



Physical Natural Sciences

Take a look around you. Everything that you can see has interacted with the light entering your eyes – that’s what allows you to observe it. However nearly 85% of matter in the Universe doesn’t behave in this way. It can be neither seen nor felt. Whilst this mysterious “Dark Matter” vastly dominates over the visible Universe, it has never actually been detected. In fact, we still do not even know what it is. Deciphering the nature and properties of this elusive substance is one of the greatest challenges in modern day science.

In this task you will investigate the “dark matter problem” and discover how scientists around the world are searching for something that we cannot see.

Question

How can we hunt for Dark Matter?

Further Guidance

Your task is to investigate the question above and to present your findings in a way that you see fit (see below).

In your response you should consider the following:

- What evidence do we have that Dark Matter exists? What properties of Dark Matter can we deduce from this evidence?
- What hypotheses i.e. “candidates” do we have for what Dark Matter might be? (e.g. WIMPs, axions)
- What are the ways that we can test these hypotheses (i.e. search for Dark Matter)? For example, WIMPs can be searched for with direct detection, indirect detection, or at particle colliders.

You may wish to discuss the current status of the search for Dark Matter, and whether you think it will be detected in the future.

Your Response

You can choose to present your findings in whatever form that you would like. You could write an essay, produce a poster, a PowerPoint presentation, or even create a video or podcast.

The most important thing is to demonstrate an understanding of the scientific information that you have uncovered and present it in a clear and accurate way!

Useful Links and Resources

You may wish to use some of the following links to help get started with your investigations:

Resource	Description
https://www.scientificamerican.com/article/what-is-dark-matter1/	General overviews of the topic – a good place to start!
https://www.sciencefocus.com/space/what-is-dark-matter	
https://earthsky.org/astronomy-essentials/definition-what-is-dark-matter/	

<p>Any of the articles at: https://www.symmetrymagazine.org/collection/dark-matter-101</p>	<p>You may want to look at the following articles in particular:</p> <ul style="list-style-type: none"> • Miraculous WIMPs • What could Dark Matter be? • The other Dark Matter candidate • What Dark Matter is (probably) not • What we know about Dark Matter • Seeing Dark Matter without seeing • The search for Dark Matter at the LHC
<p>https://www.space.com/if-dark-matter-invisible-how-do-we-know-it-exists</p>	<p>Evidence for Dark Matter</p>