# Lecture 2: Ancient Mythology and Modern Cosmology: Is there a Difference ?

# Creation Stories I: The Christian/Jewish View

Genesis: In the beginning God created the heavens and the earth. And the earth was waste and void; and darkness was upon the face of the deep: …

# Creation Stories II: Greco-Roman Mythology

Hesiod: In the beginning there was only “chaos” [the infinite emptiness]. Then out of the void appeared Erebus, the unknowable place where death dwells, and Night. All else was empty, silent, endless, darkness. Then somehow Love was born bringing a start of order. From Love came Light and Day. Once there was Light and Day, Gaea, the earth appeared.

Then Erebus slept with Night, who gave birth to Ether, the heavenly light, ...

# Creation Stories III: Nordic/Germanic Mythology

Edda: In the beginning there was no earth or heaven, no sand nor sea nor cooling waves. There was only Ginnungagap, a great void. In the north there was Nilfheim, and from Nilfheim's spring flowed eleven rivers, known as Elivagar. As the rivers flowed south, they cooled and hardened into ice. ...

# Creation Stories IV: Hopi People

The world at first was endless space in which existed only the Creator, Taiowa. This world had no time, no shape, and no life, except in the mind of the Creator. Eventually the infinite creator created the finite in Sotuknang, whom he called his nephew and whom he created as his agent to establish nine universes. …

# Creation Stories V: Chinese Mythology

In the beginning there was an egg and nothing else. The egg was the universe but there were no heavens and no earth, just darkness. From the darkness, the first creature was born. His name was Pangu and he slept in the darkness for many thousands of years.

Over these year he grew and grew until eventually he was a giant and was so big that he awoke and broke the egg. All of the light parts flew up and became the sky and all of the heavy parts sank and became the earth. Pangu was frightened that they would connect so he pushed them apart ...

# Common Themes and Concepts:

- Anthropomorphism
- Action of a supreme craftsman
- Generation from a seedling/egg
- Imposition of order over “chaos”
- Life cycle dominates over eternal/unchanging: there is a beginning
- Hybrid schemes: act of creation, but supreme being/chaos existed forever
- Anthropocentrism

# Creation Story 2001:

In the beginning there was neither space nor time as we know them, but a shifting foam of strings and loops, as small as anything can be. Within the foam, all of space, time and energy mingled in a grand unification. But the foam expanded and cooled. And then there was gravity, and space and time, and a universe was created. …

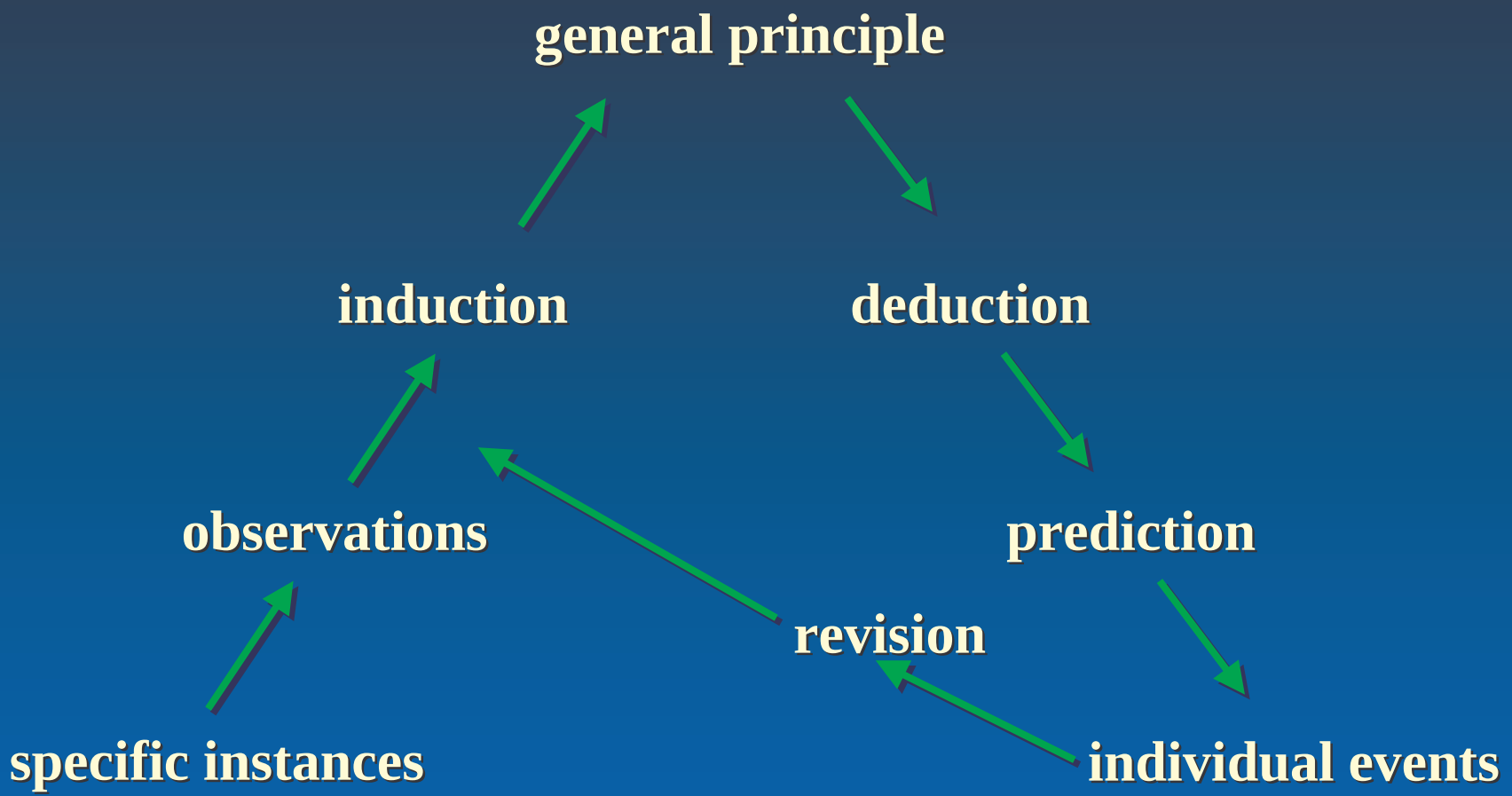
⇒ **Is there a difference ?**

# What is Science ?

Science is the concerted human effort to understand, or to understand better, the history of the natural world and how the natural world works, with observable physical evidence as the basis of that understanding. It is done through observation of natural phenomena, and/or through experimentation that tries to simulate natural processes under controlled conditions.

⇒ **Scientific Method**

# The Scientific Method




⇒ Science is a history of corrected mistakes (Popper)

# Example: Test of Gravity on the Moon (Apollo 15)

# A few Definitions

- **fact:** a truth known by actual experience or observation
- **deductive inference:** a conclusion based on reasoning from accepted premises
- **inductive inference:** a conclusion based on repeated observation of fact
- **hypothesis:** a proposition explaining the occurrence of a phenomenon or phenomena
- **theory:** a coherent set of propositions that explain a class of phenomena, that are supported by extensive factual evidence, and that may be used for prediction of future observations

# WARNING !! Pitfall language

- Daily life: “theory” = an opinion, a conjecture
- Science: theory = a hypothesis that is sufficiently accepted and which shows enough explanatory power to be strongly confirmed by experiment. In no case is a scientific hypothesis or theory just a mere guess.
- Statements like “It’s just a theory” used to assess the value of a scientific theory are therefore meaningless because they mix-up different usages of the word “theory”.

# Five criteria for the evaluation of scientific hypotheses

- relevant
- testable and falsifiable
- consistent
- simple
- predictive