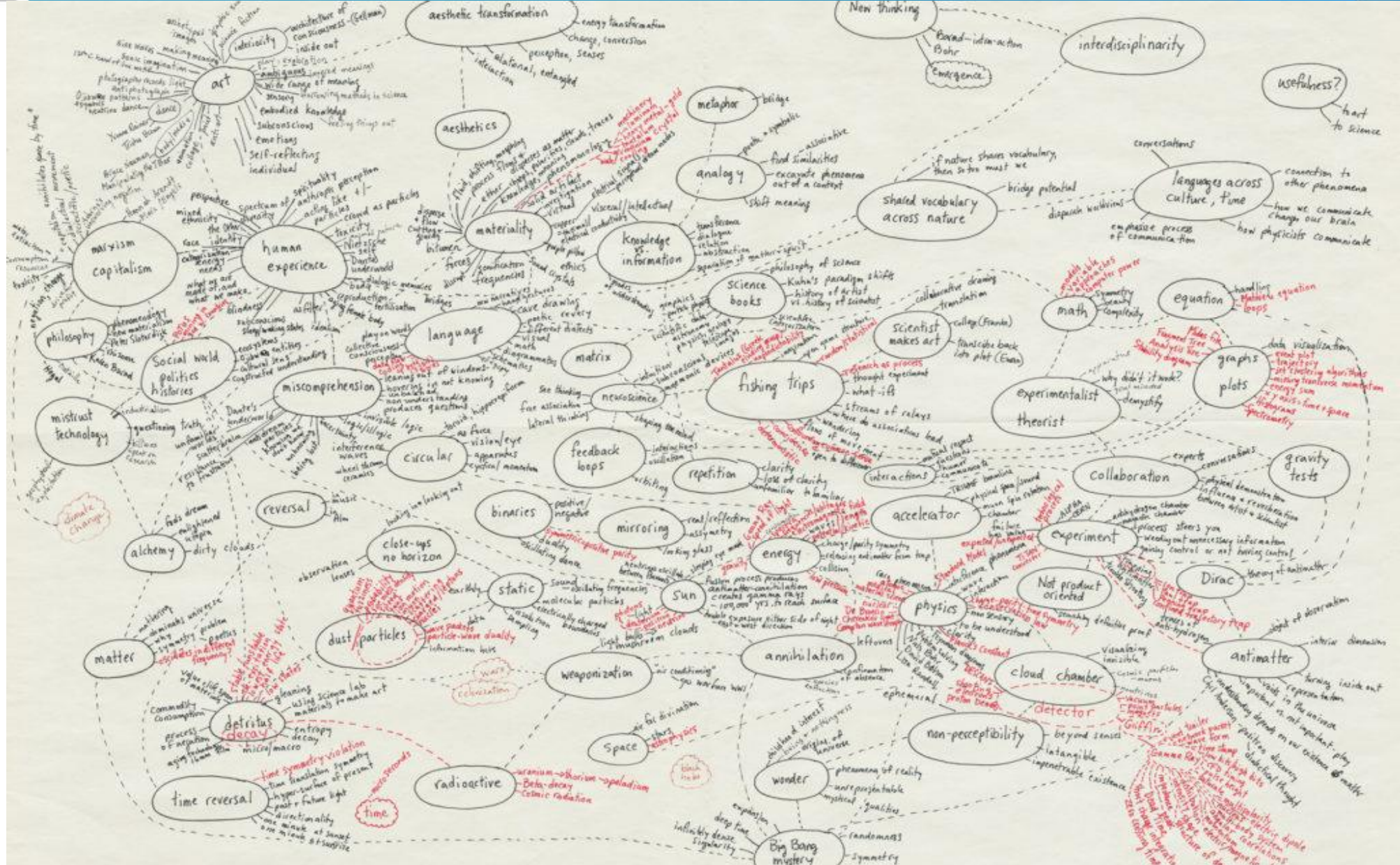
In our classes we should take every opportunity to include particle physics and antimatter examples.

Some areas where this could occur are in:

- Gravity/freefall
- Conservation laws - radioactive decay
- Biology class - cross curricular connections



Concept Map- This is what we expect...



- 
- YEAH RIGHT!!!
 - Our apologies to Milena!!

Antimatter Examples



Lightning



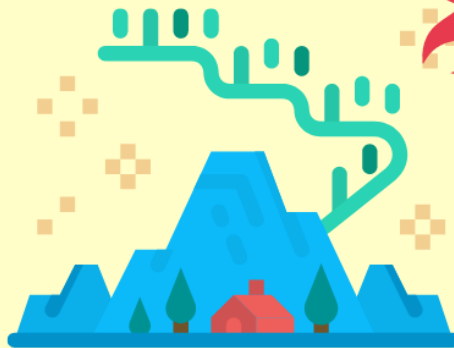
Cosmic Rays



**Potassium Decay
in Bananas**



Black Hole



Aurora



**Solar
Flare**



PET Scan

Helpful Material And Resources

- <https://sciencenotes.org/what-is-matter-definition-and-examples/>
- <https://sciencenotes.org/what-is-matter-definition-and-examples/>
- <https://cds.cern.ch/record/2865978><http://cds.cern.ch/record/1561098>
- <https://www.britannica.com/science/antimatter>
- https://www.symmetrymagazine.org/article/april-2015/ten-things-you-might-not-know-about-antimatter?language_content_entity=und
- https://science.nasa.gov/science-news/science-at-nasa/2011/11jan_antimatter
- <http://cern.ch/PER> - go look for items

Thank you for your attention!!!