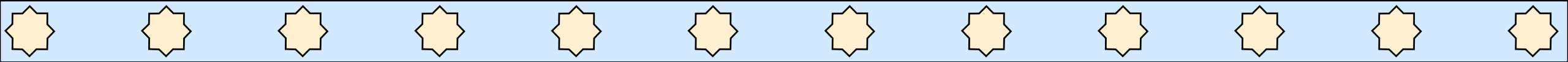


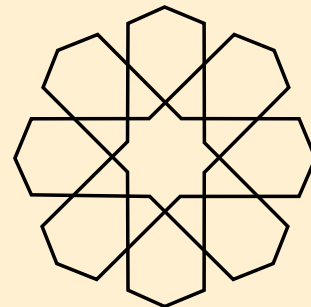
Scientific Method for Wikimedians

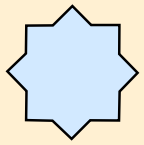
Scientific facts



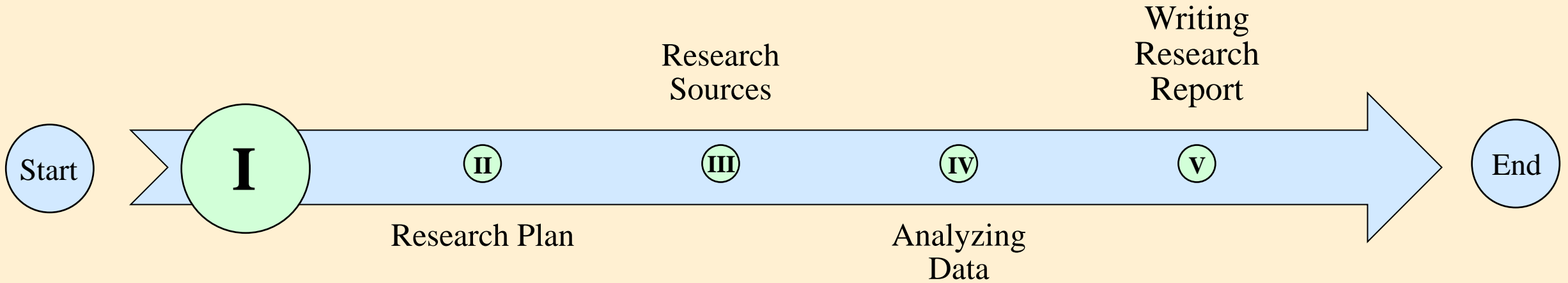
Michel BAKNI

2023





Course Structure



Part I: Knowledge & Scientific Method

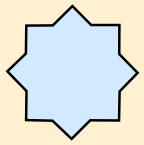
Chapter 1: Knowledge & its types

Chapter 3: Research Methodologies

Chapter 2: Scientific facts

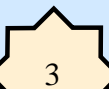
Chapter 4: Scientific Methods

Chapter 5: Research Question



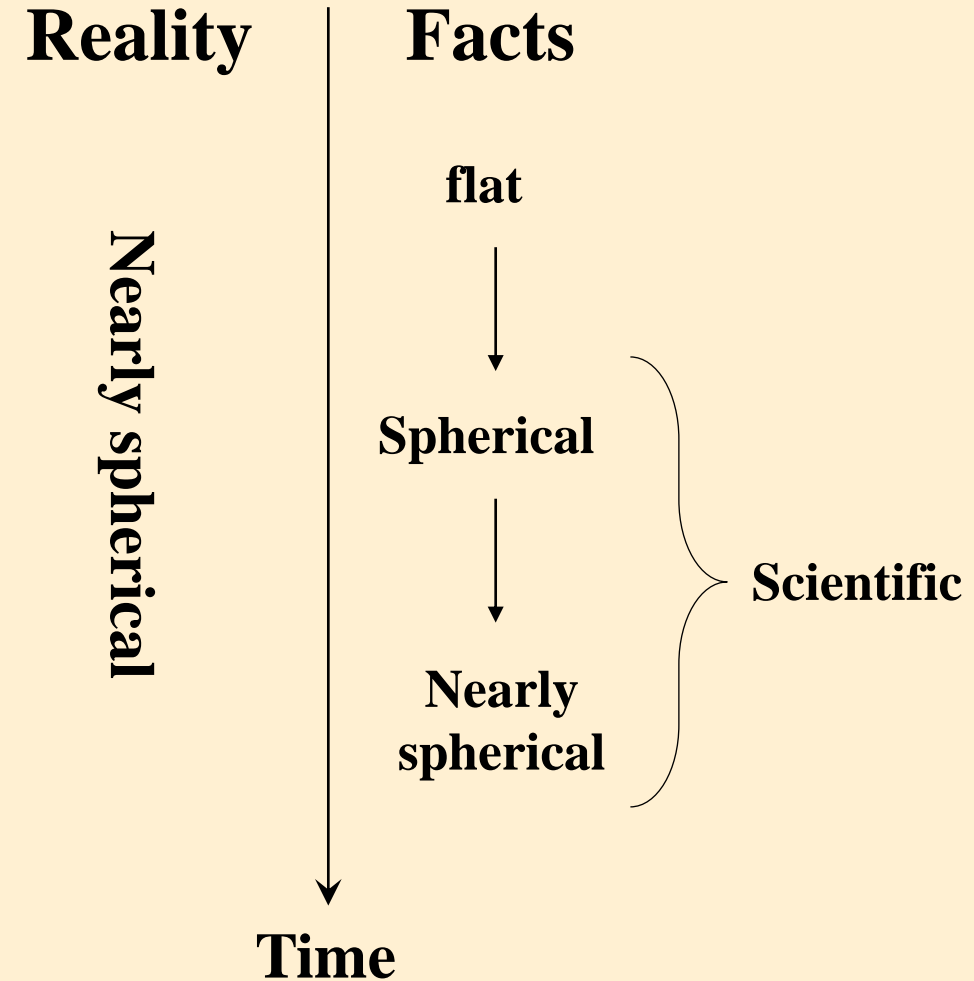
Outlines

- ★ **Facts as knowledge**
- ★ **Fact development: simple fact**
- ★ **Fact development: complex fact**
- ★ **Notes on scientific facts**



I Facts as knowledge: Reminder

- ★ **Facts are knowledge**
 - ◆ **Knowledge not always fact!**
 - ◆ **Example: fear**
- ★ **Best understanding of reality**
- ★ **Facts change**



I Facts as knowledge

“ **A thing that is known to be true, especially when it can be proved** ”

Oxford Learner’s dictionaries

“ **Something that is known to have happened or to exist, especially something for which proof exists, or about which there is information** ”

Cambridge dictionary

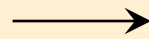
“ **Something that has actual existence, or a piece of information presented as having objective reality** ”

Merriam webster dictionary

I Nature of the knowledge: Etymology

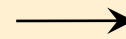
Old English: fact

Fact*



Factum

Latin



*dhe-

Proto-Indo-European

IPA**:/ǵe/

“ event | occurrence ”
achievement

“ to set | to put ”

do affect affair

16th century | action, a thing done

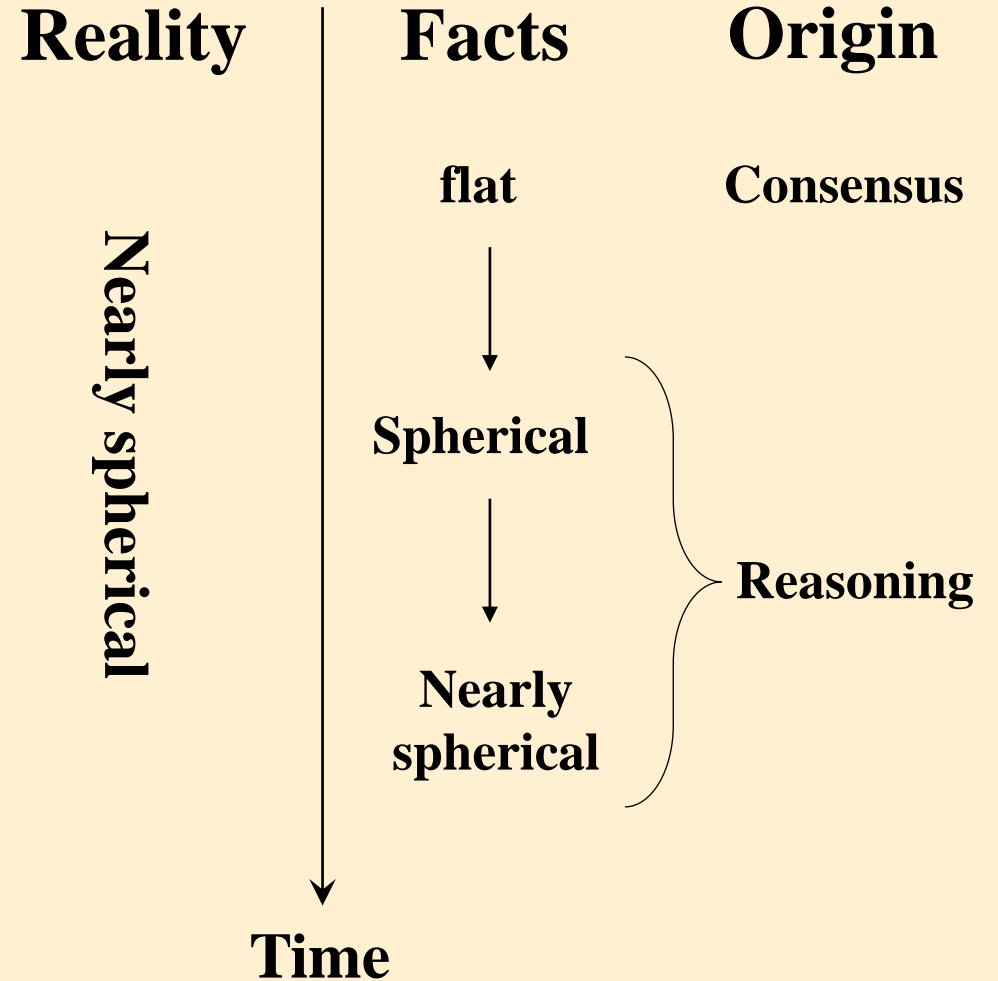
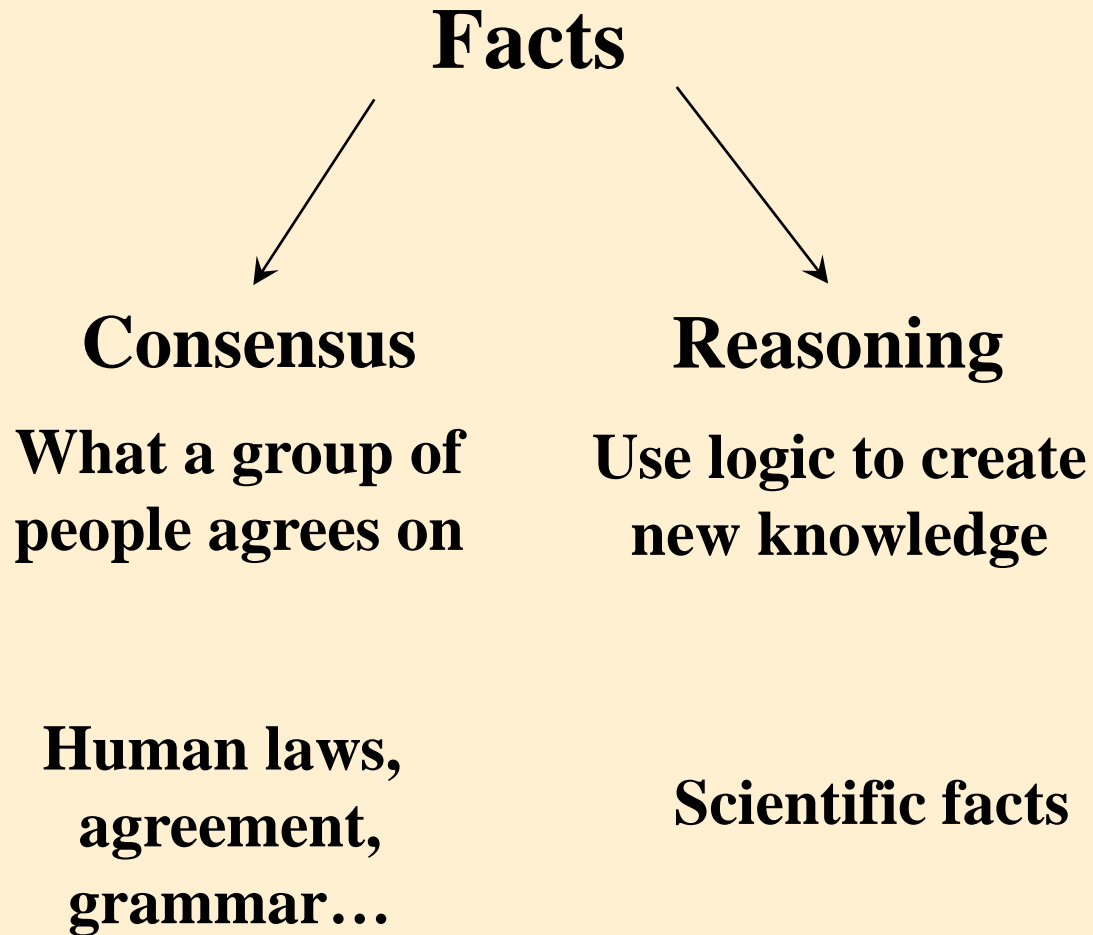
17th century | a truth known by observation or authentic testimony

19th century | the stark realities of existence

*<https://www.etymonline.com/>

** IPA: International phonetic alphabet

I Facts as knowledge: Origin



I Facts as knowledge: Origin

★ Consensus

- ★ Agreement upon a false statement**
- ★ Appeal to popularity fallacy**
- ★ Not Systematic (not scientific)**

★ Reasoning

- ★ Complex, hard to use & misleading**
- ★ Hard to understand**

I Facts as knowledge: Definition

★ What is the fact?

- ★ Different definitions: philosophy, law, history & science**

★ What is the scientific fact?

- ★ An objective and verifiable observation intended to explain or interpret natural or human-made phenomenon**

**Gower, Barry (1997)
Scientific Method: A Historical and
Philosophical Introduction
ISBN 0-415-12282-1**

I Facts as knowledge: Classification

★ Time basis

- ★ Credibility \Leftrightarrow time

Constant (Fix)

Variable

**No change
in value**

**Changing
value**

**Gold is a
metal**

**Joe Biden is
US president**

★ Structure basis

- ★ Complexity

Simple

complex

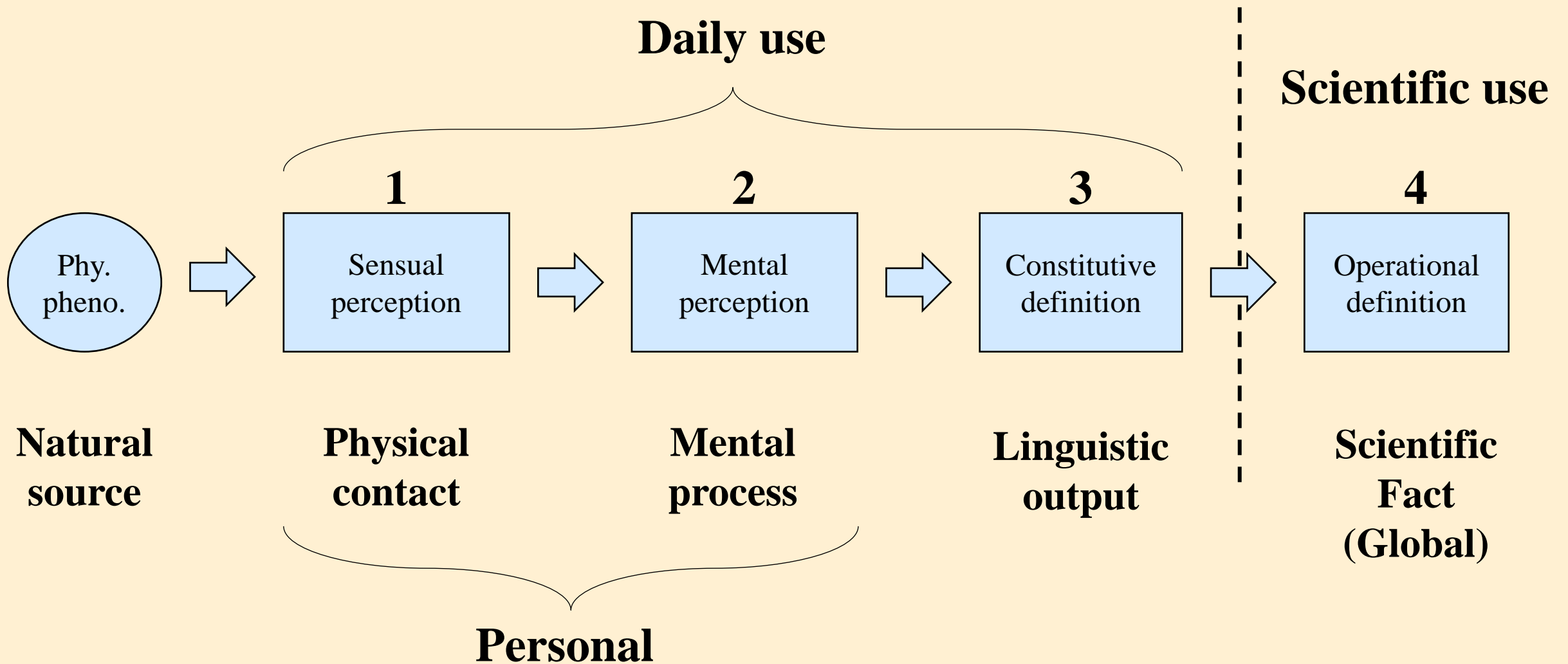
Basic

Sophisticated

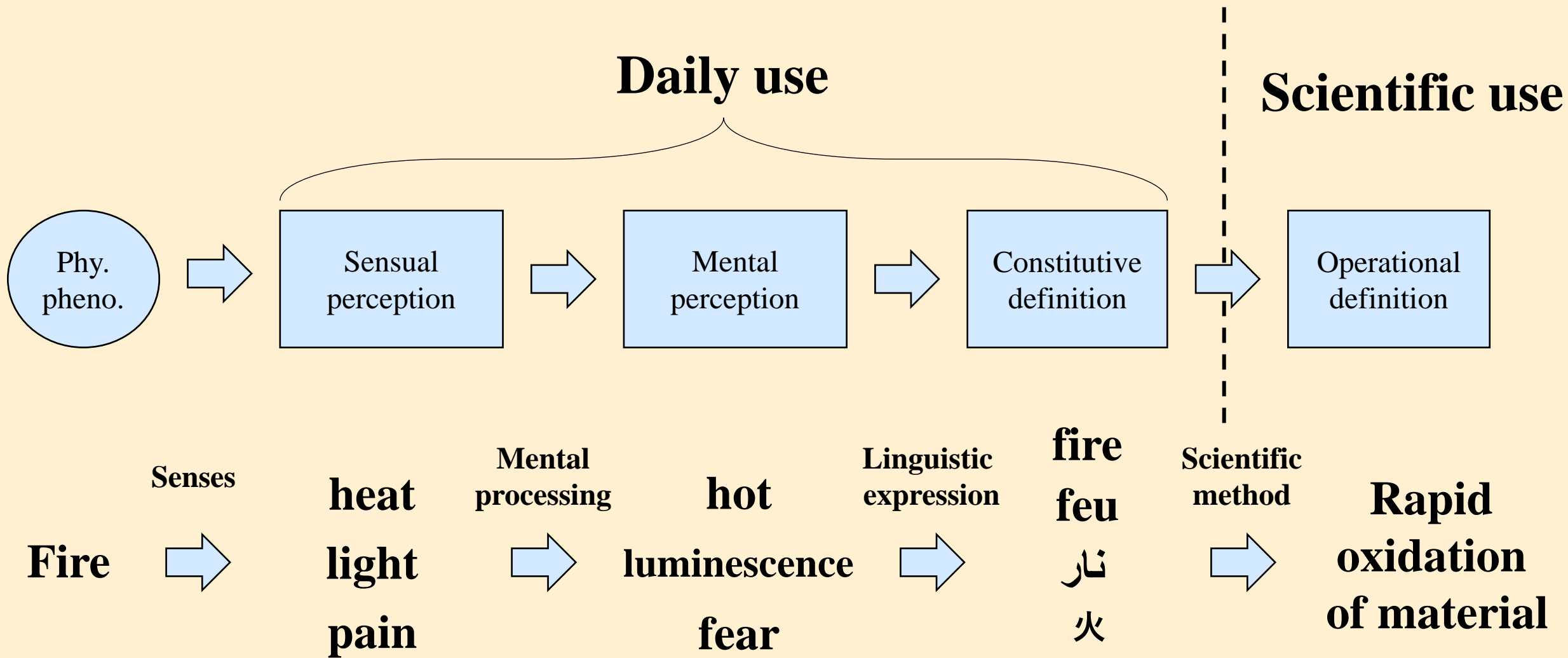
**Summer is
usually
hot**

**Circle area
is πr^2**

II Fact development: simple fact



II Fact development: simple fact



II Facts as knowledge: simple fact

★ **Simple facts** ^{build} **====> complex**

★ **Study simple facts**

◆ **Relationship**

A related to B?

Sun <=> heat

◆ **Changeability**

A changes with time?

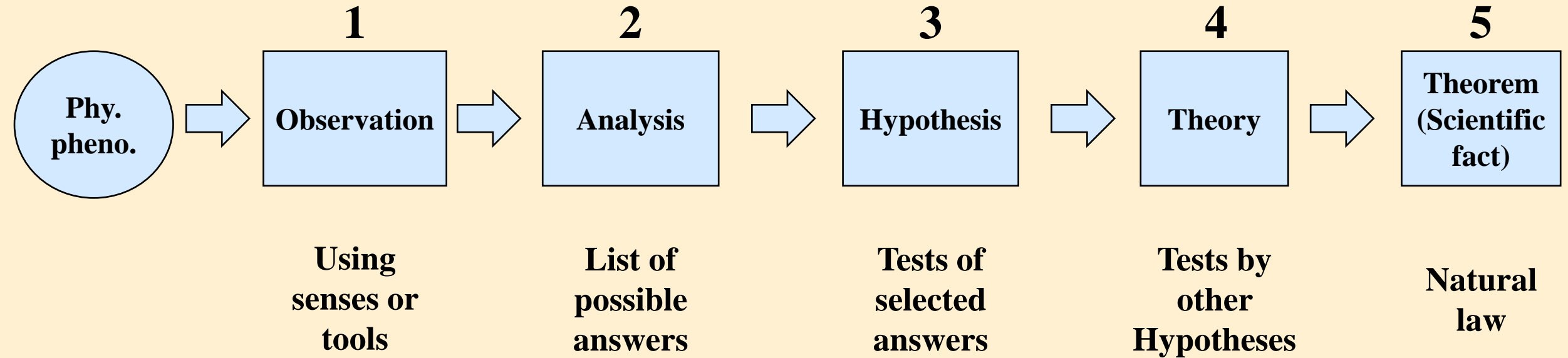
Day length

◆ **Look for patterns**

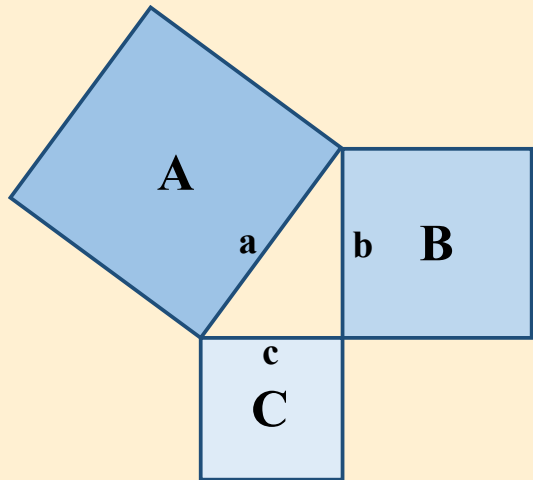
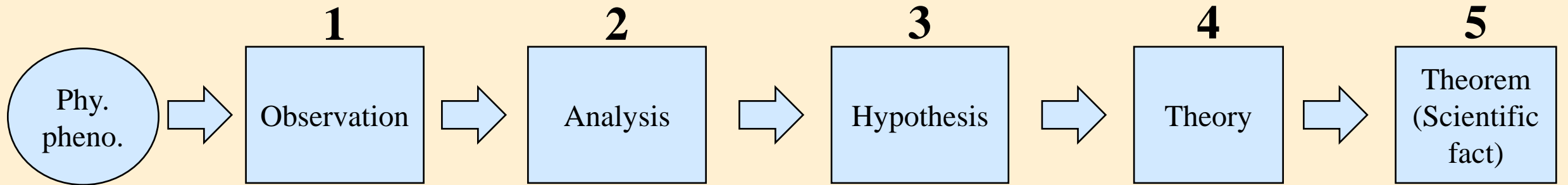
Identifiable patterns?

Stars

III Fact development: Complex fact



III Fact development: Complex fact



lucky strike
B & C farmers
work harder
&
A farmer is lazy

The area is
the same

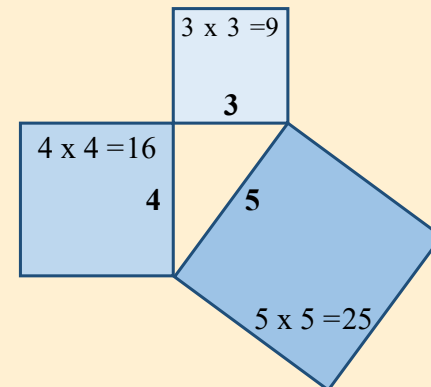
Wait next
year ❌

Watch
farmers ❌

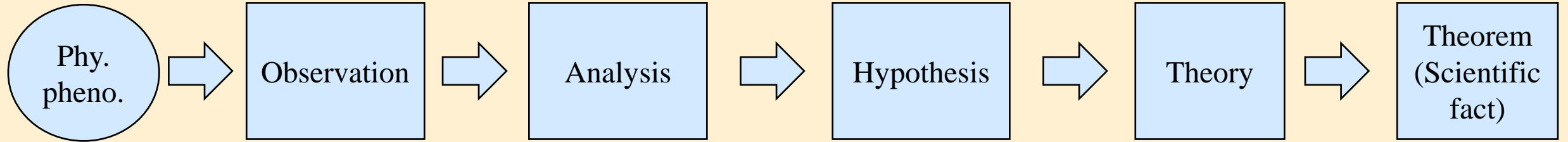
Measure
it ✅

Area of the square
whose side is the
hypotenuse is equal to
the sum of the areas of
the squares on the
other two sides

$$a^2 = b^2 + c^2$$



III Fact development: Complex fact



Oxford dictionary of Science
ISBN 0-19-860757-1 (1999)

Hypothesis

A law that may not be universally true

Theory

A description of nature that encompasses more than one law but has not achieved the incontrovertible status of a theorem

Theorem

A descriptive principle of nature that holds in all circumstances covered. There are no loopholes in laws of nature and any exceptional event that did not comply with the law would require the existing Theorem to be discarded

III Fact development: Complex fact

Hypothesis

Close to physical world
easy to test

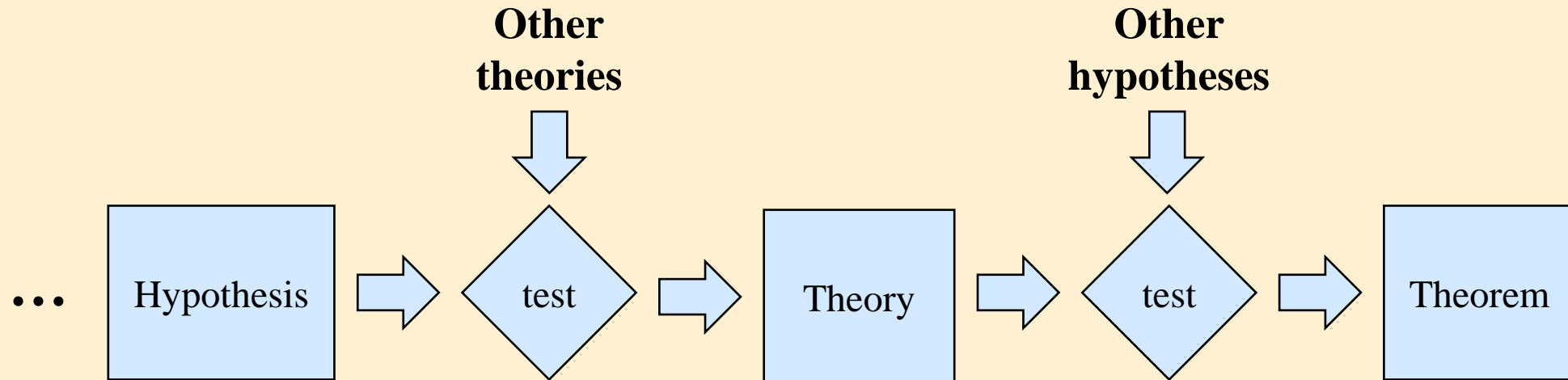
Theory

Theoretical nature
abstract

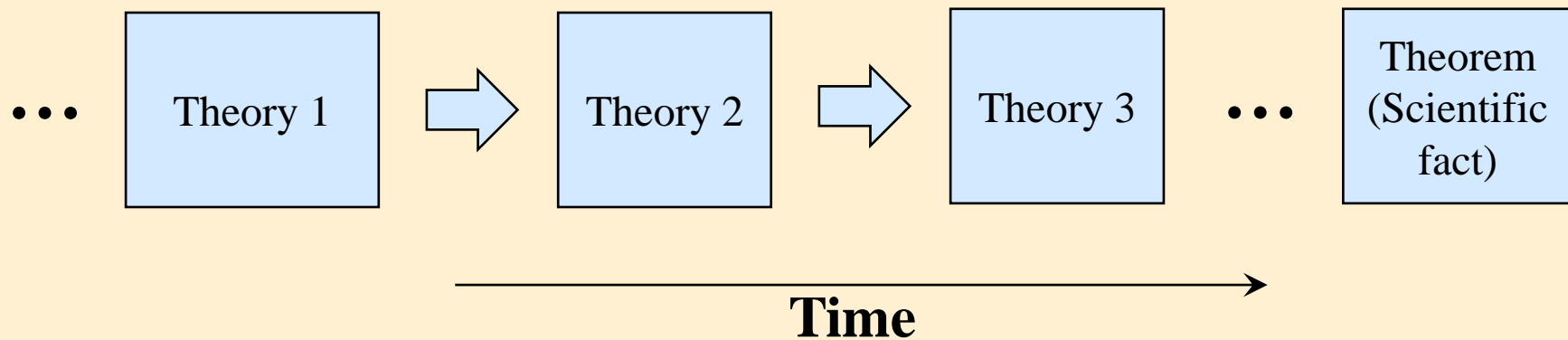
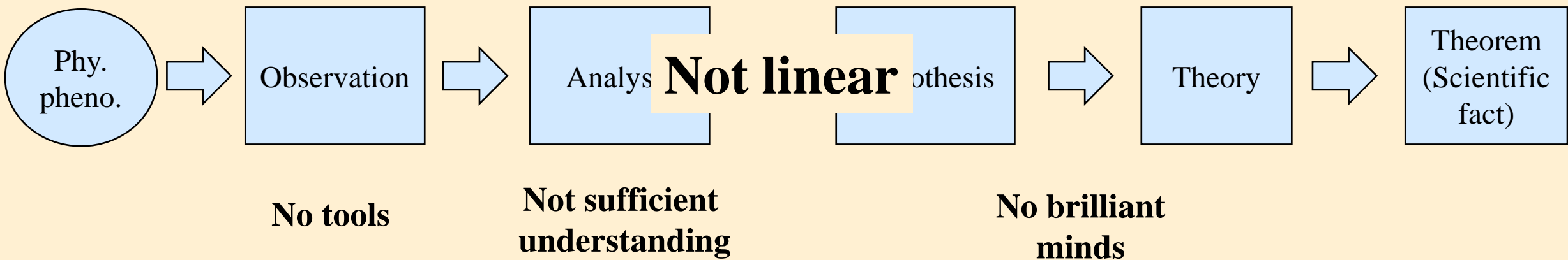
Example: Gravity

Hypothesis: throw object => go down

Theory: force attracting uneven distribution of masses together



III Fact development: Complex fact

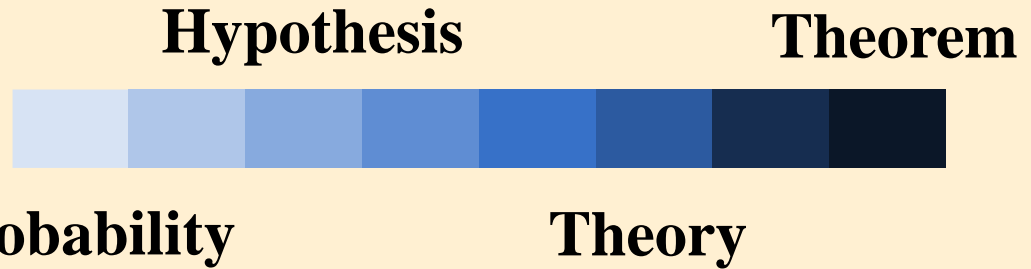


Example

Classical mechanics
&
Quantum mechanics

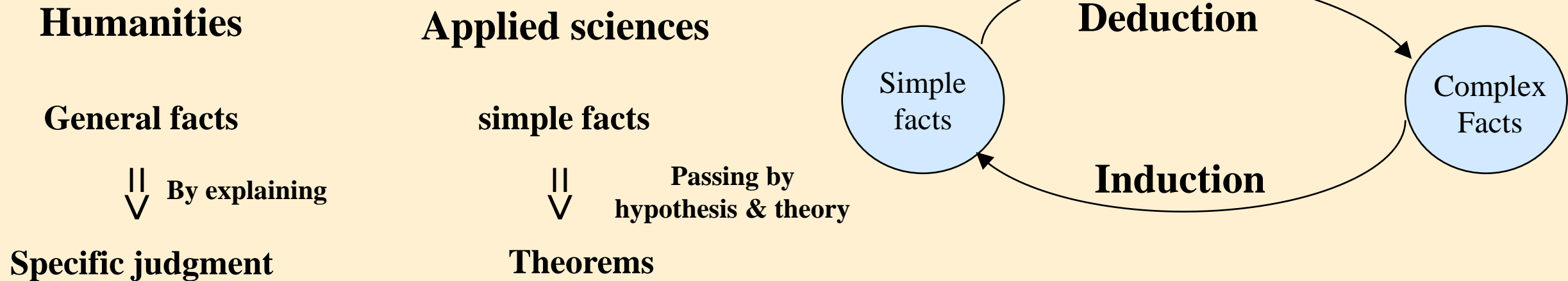
IV Notes on scientific facts

★ **Validity changes**



★ **Not linear**

★ **Not unidirectional: part => whole**



Notes on scientific facts

★ Assumption ≠ Hypothesis

★ No Truth or Falsehood

- ◆ **Science is oriented by facts**
- ◆ **Non-reversible**
- ◆ **Continuous evolution**

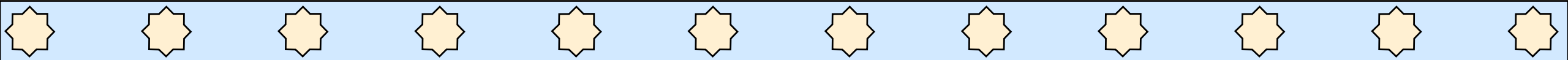
Course Title: Scientific Method for Wikimedians

Course Creator: Michel BAKNI

Video Title: Scientific facts

Film Editing : Sandra HANBO

Date: January 2023



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