

A History of Science in Latin America (INTD290): Unit 0.1

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Course Introduction

1. Examination of the syllabus
2. *What is science?* Group activity in a moment.
3. Inaugural version of the course
4. Connections 2, Culture 3
5. Logistics made necessary by the pandemic
6. Creating quality writing with outlines, and Coggle.it
7. Introduce terminology

What is Science?

What is Science?

Have you ever been doing science or math homework, and someone asked you what you were doing? Have you ever attempted to explain to a family member your courses or major? ... breakout rooms

1. How did you answer?
2. What about your behavior indicated to someone that you were *performing* scientific activity?
3. If a person on a park bench left behind their backpack, and you had to examine its contents, how would you know this was a scientist or mathematician?

What is Science?

Components for **humans** to perform science

Move items from the lefthand list to the right. ... *breakout rooms*.

- Collections of data
- Specimens from nature
- Formulation of a hypothesis 1. ...
- A general paradigm 2. ...
- Instruments for making measurements 3. ...
- The five senses 4. ...
- A system of writing 5. ...
- A system of numbers
- A group of scientists

What is Science?

Determine the items at left at work in the following events:

... *breakout rooms*.

- Collections of data
- Specimens from nature
- Formulation of a hypothesis
- A general paradigm
- Instruments for making measurements
- The five senses
- A system of writing
- A system of numbers
- A group of scientists

Determine the items at left at work in the following events:

1. Galileo determining that objects fall at the same rate regardless of mass
2. Aztec doctors determining that chinaberry bark cures syphilis

What is Science?

Determine the items at left at work in the following events:

... *breakout rooms*.

- Collections of data
 - Specimens from nature
 - Formulation of a hypothesis
 - A general paradigm
 - Instruments for making measurements
 - The five senses
 - A system of writing
 - A system of numbers
 - A group of scientists
1. Incan accountants devising *quipu* knots to record taxation information in their Andean provinces^a
 2. Aztec doctors determining that chinaberry bark cures syphilis

^aIs this science? If not, what is it?

What is Science?

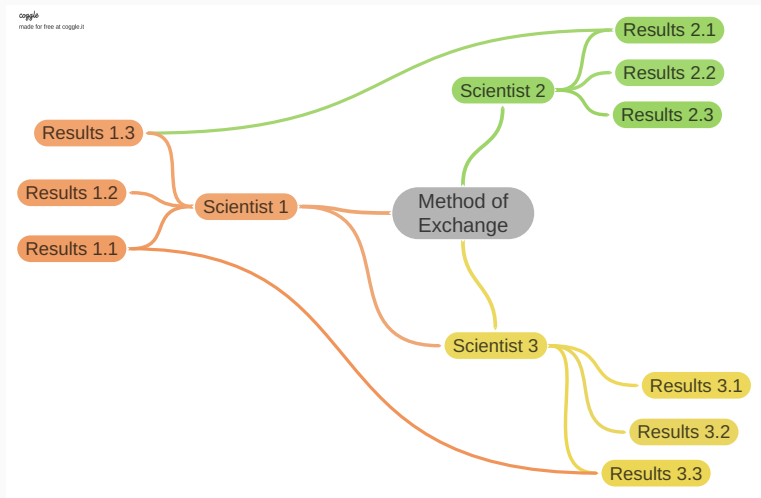


Figure 1: An imperfect method of exchange in a scientific community.

What is Science?

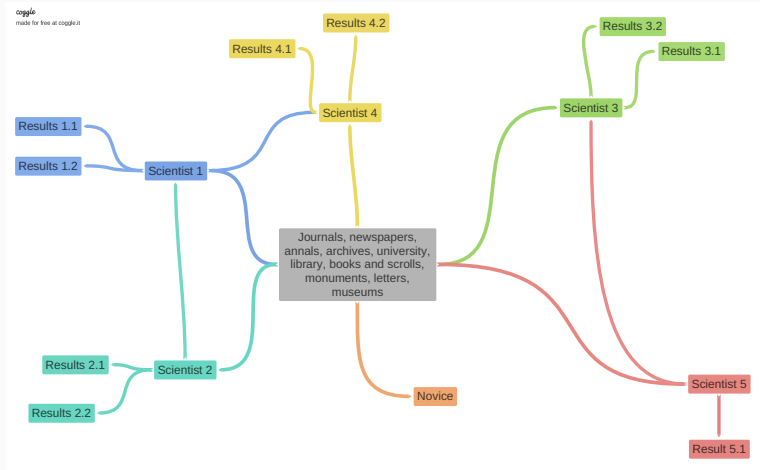


Figure 2: A (less) imperfect method of exchange in a scientific community.

What is Science?

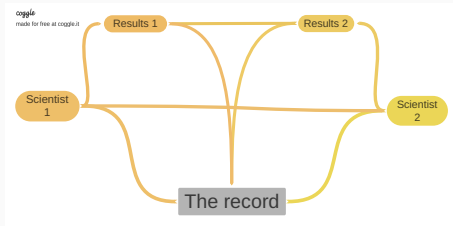


Figure 3: An ideal method of exchange in a scientific community.

Do we reach this in the modern era?

1. Traditions of physics in the United States, Russia, and China
2. The internet, computation and large data sets
3. Open-source technologies and strategies
4. Economic trends

Is Science True?

Is Science True?

Determine which of the following questions can be answered scientifically, and add them to the list at right ... *breakout rooms*.

- What is the nature of time?
- What colors are present in sunlight?
- Given market demand, at what price should we sell our milk? 1. ...
- What is the speed of sound in a particular substance? 2. ...
3. ...
- Are these two individuals related? 4. ...
- Are these two individuals in love?
- What is the arrangement of the Earth, stars, and planets?

Is Science True?

For each question we claim is answerable with the scientific method, think about how we rely on our senses.

What colors are present in sunlight? Using a prism, we can tease apart the different frequencies of light wave in regular sunlight.

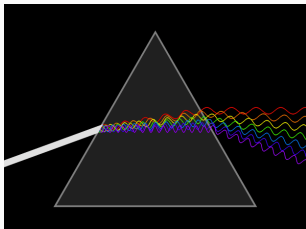


Figure 4: A prism has an index of refraction that depends on the frequency of the light.

Is Science True?

For each question we claim is answerable with the scientific method, think about how we rely on our senses.

What colors are present in sunlight?

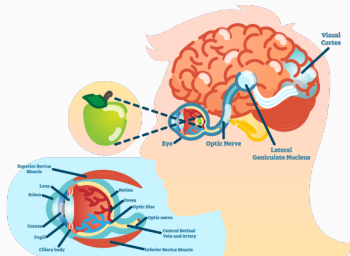


Figure 5: However, the light is still something you perceive with your eyes. The eyes are merely producing electrical signals after focusing the light.

Is Science True?

For each question we claim is answerable with the scientific method, think about how we rely on our senses.

What colors are present in sunlight?

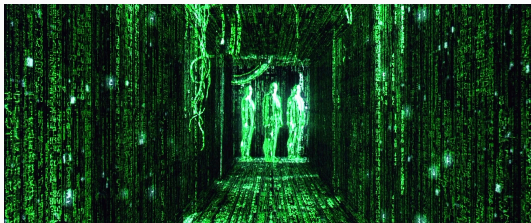


Figure 6: And if your eyes are optical devices that produce electrical signals, how do you know that the actual universe appears the way you think it does? Is it possible that the signals that serve as input to your perception are from somewhere else? The matrix ...

Is Science True?

For each question we claim is answerable with the scientific method, think about how we rely on our senses.

What colors are present in sunlight?



Figure 7: A portrait of René Descartes, French philosopher, mathematician, and scientist, 1596-1650.

Is Science True?

For each question we claim is answerable with the scientific method, think about how we rely on our senses.

Some vocabulary:

1. Epistemology: the theory of the origin of knowledge, distinguishing justified belief from opinion
2. Rationalism: the theory that reason rather than experience is the foundation of certainty in knowledge
3. Empiricism: the theory that all knowledge is derived from sensory experience, stimulated by the rise of experimental science
4. Theology: the study of the nature of God and religious belief, systematically developed

Catholic Terminology

Catholic Terminology

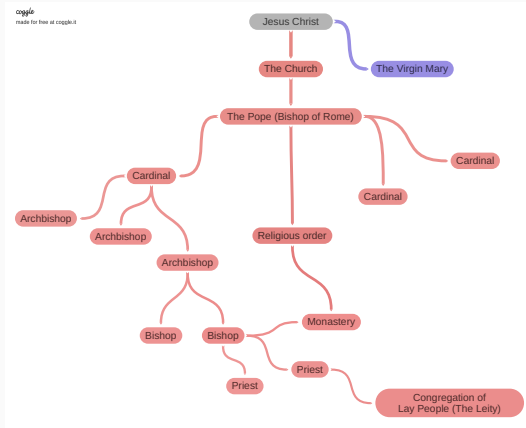


Figure 8: A rough outline of the Catholic Church hierarchy, including *Religious Orders*.

Catholic Terminology

Other Catholic terminology:

1. Diocese: A district under the pastoral care of a bishop. A diocese may have several churches or a cathedral, in which people worship.
2. Monastery: A place where those who have taken religious vows (think monks and nuns) live and work.
3. The Society of Jesus (Jesuits): A religious order that played a significant international role in education
4. The Dominican Order: A religious order primarily known for scholastic tradition and preaching the gospel, dealing with heresy
5. Heresy: When a person spreads an idea counter to the teaching of Christ. For example, the Arian heresy took place in first few centuries in Church history. The Emperor Constantine attempted to settle the question at the Council of Nicea, from which we get the Nicene Creed.

Geographic Terminology

Geographic Terminology

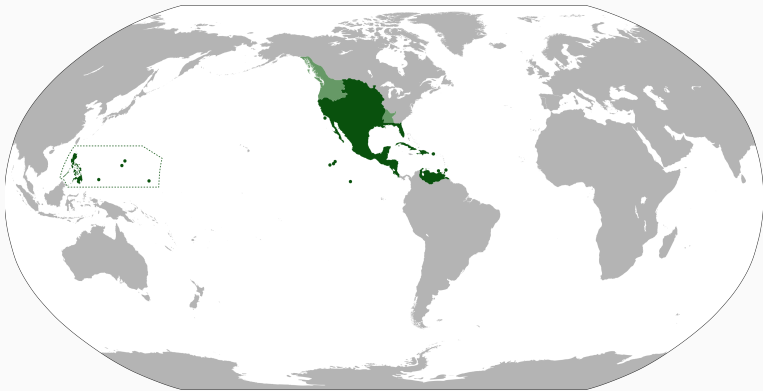


Figure 9: The largest extent of the Spanish colonies in America, up to 1803.

Geographic Terminology

The four major Spanish *viceroalties*:

- Virreinato de Nueva España, comprised of former Aztec capital and territory
 1. Capital: Ciudad de México, Tenotchtlan, modern Mexico City
- Virreinato del Perú, comprised of former Incan capital and territory
 1. Capital: Lima, Perú. The original capital of the Incans was Cusco. *Note: Incan empire was the largest in the world at the time.*
- Virreinato de Nueva Granada (from Perú)
 1. Capital: Santa Fe de Bogotá, modern Bogotá, Colombia
 2. Caracas and Quito are also within this province
- Virreinato del Río De la Plata (from Perú)
 1. Capital: Buenos Aires
 2. Modern Argentina, Chile, Bolivia, Paraguay and Uruguay



Figure 10: Virreinato de Nueva España



Figure 11: Virreinato del Perú



Figure 12: Virreinato de Nueva Granada



Figure 13: Virreinato del Río De la Plata