

What are the computational and data sciences?

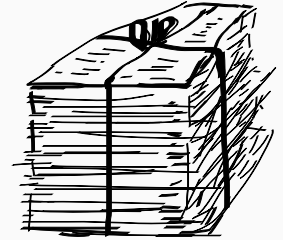
Science



What is science?

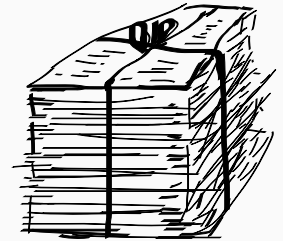
What is science?

(1) A set of facts



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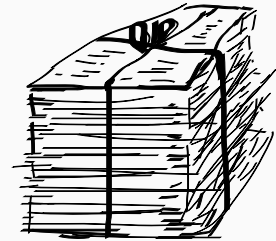


(2) Something that professional scientists do



What is science?

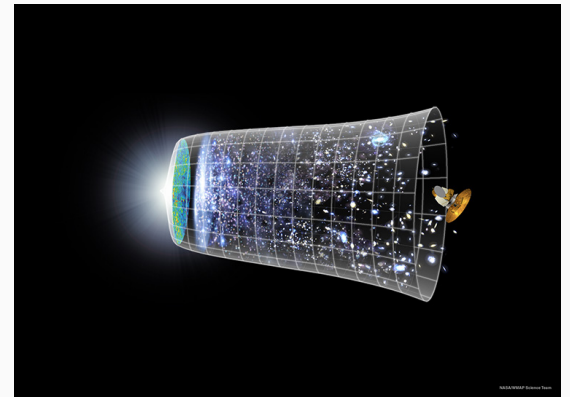
(1) A set of facts



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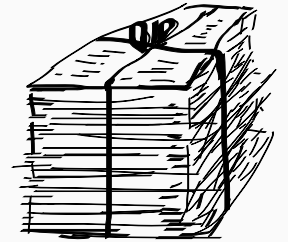


(3) The underlying Truth about the Universe



What is science?

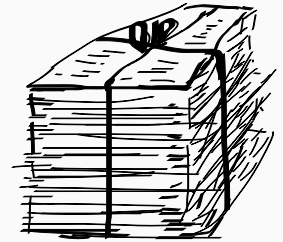
A set of facts



What is science?

A set of facts

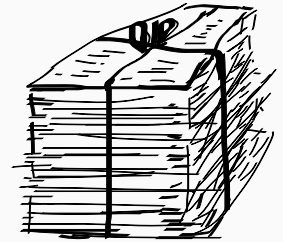
- We are constantly making new discoveries and collecting new data



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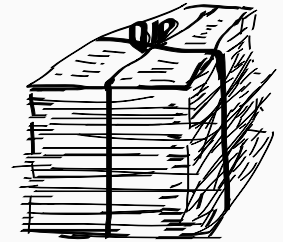
A set of facts

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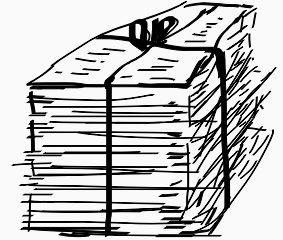
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- We are constantly making new discoveries and collecting new data
- Technology and experiments are changing
- Old Theories are replaced by new Theories

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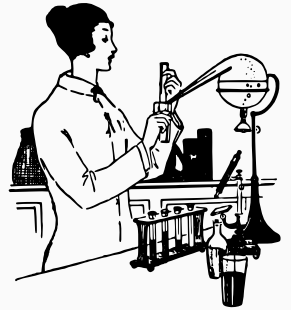
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- Scientific "Facts"

What is science?

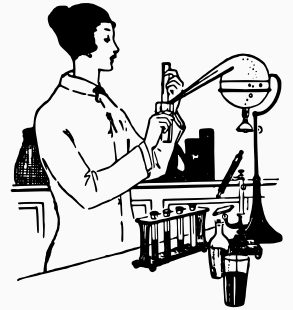
Something that professional scientists do



What is science?

Something that professional scientists do

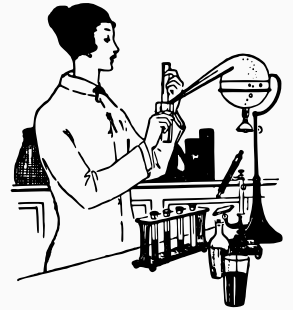
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What is science?

Something that professional scientists do

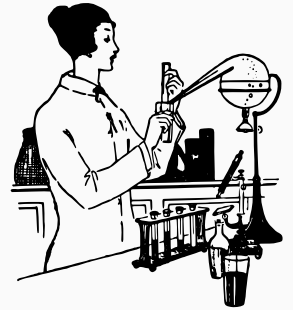
- What is a scientist?
- Do you need a PhD?



What is science?

Something that professional scientists do

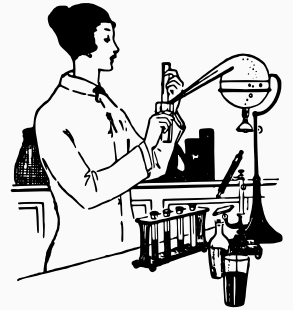
- What is a scientist?
- Do you need a PhD?
- There are countless examples of amateur scientists playing a role in discovery



What is science?

Something that professional scientists do

- What is a scientist?
- Do you need a PhD?
- There are countless examples of amateur scientists playing a role in discovery
- Being scientific **does not** require becoming a member of a professional society



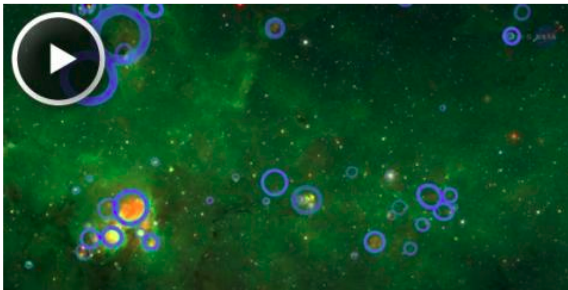
What is science?

Published: Apr 9, 2015

Citizen Scientists Discover Yellow "Space Balls"

April 9, 2015: Citizen scientists scanning images from NASA's Spitzer Space Telescope, an orbiting infra-red observatory, recently stumbled upon a new class of curiosities that had gone largely unrecognized before: yellow balls.

"The volunteers started chatting about the yellow balls they kept seeing in the images of our galaxy, and this brought the features to our attention," said Grace Wolf-Chase of the Adler Planetarium in Chicago.



A new ScienceCast video examines "yellow balls" and their role in star formation. [Play it](#)

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Molina, Rachel. "15 Citizen Scientists Discover Yellow 'Space Balls.'" *NASA Science*, 9 Apr. 2015, https://science.nasa.gov/science-news/science-at-nasa/2015/09apr_yellowballs.

What is science?



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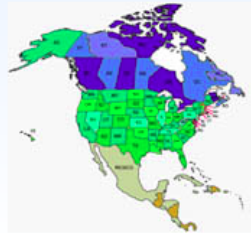
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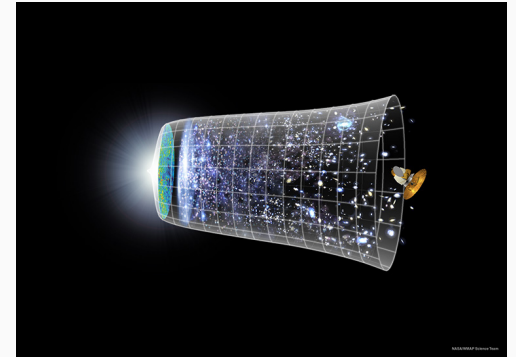
- Montana Golden Eagle Migration Tour with Steve Hoffman. October 3-11, 2018
[Reserve your Spot](#)
- Join us for HMANA's conference, [October 12-14, 2018: Soaring Toward the Future: New Challenges in Raptor Migration](#)



Crested Caracara, photo by Linda Rockwell

What is science?

The underlying Truth about the Universe

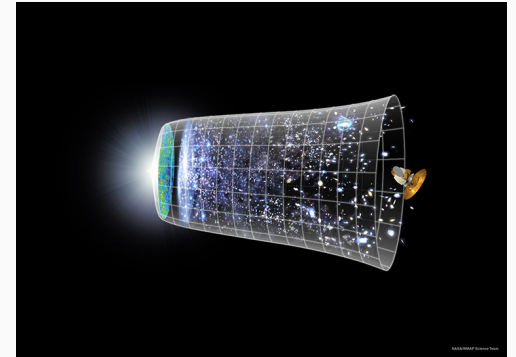


Credit: NASA / WMAP Science Team

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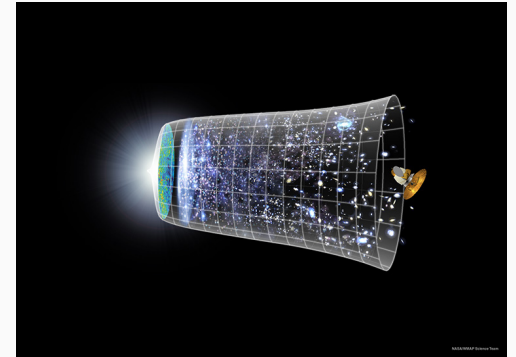
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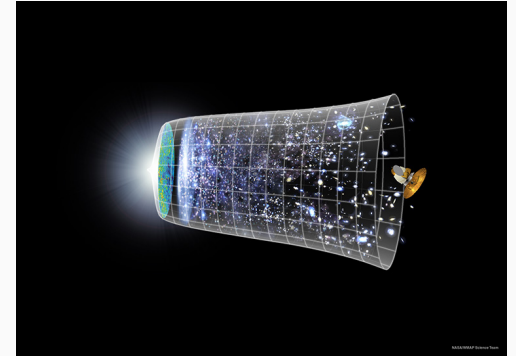
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What is science?

The underlying Truth about the Universe

- Science is a process, not dogma
- Science experiments are able to falsify hypotheses, but they cannot prove that a claim is the *Truth*
- The predictive tools of science, models and simulations, are used to *represent* the world to the best of our current knowledge



What is science?

What is science?

- **Science**

a study that uses the scientific method

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- **Science**

a study that uses the scientific method

- **Natural science**

The branch of science concerned with the description, prediction, and understanding of natural phenomena, based on empirical evidence from observation and experimentation. Mechanisms such as peer review and repeatability of findings are used to try to ensure the validity of scientific advances.

— Wikipedia

The scientific method

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2. Hypothesis

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- A hypothesis should be testable by anyone, regardless of time, place, culture, etc. Anyone can double check an experiment!

Credits

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Acknowledgments

Content adapted from the [Lecture 1: The Computational and Data Sciences slides](#) by John Wallin.