

What are the computational and data sciences?

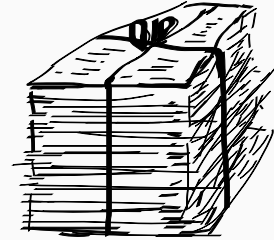
Science



What is science?

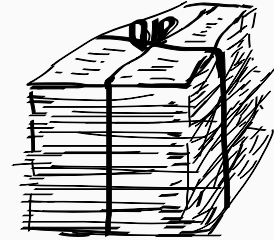
What is science?

(1) A set of facts



What is science?

(1) A set of facts

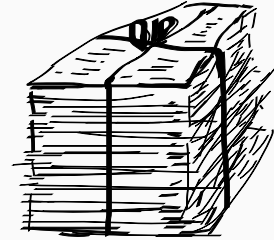


(2) Something that professional scientists do



What is science?

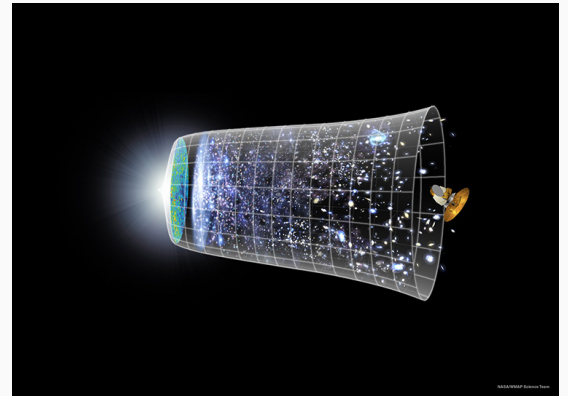
(1) A set of facts



(2) Something that professional scientists do

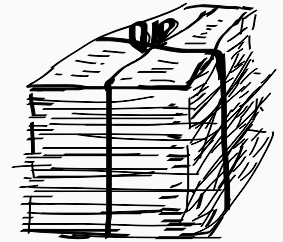


(3) The underlying Truth about the Universe



What is science?

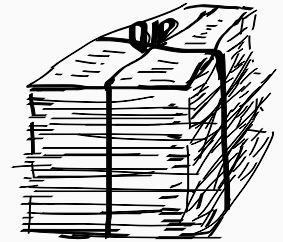
A set of facts



What is science?

A set of facts

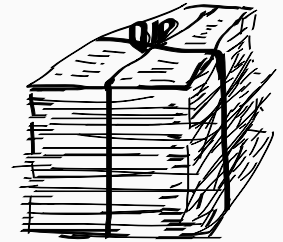
- We are constantly making new discoveries and collecting new data



What is science?

A set of facts

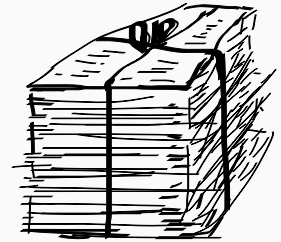
- We are constantly making new discoveries and collecting new data
- Technology and experiments are changing



What is science?

A set of facts

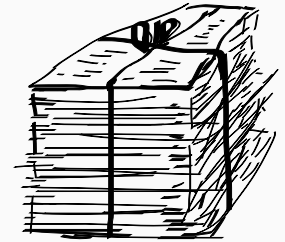
- We are constantly making new discoveries and collecting new data
- Technology and experiments are changing
- Old Theories are replaced by new Theories



What is science?

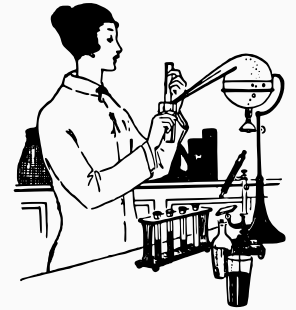
A set of facts

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



What is science?

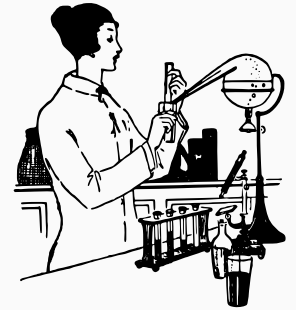
Something that professional scientists do



What is science?

Something that professional scientists do

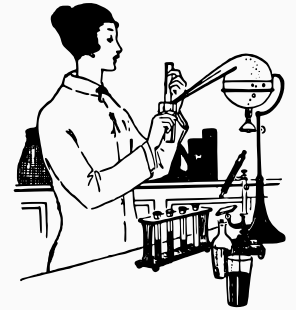
- What is a scientist?



What is science?

Something that professional scientists do

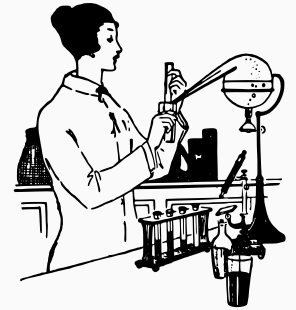
- What is a scientist?
- Do you need a PhD?



What is science?

Something that professional scientists do

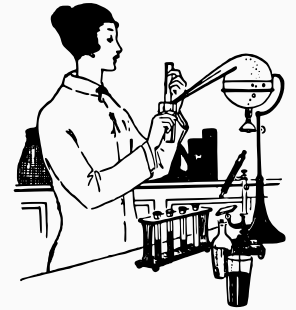
- What is a scientist?
- Do you need a PhD?
- There are countless examples of amateur scientists playing a role in discovery



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



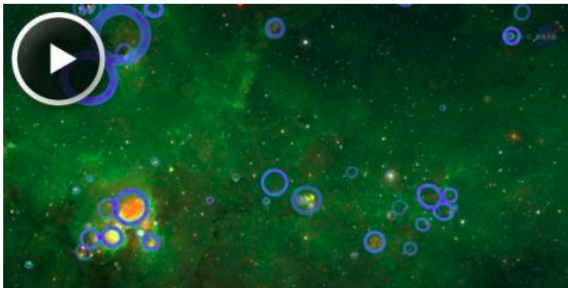
What is science?

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](#)

Top Stories

- 1** [NASA Pays Tribute to Four Great Minds in Science](#)
- 2** [Gravity Assist Podcast, Venus with David Grinspoon](#)
- 3** [The Hunt for Asteroids](#)
- 4** [National Public Health Week - Predicting Malaria Outbreaks](#)
- 5** [Visualization of the 2017 Hurricane Season](#)

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?



HawkCount

[Sponsor this page]

[Main]

[Login](#)

[Find a Hawkwatch](#)

Data Summaries

[Monthly](#) | [Daily](#)

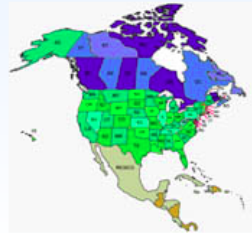
[Account Request](#)

[New Site Request](#)

[Sponsors/Donors](#)

Welcome to HawkCount:

Count data and site profiles for over 300 North American Hawkwatch sites



Find hawkwatch sites by country, state or province;
view hawkwatch profiles, maps, data and more.

[Get Started...](#)



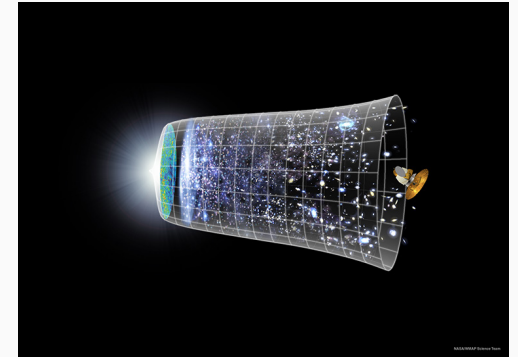
- Montana Golden Eagle Migration Tour with Steve Hoffman. October 3-11, 2018
[Reserve your Spot](#)
- Join us for HMANA's conference, October 12-14, 2018: Soaring Toward the Future: New Challenges in Raptor Migration



Crested Caracara, photo by Linda Rockwell

What is science?

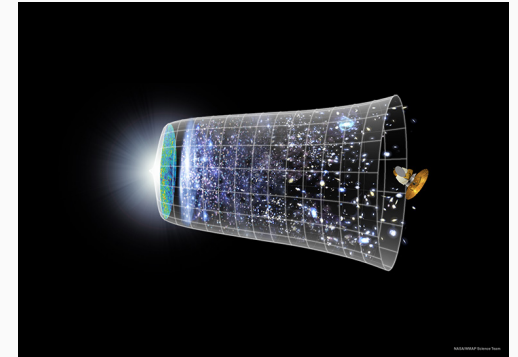
The underlying Truth about the Universe



What is science?

The underlying Truth about the Universe

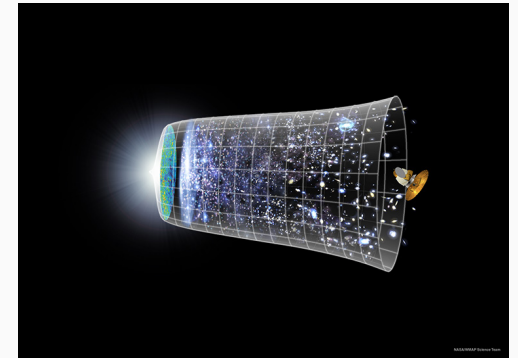
- Science is a process, not dogma



What is science?

The underlying Truth about the Universe

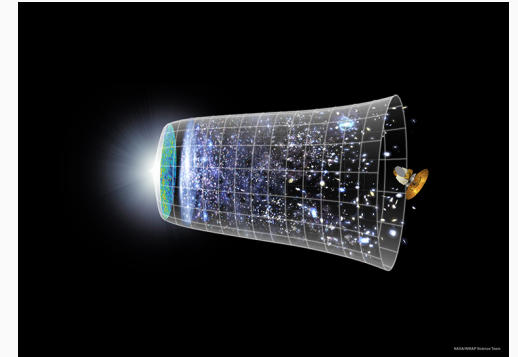
- Science is a process, not dogma
- Science experiments are able to falsify hypotheses, but they cannot prove that a claim is the *Truth*



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

What is science?

- **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

The scientific method

1. Review evidence

The scientific method

1. Review evidence
2. Hypothesis

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test
4. Design/run experiment

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test
4. Design/run experiment
5. Validate or revise hypothesis

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test
4. Design/run experiment
5. Validate or revise hypothesis

In practice, research programs don't strictly adhere to this step order. It's a list of principles, not a recipe.

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test
4. Design/run experiment
5. Validate or revise hypothesis

In practice, research programs don't strictly adhere to this step order. It's a list of principles, not a recipe.

Key point: *create a hypothesis and collect evidence to test it out*

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test
4. Design/run experiment
5. Validate or revise hypothesis

In practice, research programs don't strictly adhere to this step order. It's a list of principles, not a recipe.

Key point: *create a hypothesis and collect evidence to test it out*

- Empirical observations constitute evidence.

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test
4. Design/run experiment
5. Validate or revise hypothesis

In practice, research programs don't strictly adhere to this step order. It's a list of principles, not a recipe.

Key point: *create a hypothesis and collect evidence to test it out*

- Empirical observations constitute evidence.
- A hypothesis is compared with the outcomes of the natural world ("Nature"), not voted on by an individual or a committee

The scientific method

1. Review evidence
2. Hypothesis
3. Formulate predictive test
4. Design/run experiment
5. Validate or revise hypothesis

In practice, research programs don't strictly adhere to this step order. It's a list of principles, not a recipe.

Key point: *create a hypothesis and collect evidence to test it out*

- Empirical observations constitute evidence.
- A hypothesis is compared with the outcomes of the natural world ("Nature"), not voted on by an individual or a committee
- A hypothesis should be testable by anyone, regardless of time, place, culture, etc. Anyone can double check an experiment!

Credits

License

Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International

Acknowledgments

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