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Cosmology and Epistemology

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Learning Outcomes

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1. Describe Cosmology and its associated disciplines
2. Discuss Epistemology and its issues in science

Inquiries

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1. What is Cosmology?
2. What are cosmogony, astronomy and mythology?
3. What is Epistemology and its importance?
4. What are epistemological issues in science?



Cosmology

- Physics:
 - the study of the *physical* universe
- Metaphysics:
 - the study of the universe as part of reality

Associated disciplines:

- Cosmogony
 - the study of the origins of the universe
- Astronomy
 - the study of the celestial bodies and phenomena

- Mythology

- the study of myths

- myths are not 'false stories'

- foundational stories

- remembered over countless generations

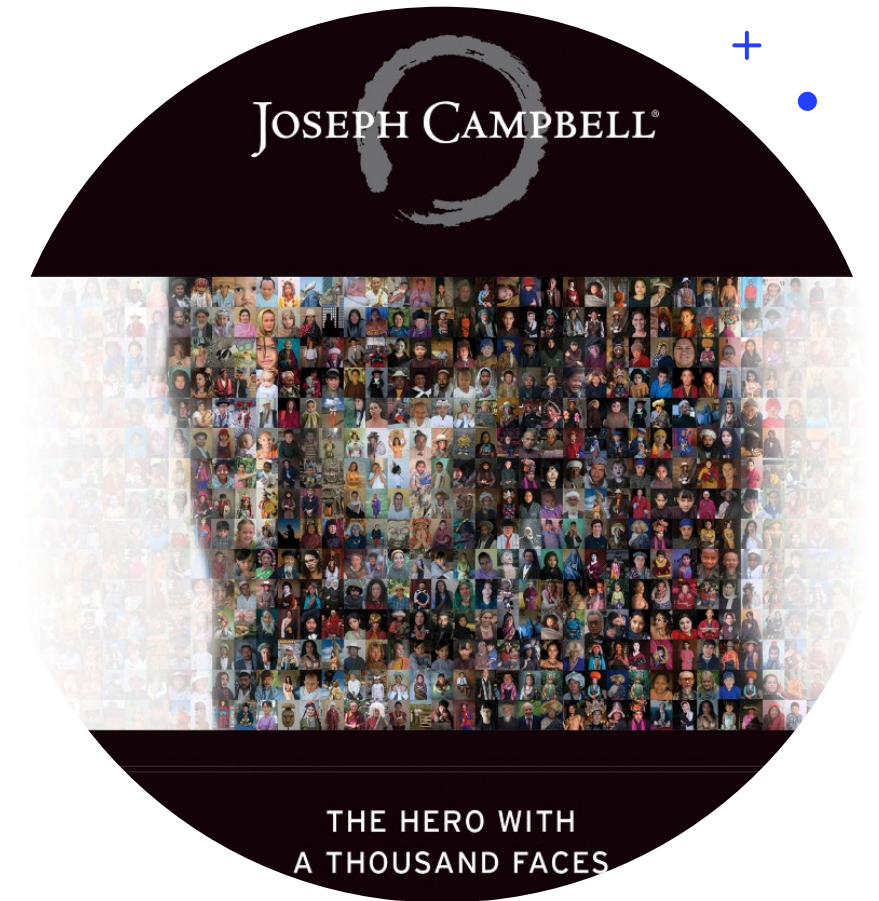
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Hero Monomyth

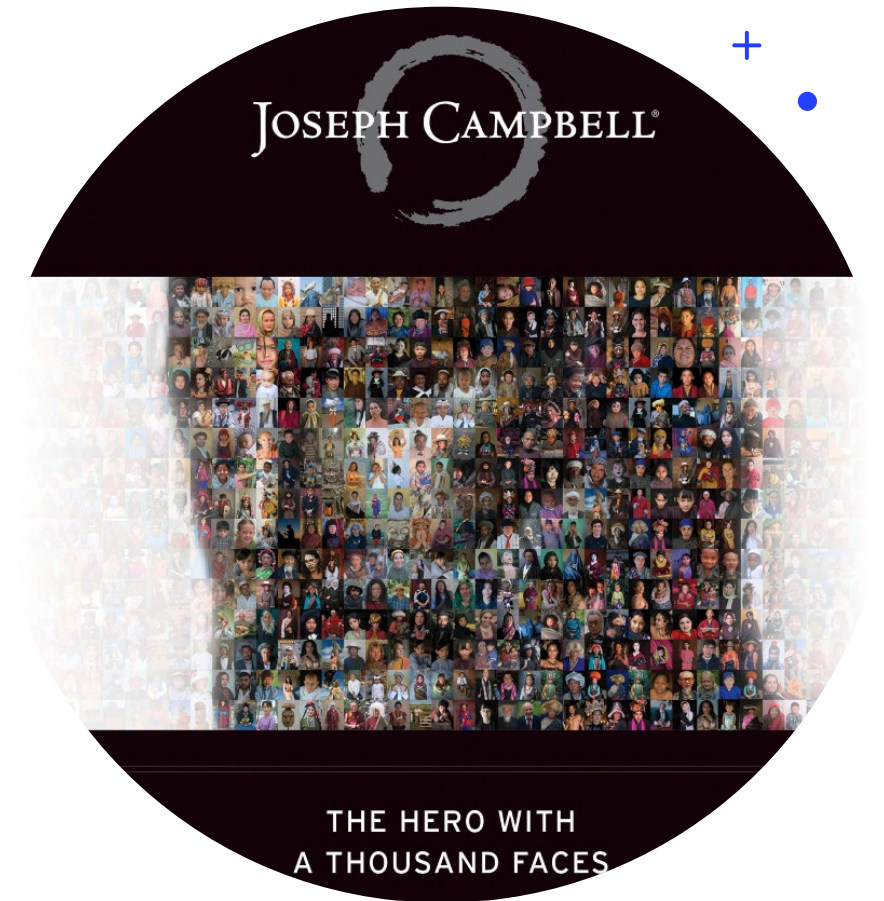
1. Departure:

- a call to adventure
- embarks on the journey
- leaving the known into the unknown



2. Initiation:

- the road of trials
- meeting with the goddess
- ultimate confrontation, 'apotheosis.'



3. Return:

- back from the unknown to the known world
- gained newfound wisdom, power, or a sacred object



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- Mythology provides philosophical, psychological and cultural values



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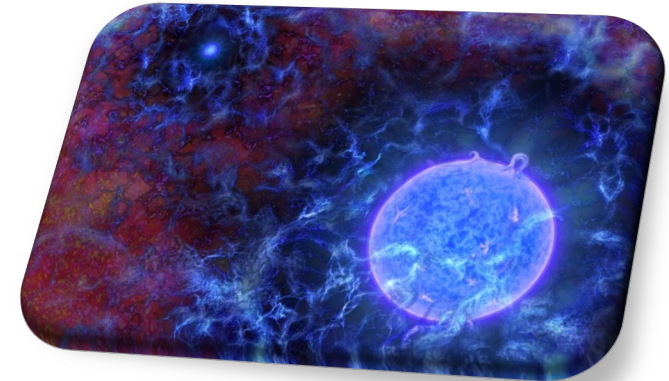
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- Civilisations express multiple perspectives of the cosmos, creations, and their relationships with the Creator



- Earliest myth
 - Enūma Eliš
 - Tiamat and Apsu
 - Cosmic chaos, feminine and Cosmic order, masculine
 - Marduk
 - preserver of the cosmos



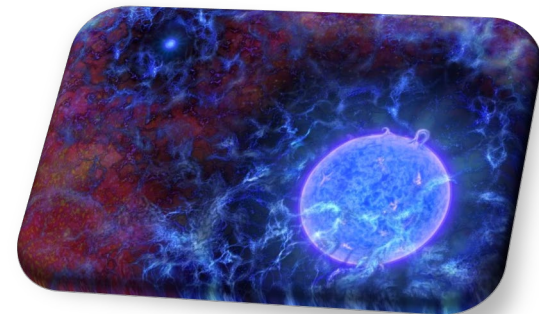
- Current myth
 - The Big Bang theory
 - Within a primordial emptiness, there existed a cosmic singularity
 - the singularity burst forth



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- Cosmic order
 - Chaos is transformed into organised cosmos
- Creatio ex nihilo
 - From nothing to something



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Epistemology

- The study of Knowledge
 - nature
 - sources
 - limits

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- Empiricism
 - Currently dominant epistemology of science
 - No source of knowledge other than sense experience:
 - Observations, experiments

- Contrast: Rationalism

- Some knowledge can be gained intuitively and deductively
- Intellect can access knowledge beyond sense experience

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- Does science give us true or approximately true knowledge?
 - Realism vs Antirealism



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- Realism
 - Theories are 'real', describing mind-independent world
 - Include unobservable entities
 - e.g. quarks, genes

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- Science has been successful in predicting natural phenomena
 - If theories are not real, how come it can do so?
 - No-Miracle Argument



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- History of Science shows
 - theories can successfully predict natural phenomena, and later found to be false
 - Phlogiston theory
 - Gravity theory

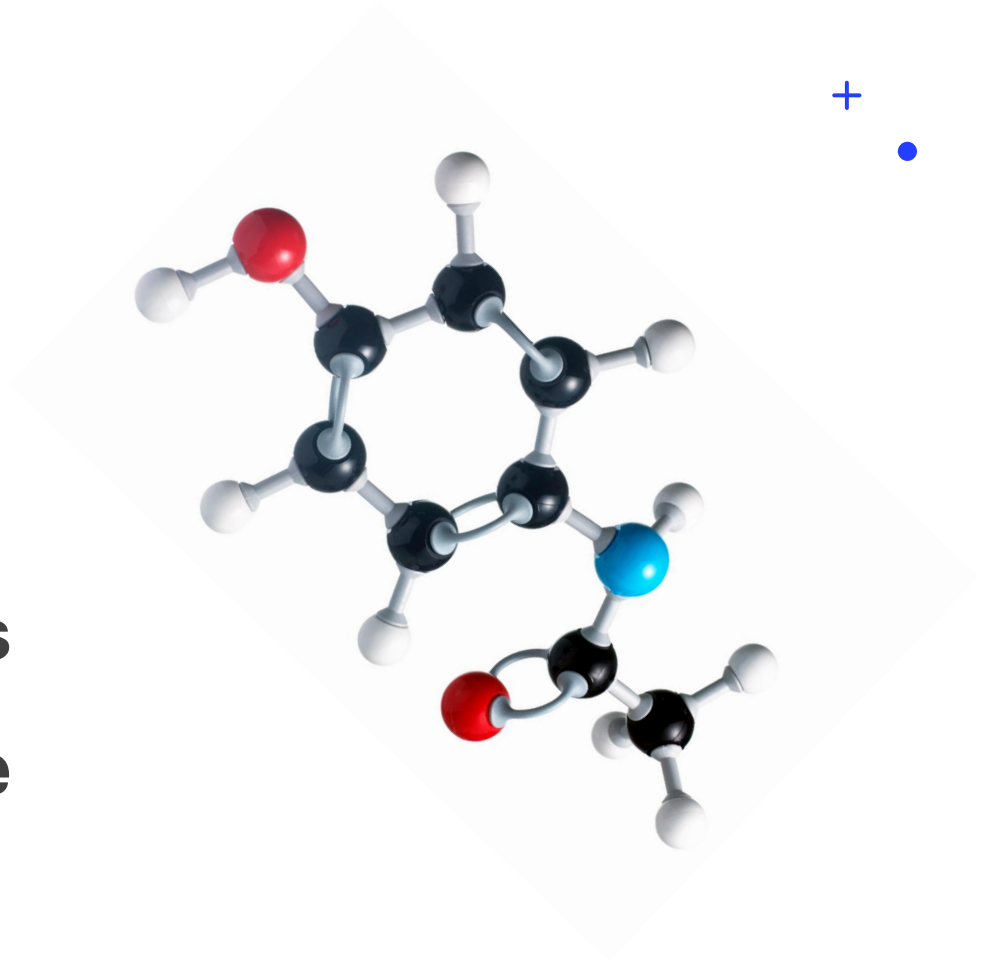
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- Instrumentalism
- Theories are instruments for prediction
- They are not literal claims about mind-independent world



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- Constructive empiricism
 - Theories do refer to mind-independent world
 - They are **constructed models** that are **empirically adequate**



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- Scientists do not need to believe
 - theories are 'real', describing mind-independent world
 - unobservable entities truly exist