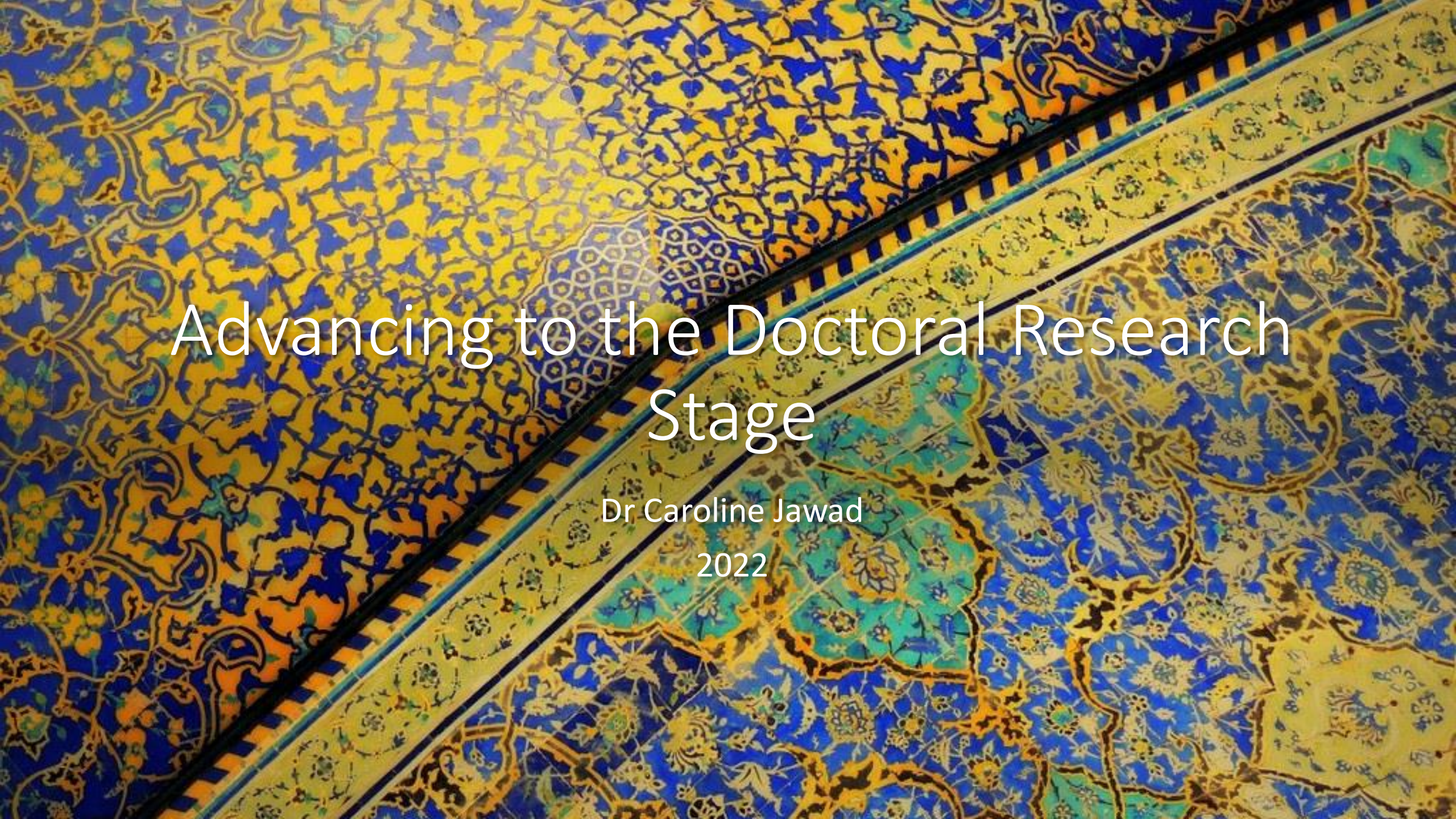




Advancing to the Doctoral Research Stage

Dr Caroline Jawad

2022

Please note

- This presentation will introduce you to some aspects of research methods – but it is NOT intended to replace key reading, such as Bryman, Crotty, Creswell, Maxwell, Denscombe, Denzin, Guba and Lincoln and Cohen.
- **SAUNDERS SHOULD NOT BE USED IN MY MODULES.**
- You must read key texts and beyond at doctoral level that cover the method and for this you may have to go beyond your modules reading list.
- Again some slides will not be focused on and you are expected at this doctoral level to be motivated, engaged and understand the areas you need to explore.



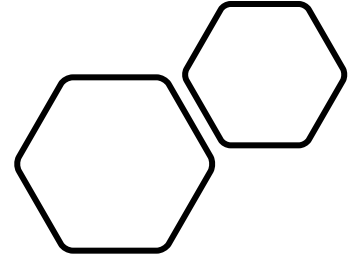


What is a paradigm

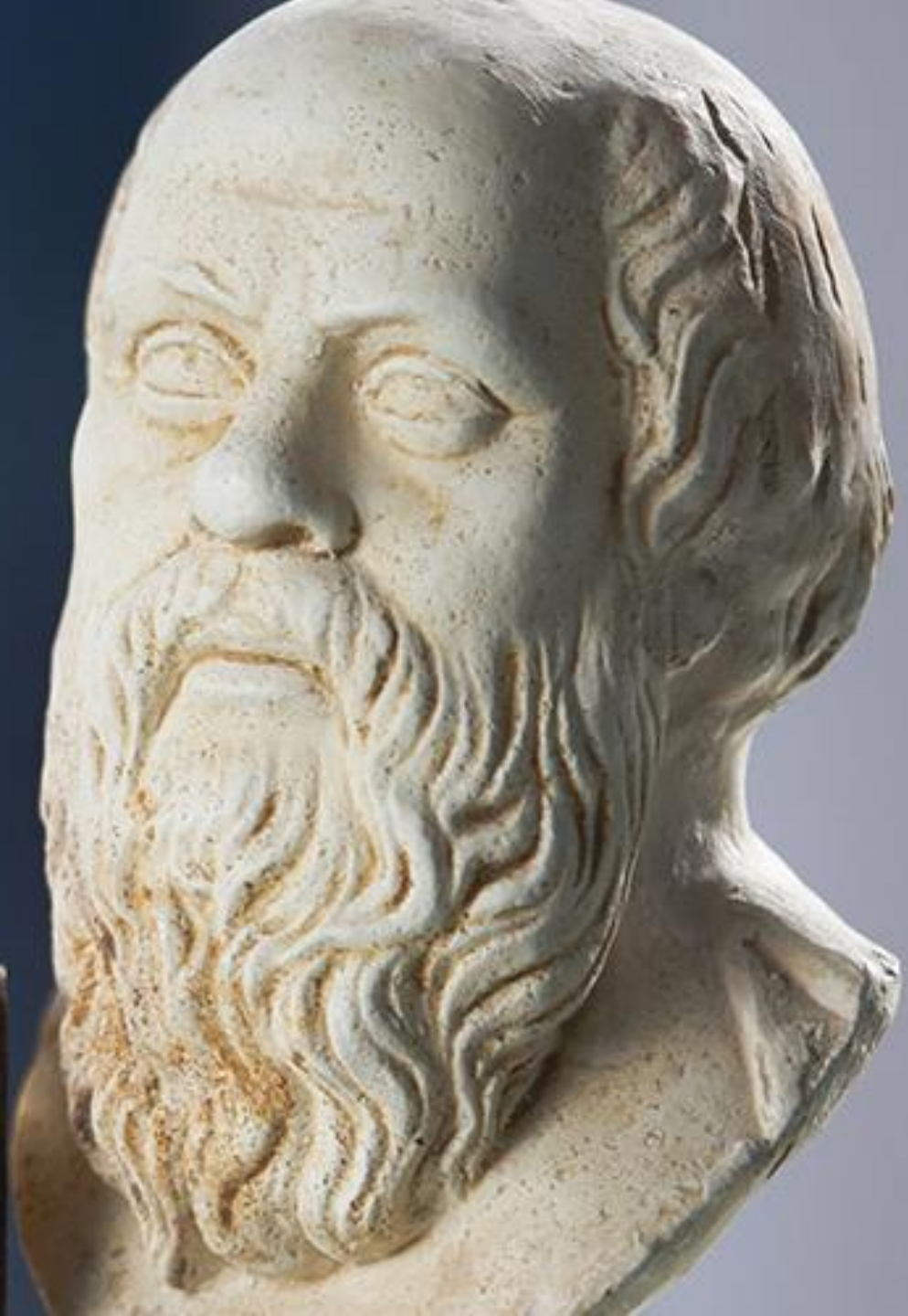
- Without using any resources, what do you understand about paradigms.
- 5 minutes.

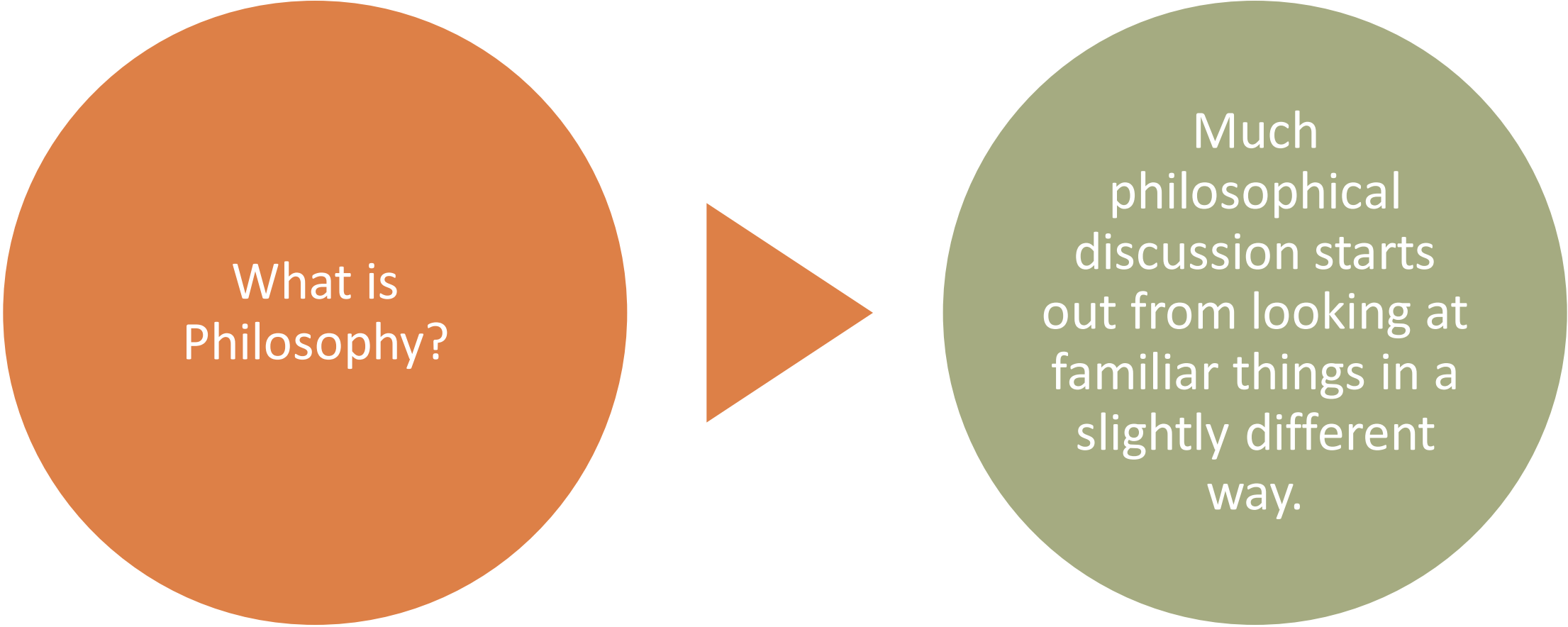
PLEASE

BEAR WITH ME









What is
Philosophy?

Much
philosophical
discussion starts
out from looking at
familiar things in a
slightly different
way.

Sometimes the answers to
philosophical questions are difficult,
if not impossible, to find...





Stephen Hawking, The Grand Design

How can we understand the world in which we find ourselves? How does the universe behave? What is the nature of reality? Where did all this come from? Did the universe need a creator? Most of us do not spend most of our time worrying about these questions, but almost all of us worry about them some of the time...

Traditionally, these have been questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics. Scientists have become the bearers of the torch of discovery in the search for knowledge.

$$F = G \frac{m_1 m_2}{d^2}$$

$$i\hbar \frac{\partial}{\partial t} \psi = \hat{H} \psi$$

$$\phi(x) = \frac{1}{\sqrt{2\pi\sigma}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$F - E + V = 0$$

So, why not just do science?

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$$

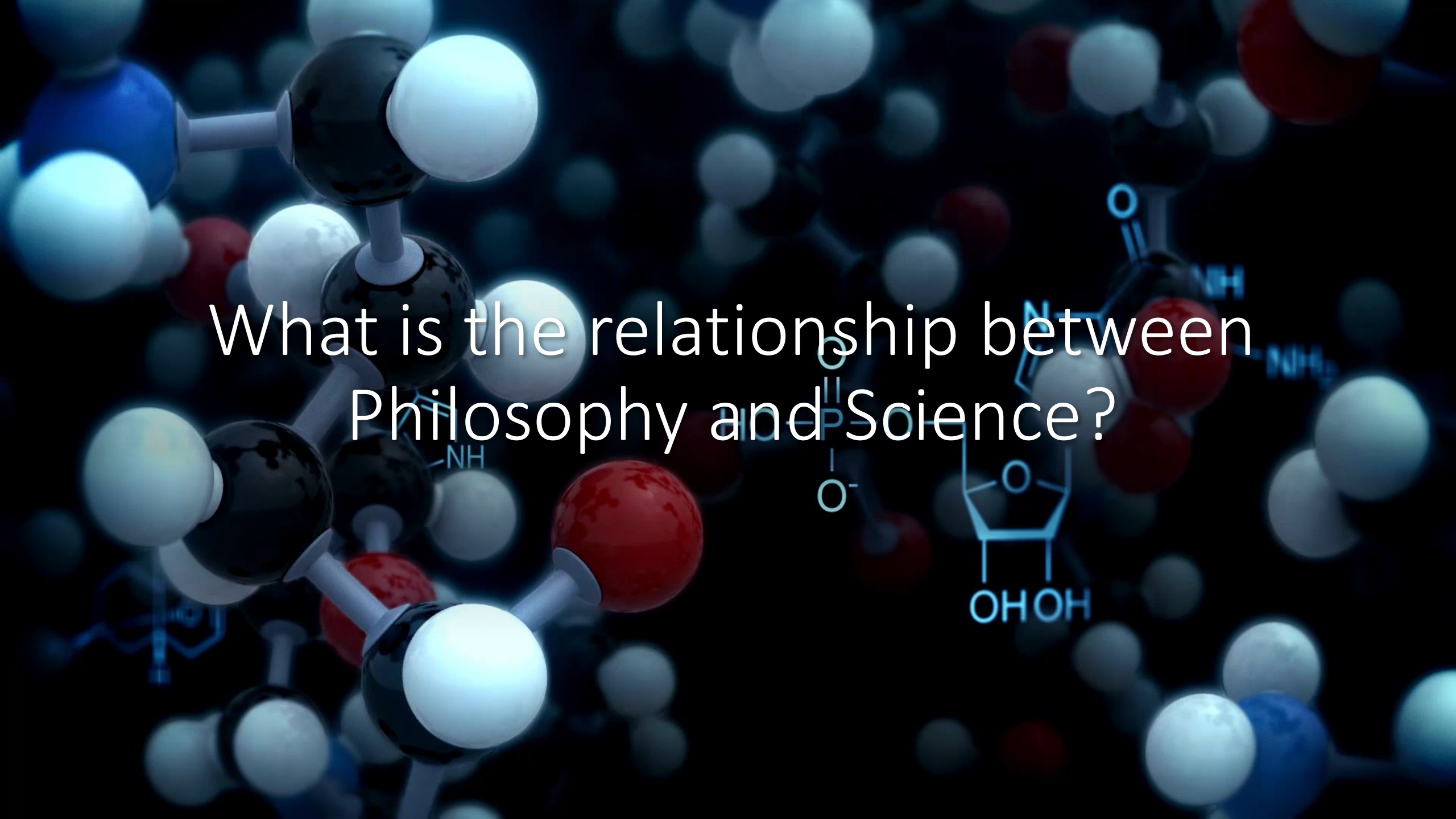
$$\frac{df}{dt} = \lim_{h \rightarrow 0} \frac{f(t+h) - f(t)}{h}$$

$$a^0 = 1 [a0]$$

$$\arcsin(z)$$

Let's take a philosophical approach
to this problem...

$$x_{n+1} =$$



What is the relationship between
Philosophy and Science?



There are three options:

1. Philosophical reasoning should be *prior* to science;
2. Science is *prior* to philosophy;
3. Somehow, science and philosophy depend upon each other.



Let's introduce some terminology into this debate about knowledge

Rationalism: contentful, non-trivial knowledge can come from reasoning.

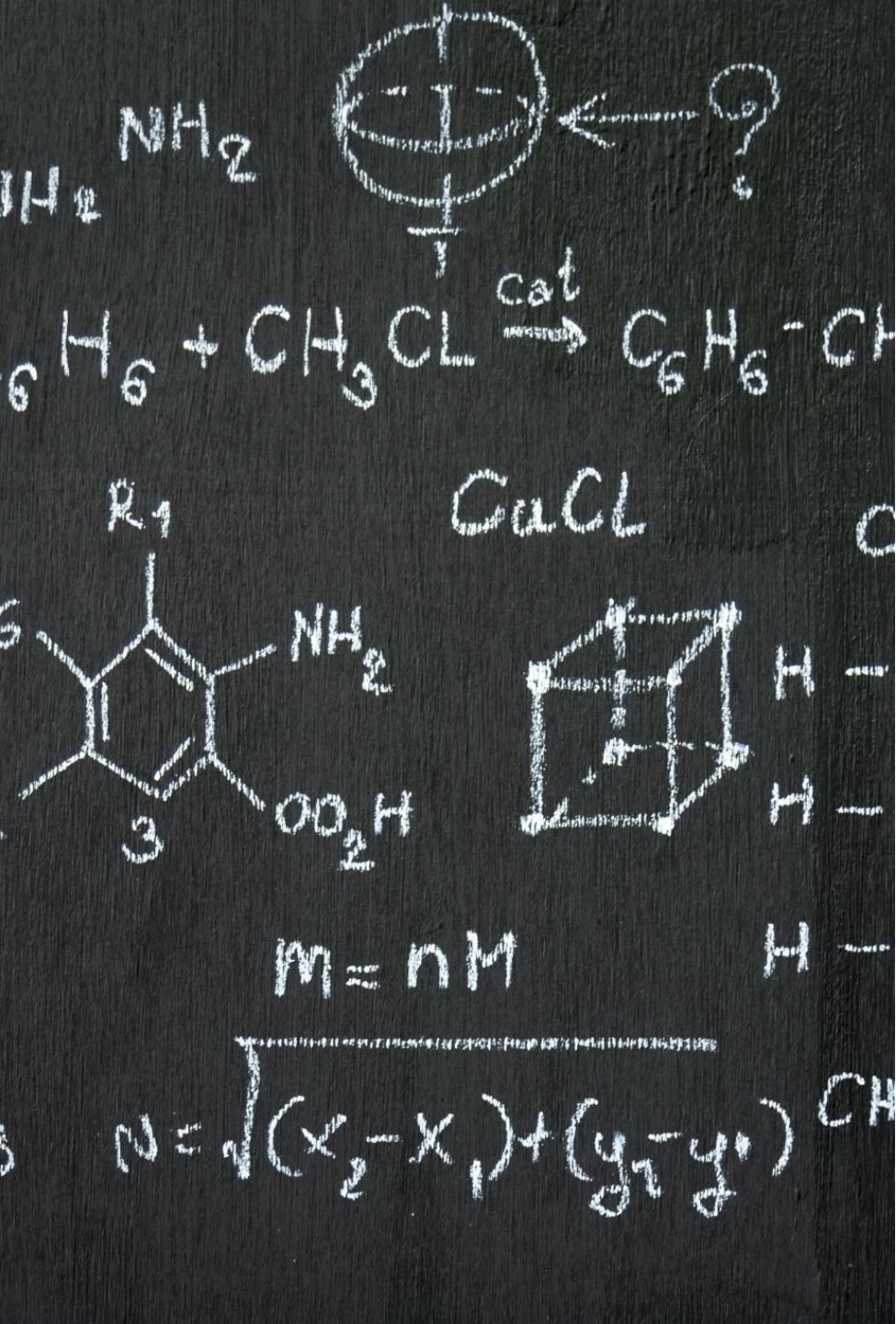
Empiricism: all knowledge comes from experience, or is known by definition.

What is the relationship between Philosophy and Science?

1. Philosophical reasoning is prior to science;

2. Science is prior to philosophy;

3. Somehow, science and philosophy depend upon each other.



Philosophical reasoning is prior to science

We could mean different things by this:

we have to do some philosophy *before* doing science;

or, (more radically) we can do science by doing philosophy (by thinking).

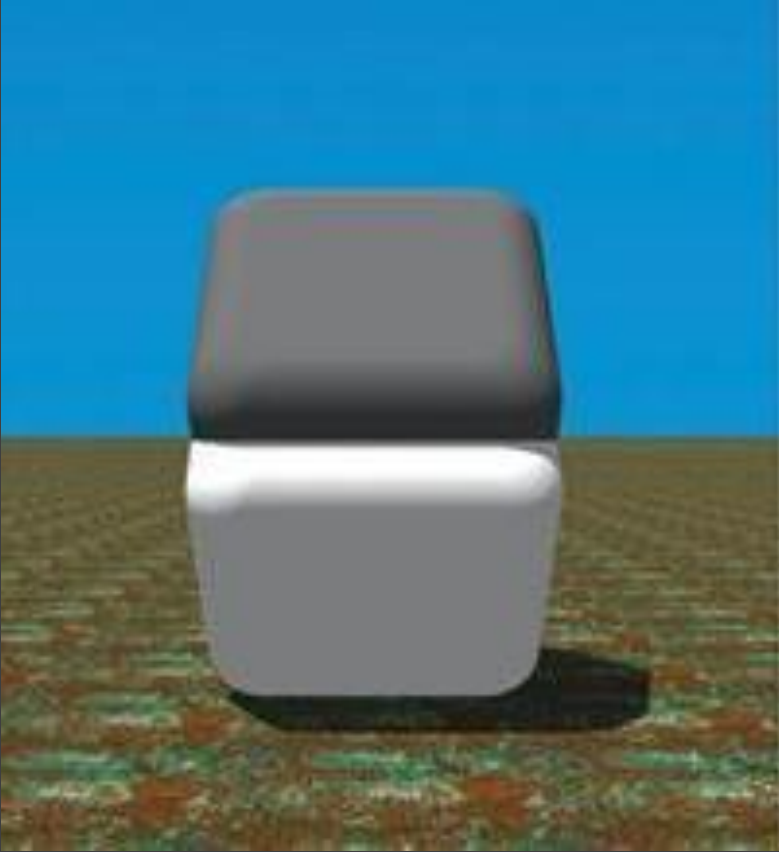
‘Philosophical reasoning is prior to science (or, physics is part of metaphysics). We can do science by reasoning.’

It doesn’t take much consideration to realise how implausible this is.



So why not just do science?

- Science has been successful in giving us knowledge about the world and the things in it.
- We should just gather evidence and rely upon it.
- The truth is out there to find if we use the right methods.



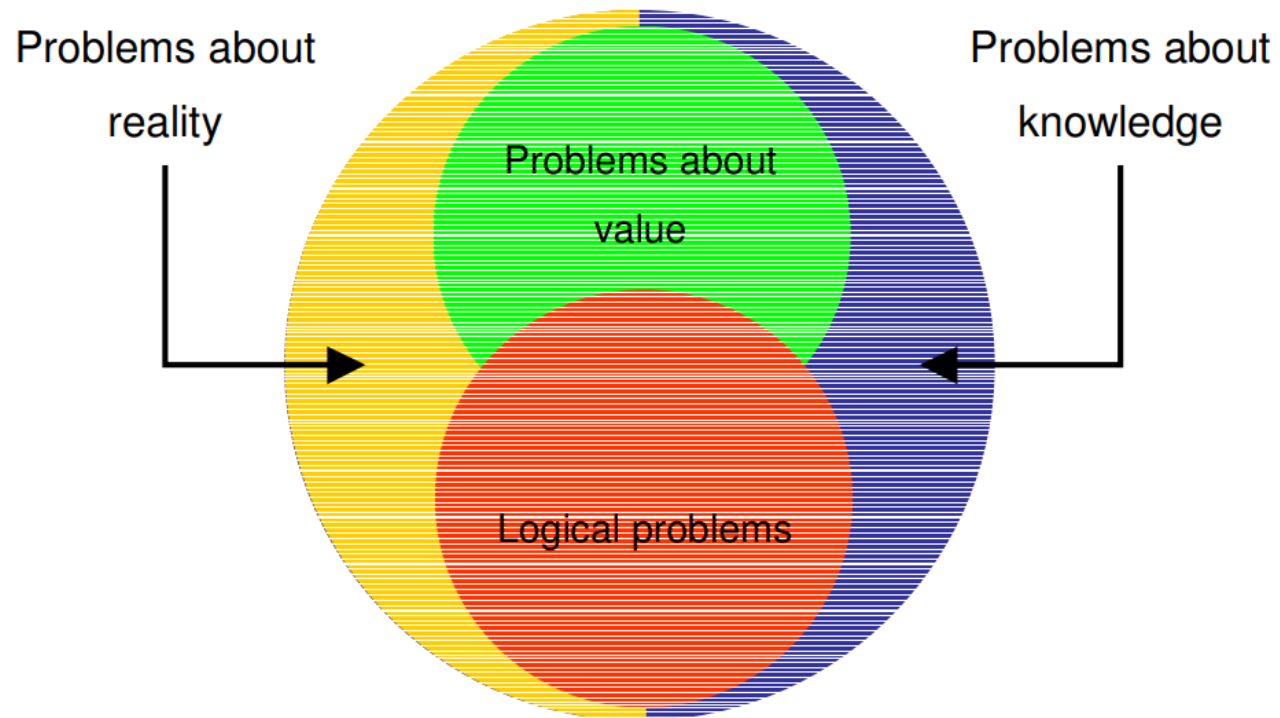
Can we trust the
evidence of the senses?

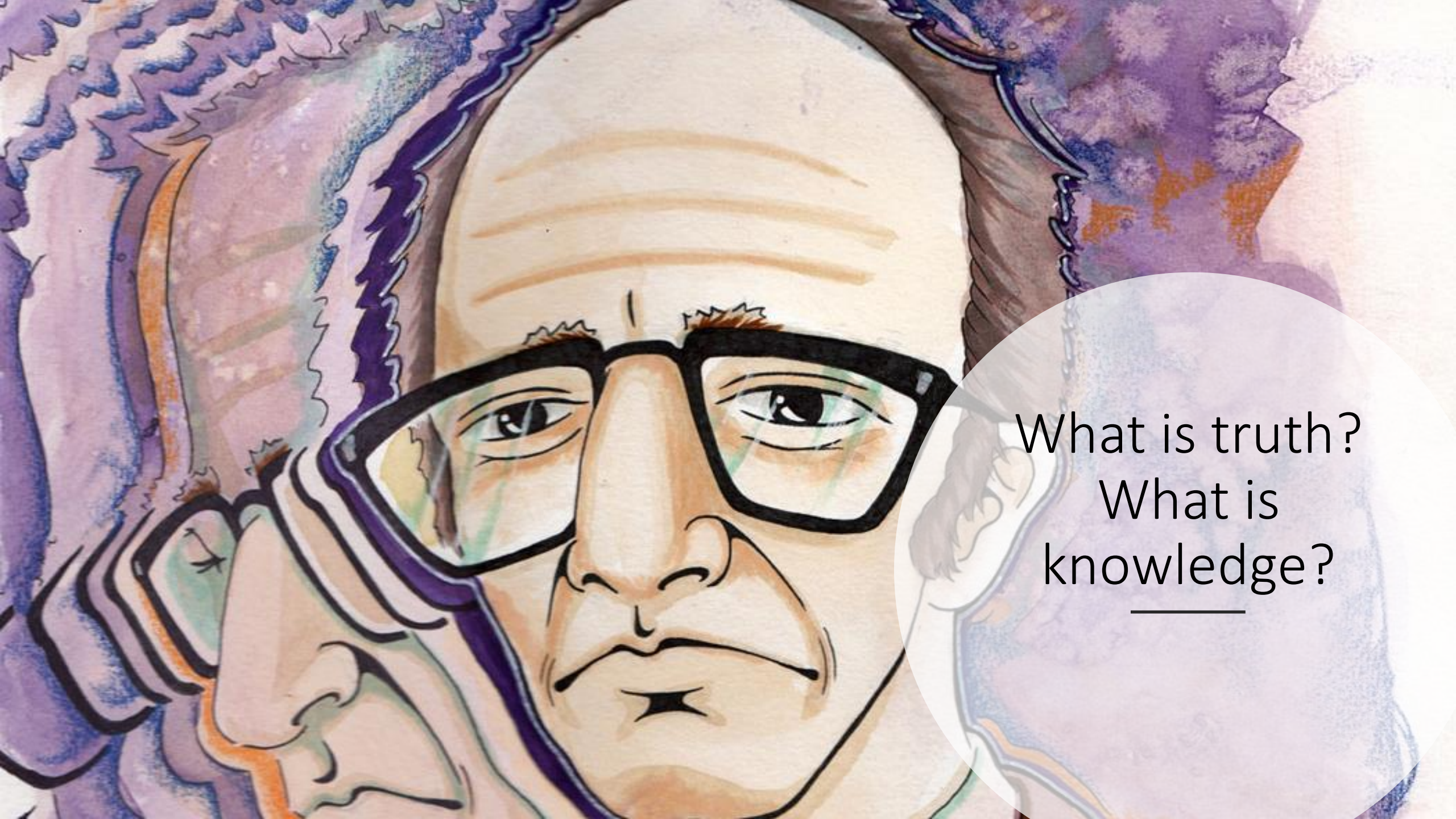
- The Argument from Colour
- The Arguments from Illusion and Hallucination



Can we trust the evidence of the senses?

Why philosophy is important ..





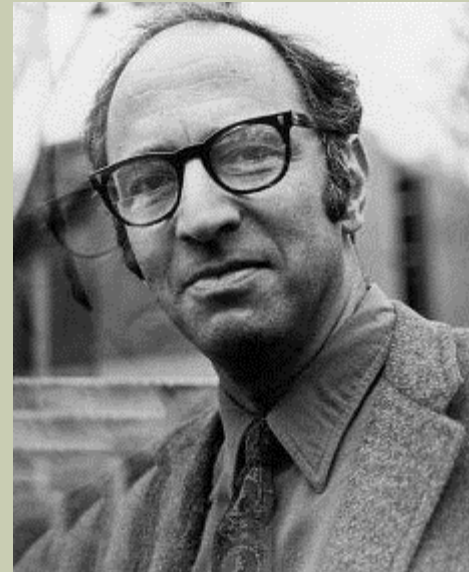
What is truth?
What is
knowledge?

Kuhn described scientific knowledge as progressing in a very different way from Popper

Karl Popper



Thomas Kuhn



WHAT

IS A

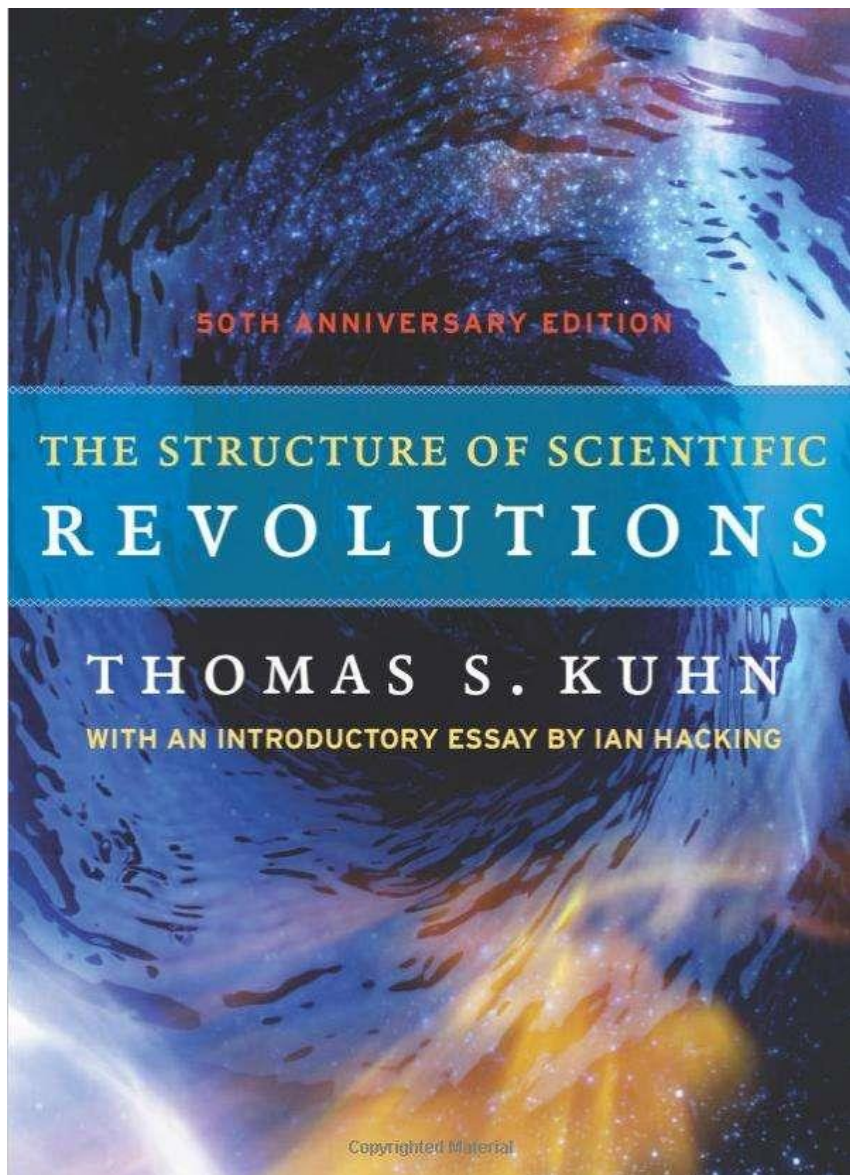
PARADIGM?



$y = g(x)$
 Secant Lines
 $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$
 $f(x) = \lim_{h \rightarrow 0} \frac{(x+h)^2 - x^2}{h}$
 $= \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 - x^2}{h}$
 $= \lim_{h \rightarrow 0} \frac{2xh + h^2}{h}$
 $= \lim_{h \rightarrow 0} (2x + h)$
 $= 2x$

Today

- Not too much on Kuhn
- See INDUCTION – ESSENTIAL INFORMATION



[北京大学科技史与科技哲学丛书]

科学革命的结构

(第四版)

THE STRUCTURE OF
SCIENTIFIC REVOLUTIONS

托马斯·库恩 (Thomas S. Kuhn) 著
伊安·哈金 (Ian Hacking) 导读
金吾伦 胡新和 译



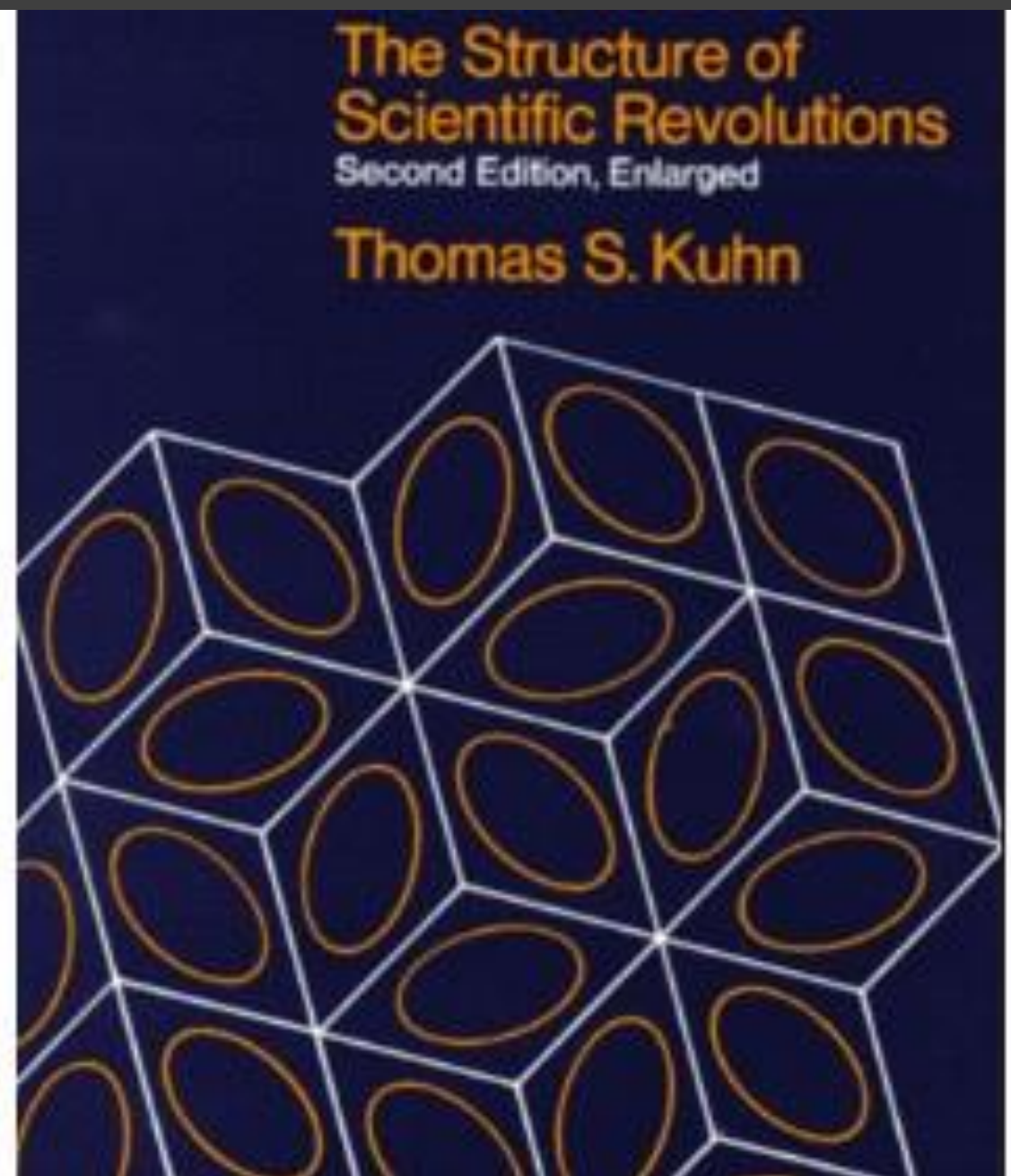
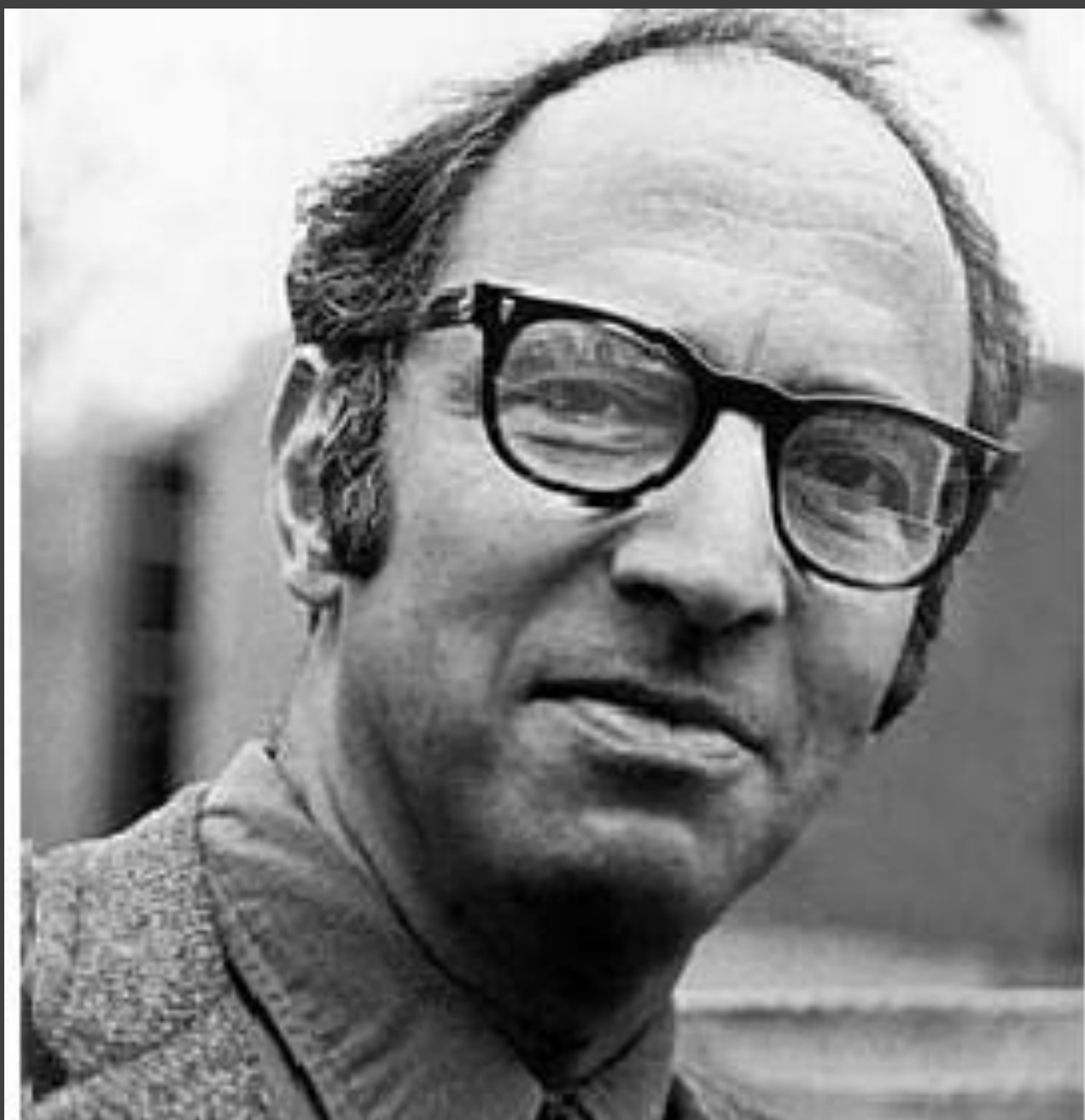
北京大学出版社
PEKING UNIVERSITY PRESS



Basic principles of research design

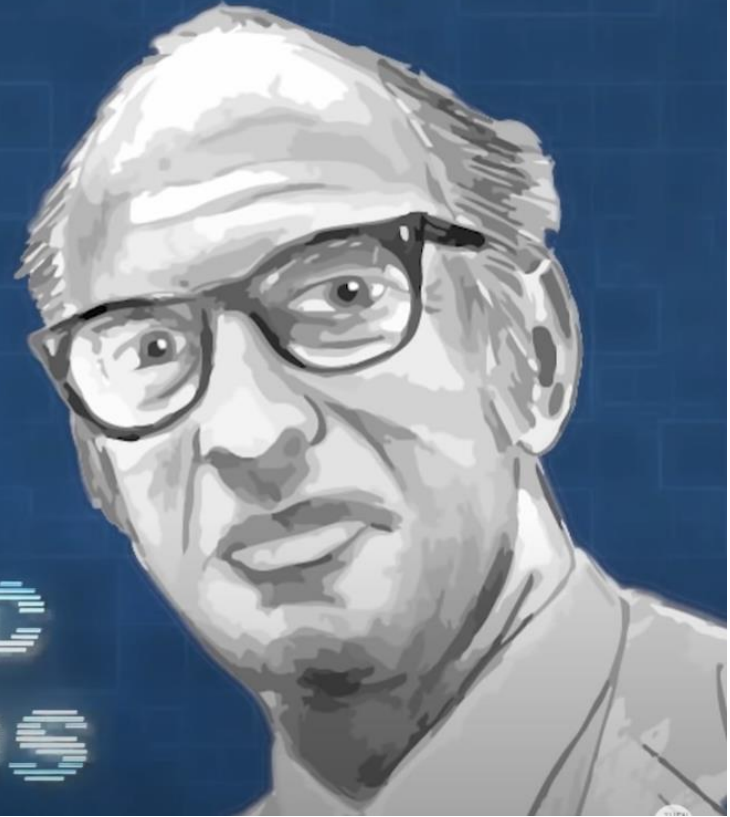
Four main features of research design, which are distinct, but closely related

- **Ontology:** How you, the researcher, view the world and the assumptions that you make about the nature of the world and of reality
- **Epistemology:** The assumptions that you make about the best way of investigating the world and about reality
- **Axiology:** Is the role and place of values in the research process, specifically the influence of values on the relationship between paradigm, methodology, and methods, is known as axiology—that is, the research paradigm is axiological in that the values of the researcher inform the choice of methods.
- **Methodology:** The way that you group together your research techniques to make a coherent picture
- **Methods and techniques:** What you actually do in order to collect your data and carry out your investigations
- These principles will inform which methods you choose: you need to understand how they fit with your 'bigger picture' of the world, and how you choose to investigate it, to ensure that your work will be coherent and effective



THOMAS KUHN

*The Structure
of Scientific
Revolutions*



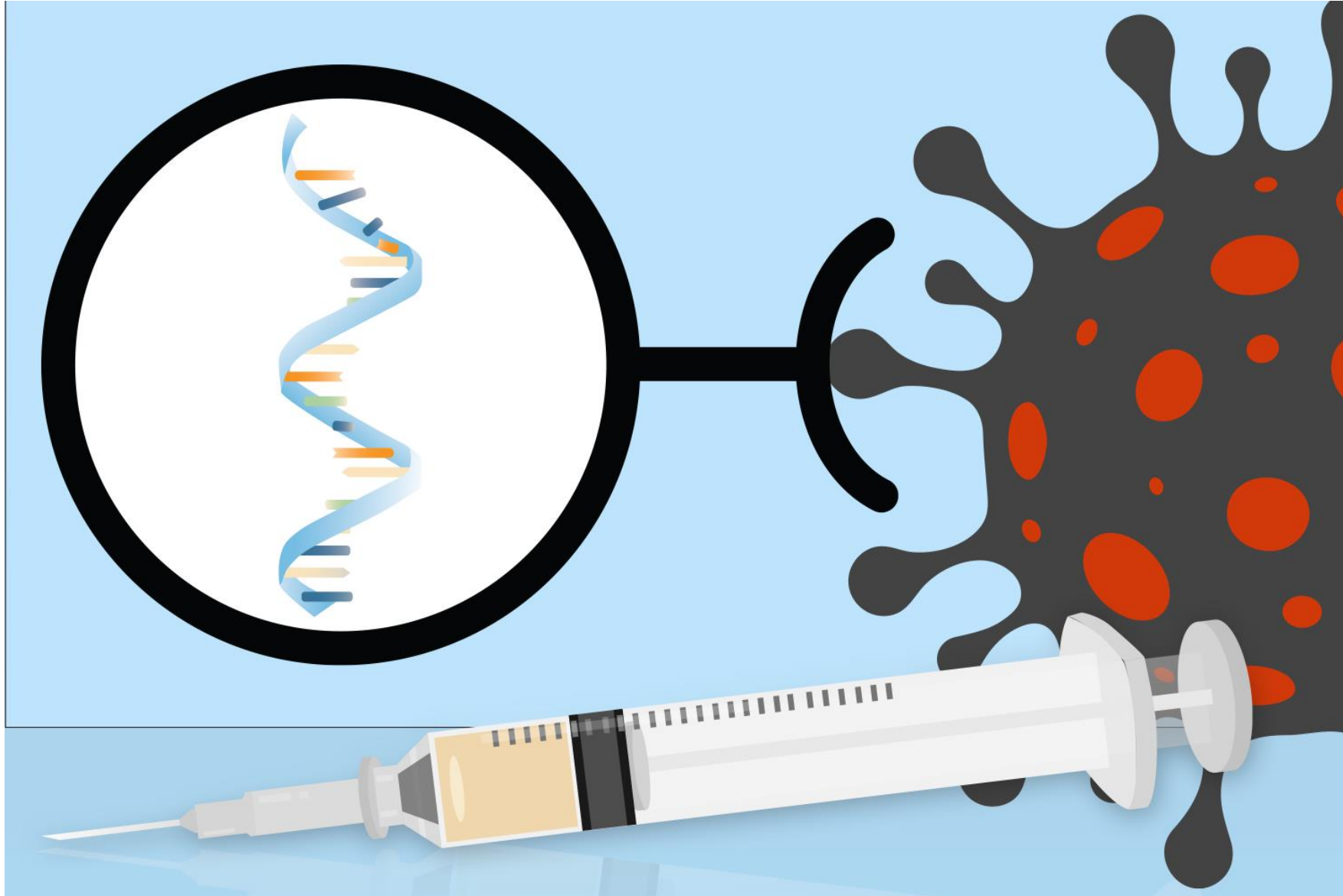


NORMAL SCIENCE

Normal science

- Normal science is, as we read Kuhn, *very nearly all* that scientists actually do.
- Normal science is the day-to-day research that scientists conduct in order to fill in the gaps in scientific knowledge that are found within the dominant paradigm.



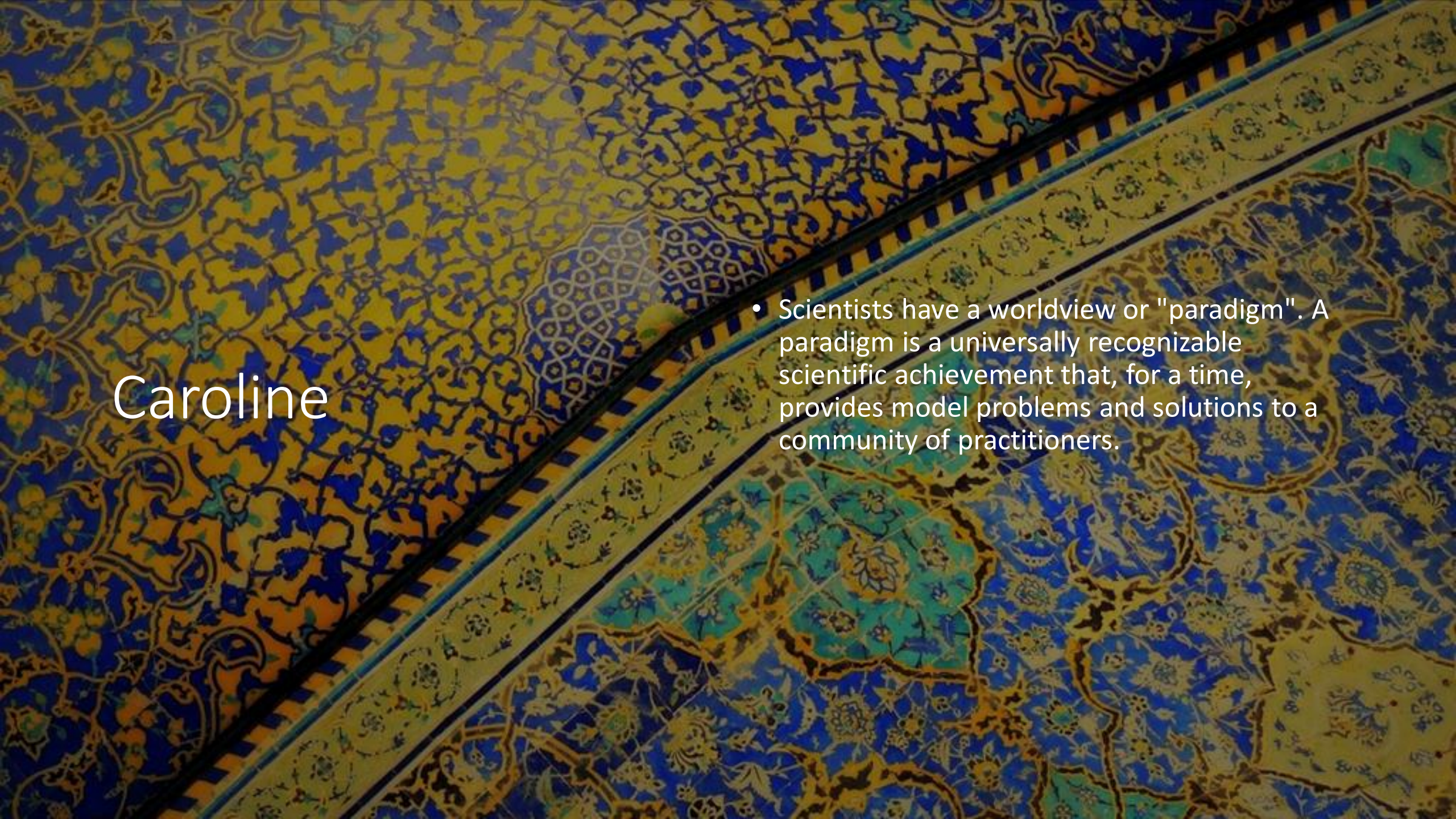






PARADIGM

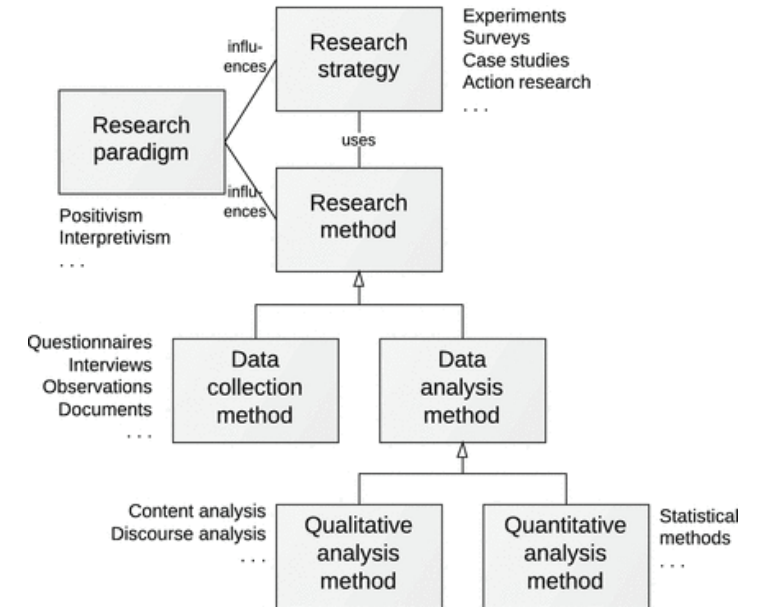




Caroline

- Scientists have a worldview or "paradigm". A paradigm is a universally recognizable scientific achievement that, for a time, provides model problems and solutions to a community of practitioners.

Paradigm	Ontology <i>What is reality?</i>	Epistemology <i>How can I know reality?</i>	Theoretical Perspective <i>Which approach do you use to know something?</i>	Methodology <i>How do you go about finding out?</i>	Method <i>What techniques do you use to find out?</i>
Positivism	There is a single reality or truth (more realist).	Reality can be measured and hence the focus is on reliable and valid tools to obtain that.	Positivism Post-positivism	Experimental research Survey research	Usually quantitative, could include: Sampling Measurement and scaling Statistical analysis Questionnaire Focus group Interview
Constructivist / Interpretive	There is no single reality or truth. Reality is created by individuals in groups (less realist).	Therefore, reality needs to be interpreted. It is used to discover the underlying meaning of events and activities.	Interpretivism (reality needs to be interpreted) - Phenomenology - Symbolic interactionism - Hermeneutics Critical Inquiry Feminism	Ethnography Grounded Theory Phenomenological research Heuristic inquiry Action Research Discourse Analysis Feminist Standpoint research etc	Usually qualitative, could include: Qualitative interview Observation Participant Non participant Case study Life history Narrative Theme identification etc
Pragmatism	Reality is constantly renegotiated, debated, interpreted in light of its usefulness in new unpredictable situations.	The best method is one that solves problems. Finding out is the means, change is the underlying aim.	Deweyan pragmatism <i>Research through design</i>	Mixed methods Design-based research Action research	Combination of any of the above and more, such as data mining expert review, usability testing, physical prototype
Subjectivism	Reality is what we perceive to be real	All knowledge is purely a matter of perspective.	Postmodernism Structuralism Post-structuralism	Discourse theory Semiotics Archaeology Genealogy Deconstruction etc.	Autoethnography Semiotics Literary analysis Pastiche Intertextuality etc.
Critical	Realities are socially constructed entities that are under constant internal influence.	Reality and knowledge is both socially constructed and influenced by power relations from within society	Marxism Queer theory feminism	critical discourse analysis, critical ethnography action research ideology critique	Ideological review Civil actions open-ended interviews, focus groups, open-ended questionnaires, open-ended observations, and journals.

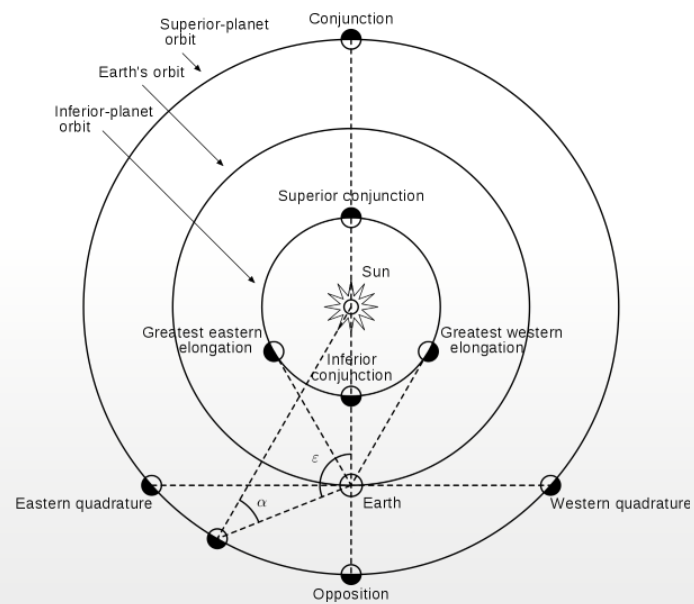


	Positivism-oriented		Interpretivism-oriented
Ontology: What is reality?	Positivism Naïve realism. Objective reality.	Post-positivism Critical realism. Reality is imperfectly apprehendable.	Interpretivism Constructivism Subject and object are dependent. The real essence of the object cannot be known. Reality is constructed.
Epistemology: How do you know?	Dualism researcher-research. Replicable findings are "true". Reality can be explained.	Dualism is not possible. Replicated findings are "probably" true. Impossible to fully explain reality.	Knowledge is interpreted. Reality can be understood. Reality can be constructed.
Methodologies: How do you find it out?	Experimental, deductive. Mainly quantitative. Relationship cause-effect. Statistical analysis.	Experimental, deductive. Mainly quantitative methods, manipulative. Scientific Community plays an important role of validation. Statistical analysis. Probability sampling.	Interpretation. Mainly qualitative methods. Purposive and multipurpose sampling. Stakeholders involvement.

The paradigm 'provides a map whose details are elucidated by mature scientific research. And since nature is too complex and varied to be explored at random, that map is as essential as observation and experiment to science's continuing development. Through the theories they embody, paradigms prove to be constitutive of the research activity.'

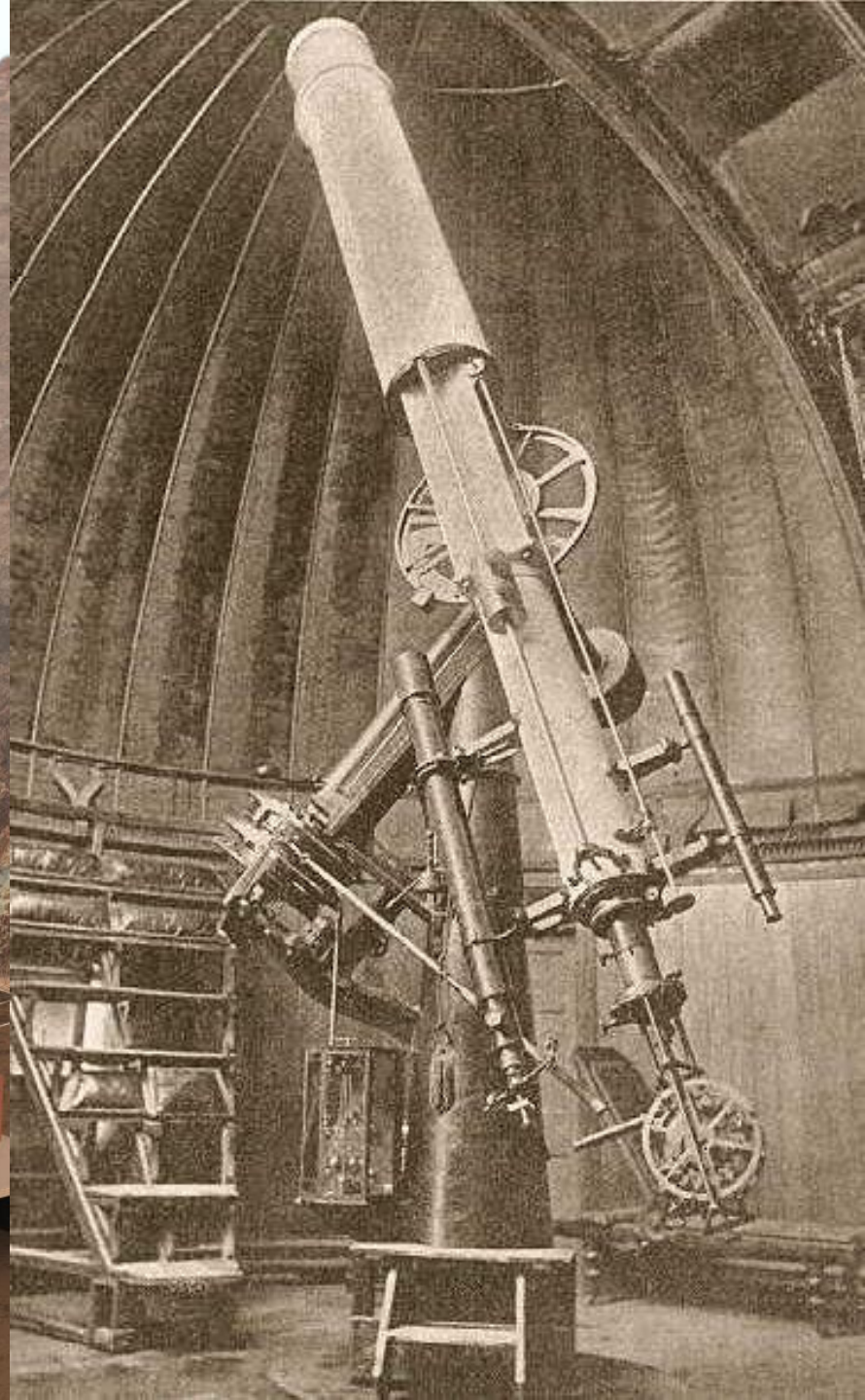
FACTS
INSTRUMENTS
PROBLEMS

Concentration of Hydrogen ions compared to distilled water		Examples of solutions at this pH	
10,000,000	pH = 0	Battery acid, Strong Hydrofluoric Acid	↑ ACIDIC
1,000,000	pH = 1	Hydrochloric acid secreted by stomach lining	
100,000	pH = 2	Lemon Juice, Gastric Acid, Vinegar	
10,000	pH = 3	Grapefruit, Orange Juice, Soda	
1,000	pH = 4	Tomato Juice, Acid rain	
100	pH = 5	Soft drinking water, Black Coffee	↑ NEUTRAL
10	pH = 6	Urine, Saliva	
1	pH = 7	"Pure" water	↓ BASIC (ALKALINE)
1/10	pH = 8	Sea water	
1/100	pH = 9	Baking soda	
1/1,000	pH = 10	Great Salt Lake, Milk of Magnesia	
1/10,000	pH = 11	Ammonia solution	
1/100,000	pH = 12	Soapy water	
1/1,000,000	pH = 13	Bleaches, Oven cleaner	
1/10,000,000	pH = 14	Liquid drain cleaner	



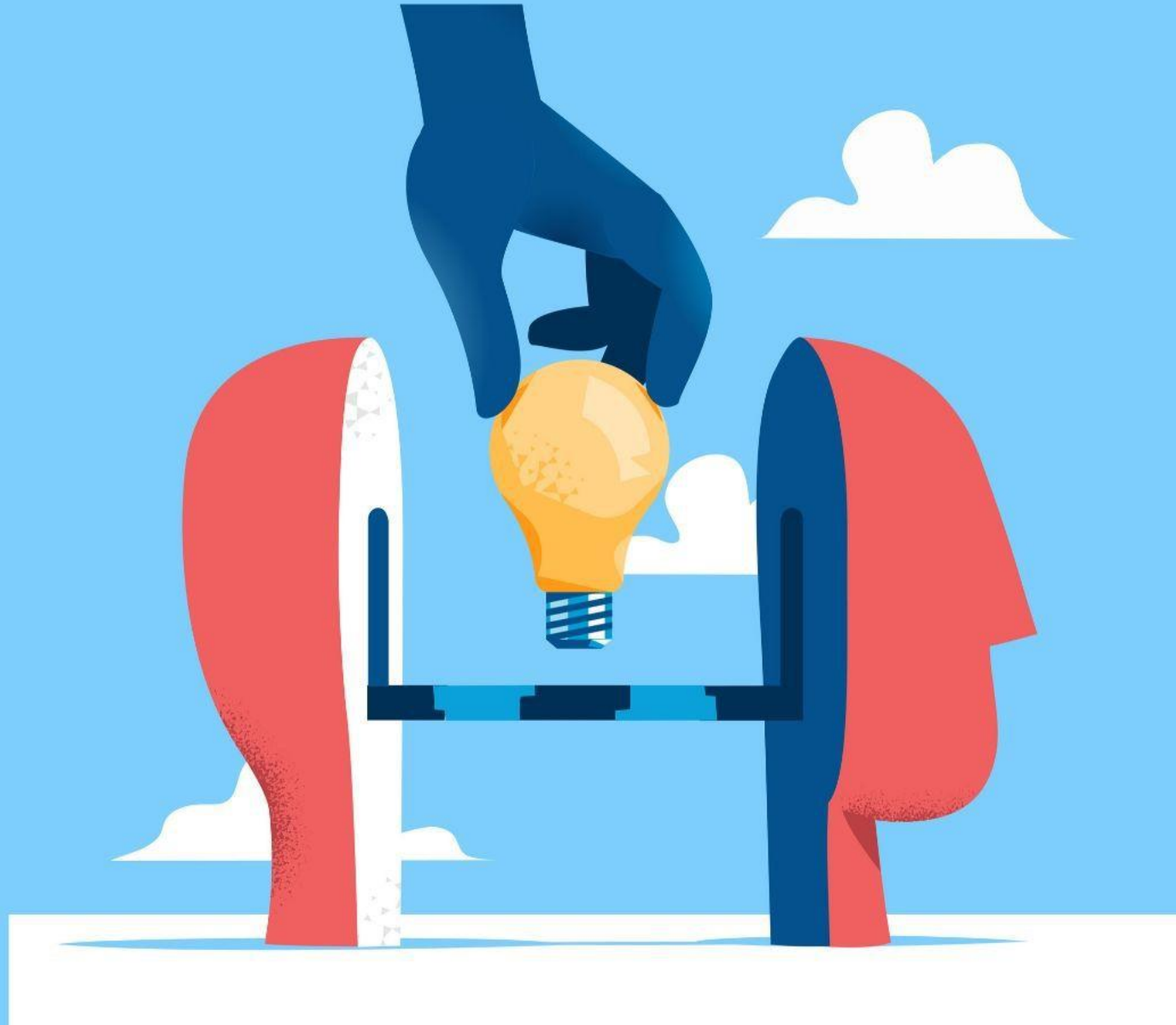
Elements (3d-series)	Atomic no.	Outer electronic configuration	Melting point (°C)	Boiling point (°C)
Sc	21	$3d^1 4s^2$	1541	2836
Ti	22	$3d^2 4s^2$	1668	3287
V	23	$3d^3 4s^2$	1910	3407
Cr	24	$3d^5 4s^1$	1907	2944
Mn	25	$3d^5 4s^2$	1246	2061
Fe	26	$3d^6 4s^2$	1538	2862
Co	27	$3d^7 4s^2$	1495	2927
Ni	28	$3d^8 4s^2$	1455	2730
Cu	29	$3d^{10} 4s^1$	1084.6	2562
Zn	30	$3d^{10} 4s^2$	419.5	907

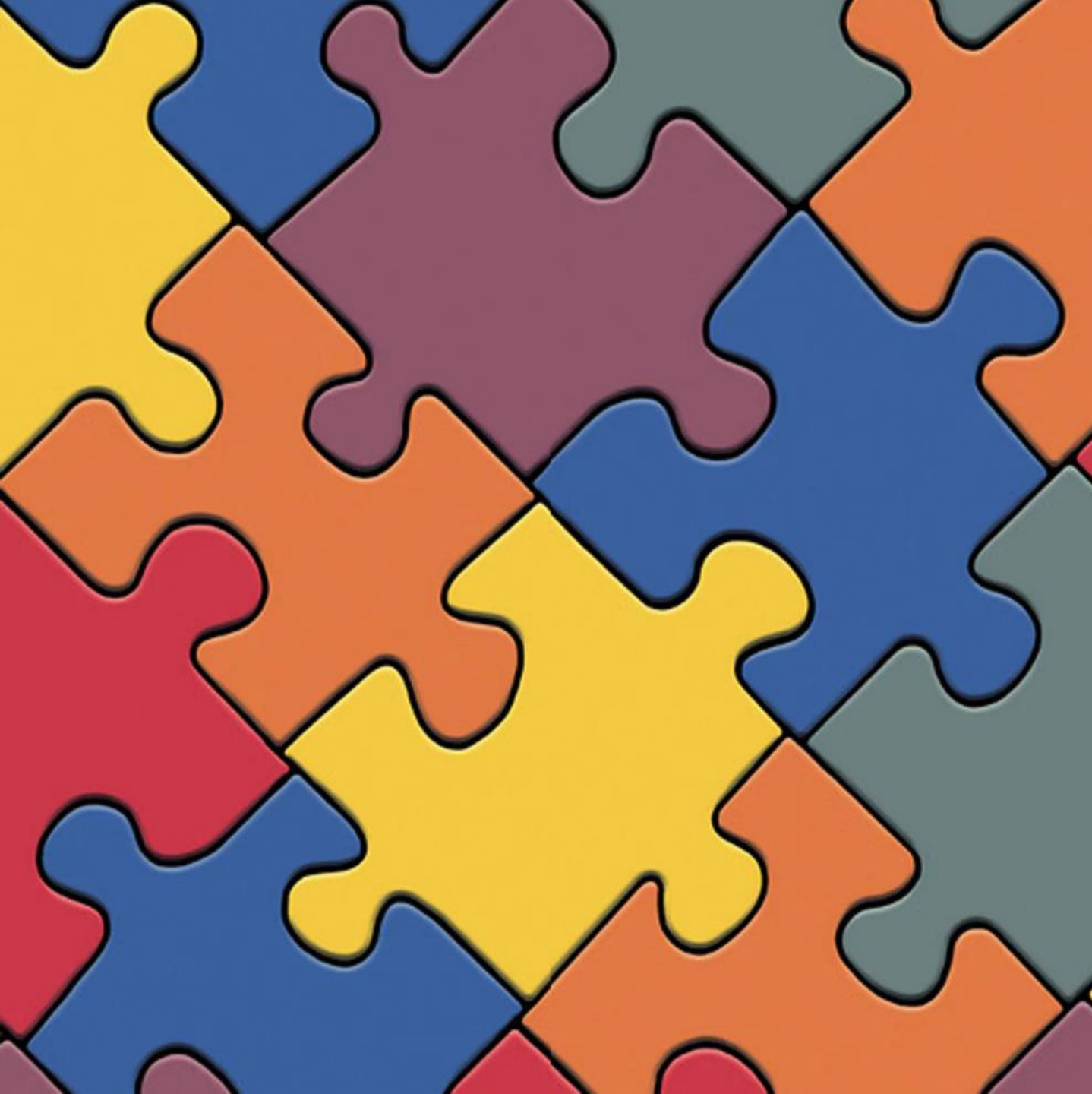
FACTS
INSTRUMENTS
PROBLEMS



FACTS
INSTRUMENTS
PROBLEMS

KNOWLEDGE GAPS



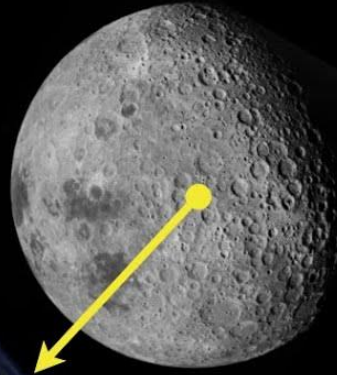


Are you here to solve a puzzle ?

- According to Kuhn, normal science is simply puzzle solving.
- The puzzles are assumed to have a solution based on this collection of theories, facts, science and instruments and there are assumptions that direct the puzzle solving.
- Most importantly this selection of pieces will solve the puzzle but sometimes they don't sometimes the pieces don't fit and sometimes the rules of the puzzle need to be abandoned.

Newton:
“That force by which
the moon is held back
in its orbit is that very
force which we
usually call ‘gravity’.”

Principia, Book III, Prop. IV.



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Staff » Hub

thomas kuhn paradigms

Thomas Kuhn (Stanford

Thomas Kuhn: The Struct

The 18th-century battle

I can't explain - Google S

fn prtscr not working - G

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← → ↺ physicstoday.scitation.org/doi/10.1063/1.3293410 ↻ ☆ ⚙ ⌵ □

PHYSICS TODAY

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Home > January 2010 (Volume 63, Issue 1) > Page 27, doi:10.1063/1.3293410

The 18th-century battle over lunar motion

In a dispute with more than just scientific import, Alexis Clairaut, Leonhard Euler, and Jean le Rond d'Alembert each employed their own strategies to establish that they were the first to understand a puzzling feature of the Moon's orbit.

Siegfried Bodenmann (siegfried.bodenmann@lapost.net) is a coeditor of Leonhard Euler's French correspondence for the Euler Commission of the Swiss Academy of Sciences in Basel, Switzerland.

PDF

4

0 COMMENTS

f t in r

TOOLS

< PREV

NEXT >

Physics Today **63**, 1, 27 (2010); <https://doi.org/10.1063/1.3293410>

About two years after *Sputnik 1* began emitting radio signals, the Soviet Union's *Luna 2* became the first manmade object to reach the Moon. The intentional crash landing of the spacecraft on 13 September 1959 once again demonstrated Soviet technological superiority over the US. That event can be regarded as the trigger of the so-called race to the Moon, initiated by President John F. Kennedy in May 1961. As the much-broadcast commemoration of *Apollo 11* and the first manned landing on the Moon reminded us, the Americans won the competition.

Every story has a prologue. The one preceding Neil Armstrong's historic steps shows that a captivating plot from the past needn't include a cold war or spies. It tells of three men who

RECOMMENDED

Of Martians, aerodynamics, and fathering the bomb

Einstein and socialism

Mayer earned the lunar-table prize

In the Wake of Galileo

Low Noise Preamplifier

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Training Older Wor...pdf

QE1 Module Revi...docx

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JOB DESCRIPTION...pdf

School of Social Sc...pdf

Show

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10.1063/1.3
293410

ANOMALIES

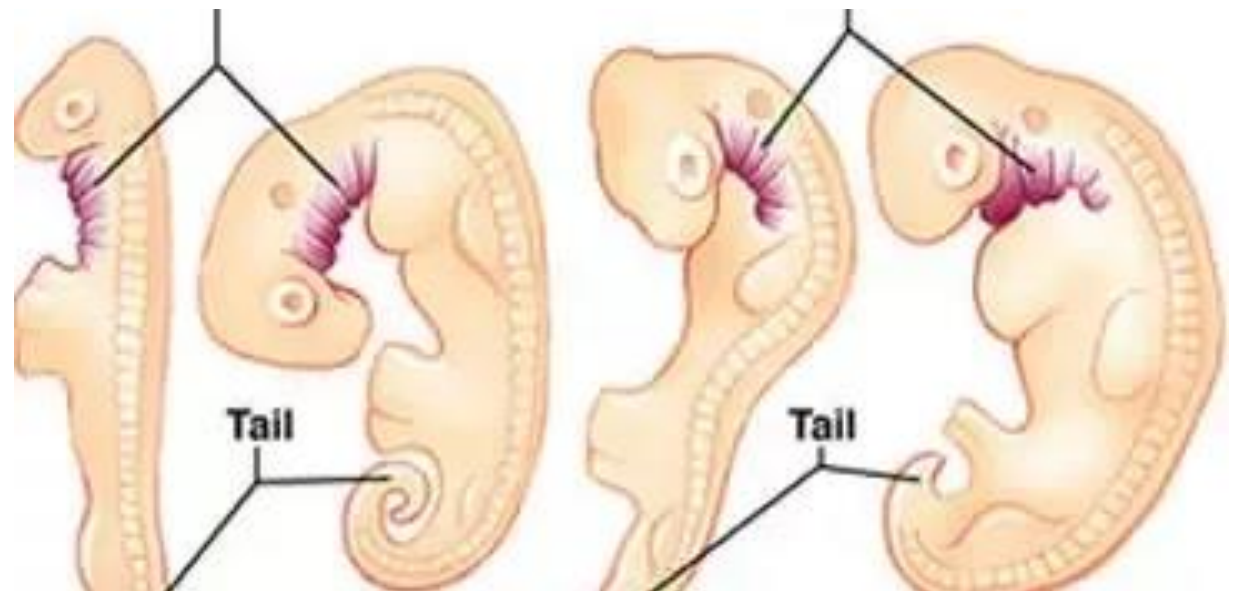
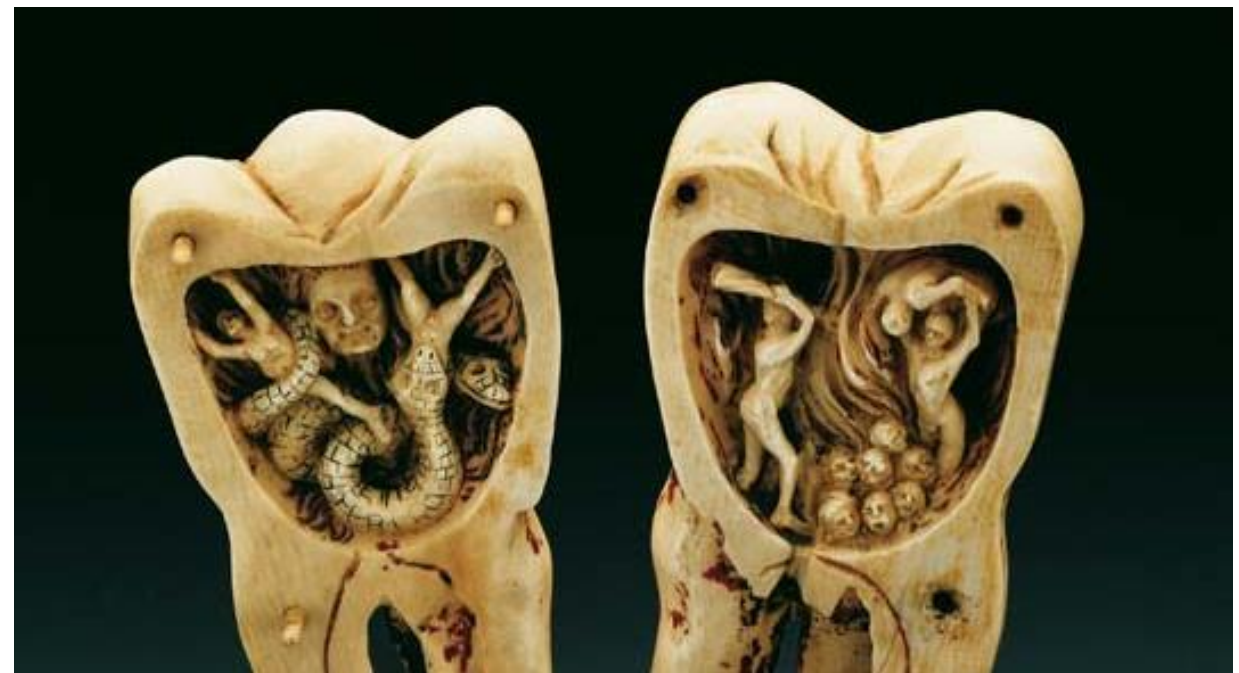
'When, for these reasons or others like them, an anomaly comes to seem more than just another puzzle of normal science, the transition to crisis and to extraordinary science has begun. The anomaly itself now comes to be more generally recognized as such by the profession. More and more attention is devoted to it by more and more of the field's most eminent men.'

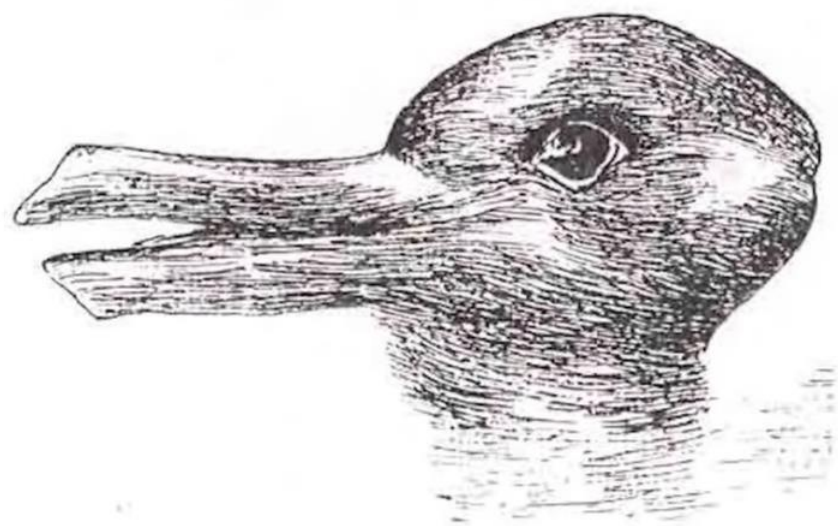
You, 'extraordinary'
science, a revolution,
more
experiments/further
research, You

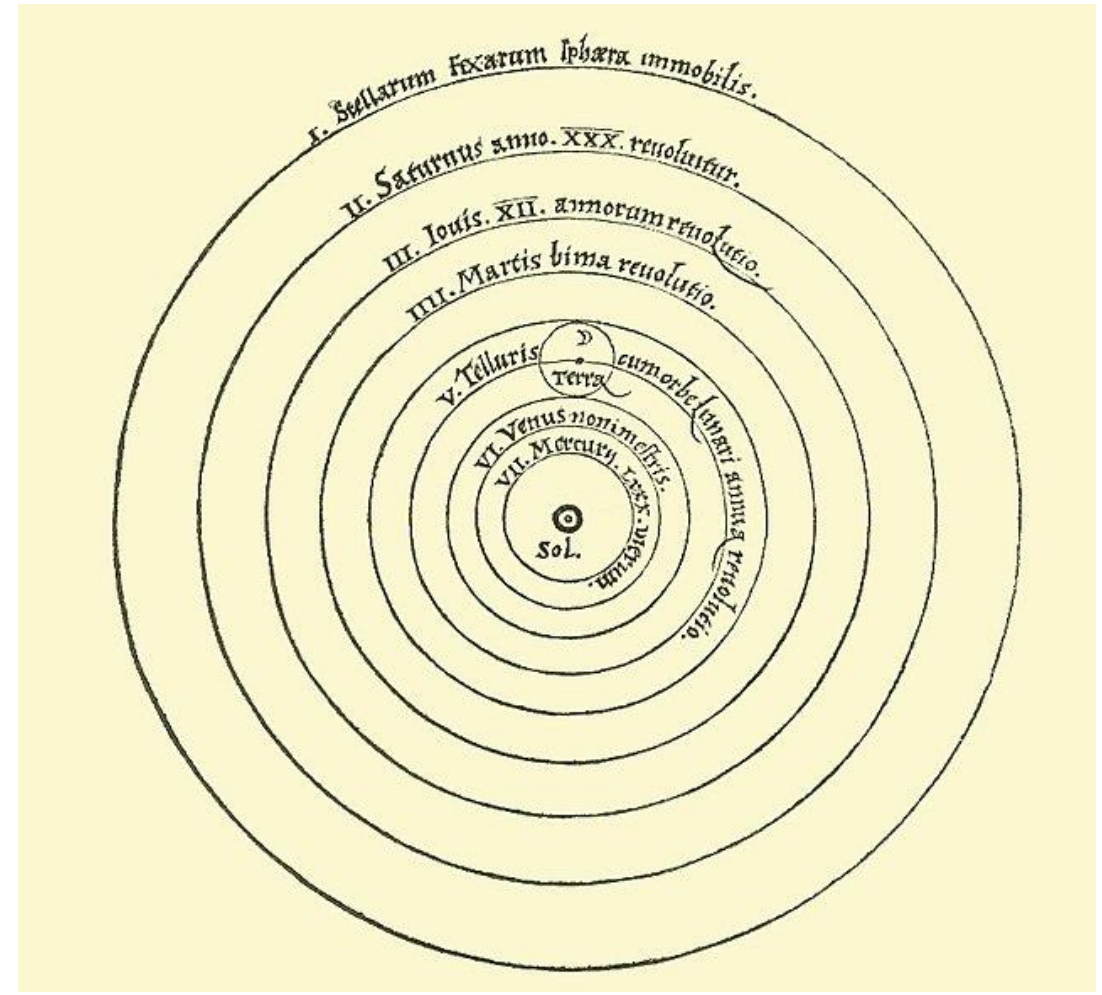
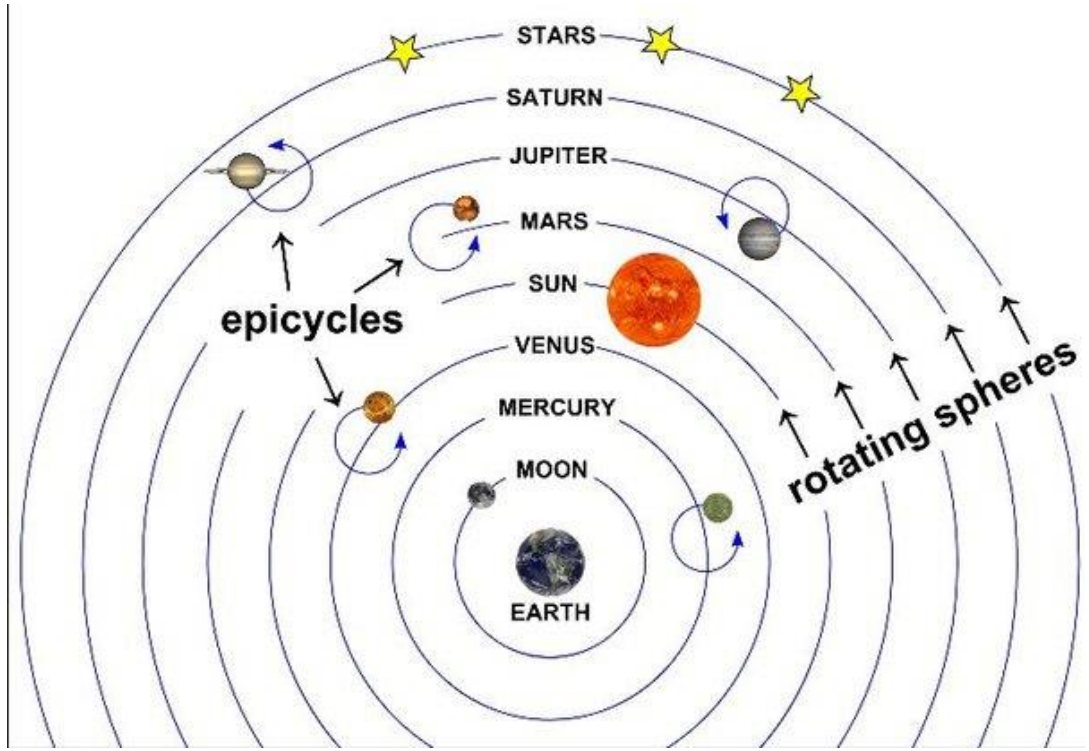
- This leads to the pursuit of extraordinary science which might lead to a revolution this extraordinary phase consists of a loosening of the rules of research.
- More experimentation and creativity more randomness trying new and unique experiments and the deconstruction of stereotypes, the reading of different philosophies, the proliferation of competing articulations, the willingness to try anything the expression of explicit discontent the recourse to philosophy.

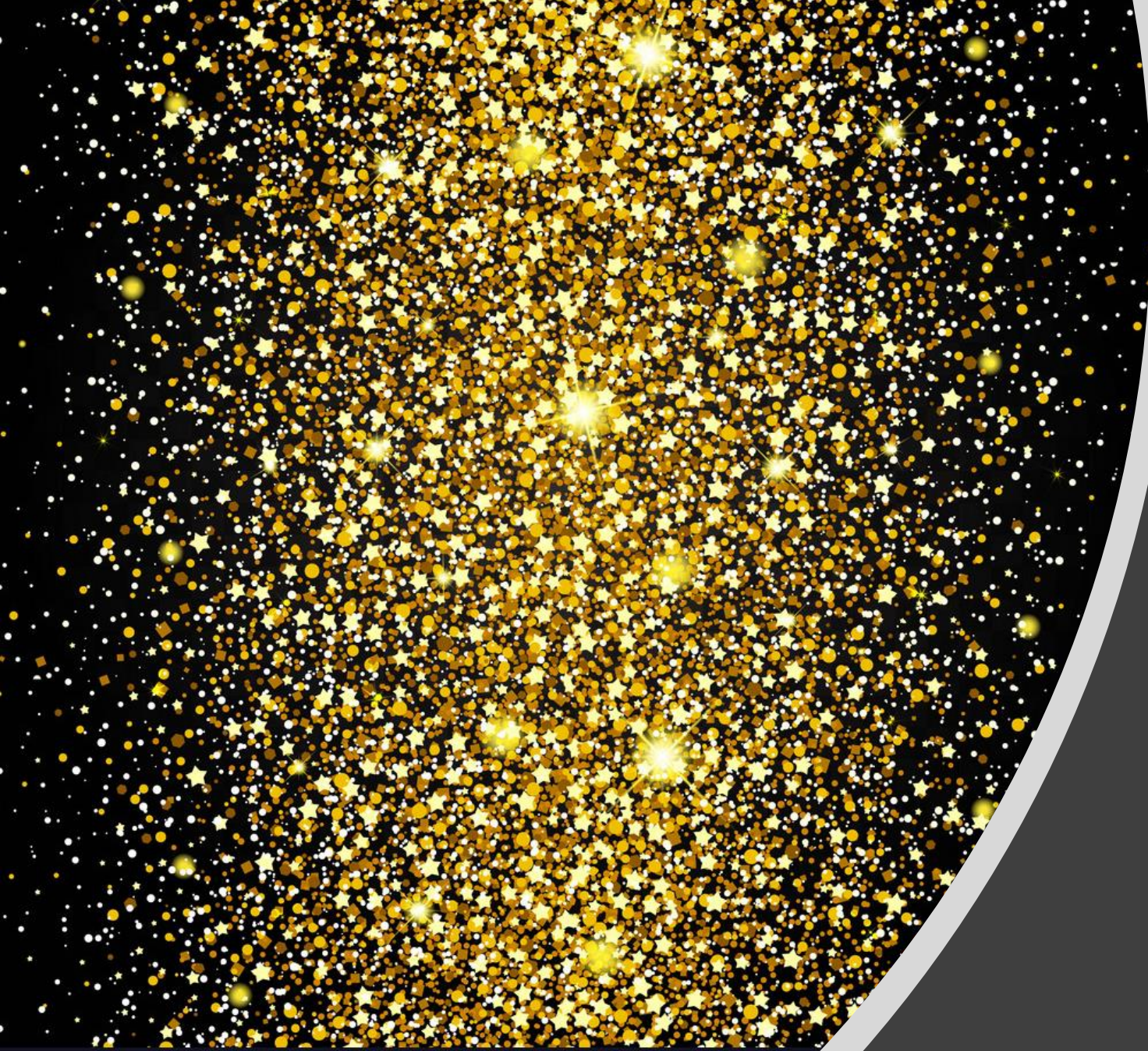
'The proliferation of competing articulations, the willingness to try anything, the expression of explicit discontent, the recourse to philosophy and to debate over fundamentals, all these are symptoms of a transition from normal to extraordinary research.'

***PARADIGM
SHIFT
VIEW***









Let me try to
get closer to
the point of
this lecture

The point for Kuhn and the point for doctoral research is



What do you see?
By shifting perspective you might see an
old woman or a young woman.

- In a vastly complicated world, what you are concentrating on, or the tools, instruments including language, you use makes a huge difference to the results.



Kuhn also said

- Paradigm shifts are usually sparked by **young creative or eccentric individuals** so scientists new to the field people not embedded so deeply in the assumed paradigm they see things in completely new ways paradigms change how we perceive the world.

Scientific development in terms of paradigms and Kuhn

- Kuhn's explanation contrasted with explanations in terms of rules of method (or confirmation, falsification etc.) that most philosophers of science took to be constitutive of rationality.
- Furthermore, the relevant disciplines were not then advanced enough to support Kuhn's contentions concerning paradigms, or those disciplines were antithetical to Kuhn's views.
- Now that naturalism has become an accepted component of philosophy, there has recently been interest in reassessing Kuhn's work in the light of developments in the relevant sciences, many of which provide corroboration for Kuhn's claim that science is driven by relations of perceived similarity and analogy.

Important

- Kuhn's work set the stage for constructivists to argue that **science is not any better at uncovering facts about nature than are religion, politics, or folklore**. Instead, they argue that what we accept as reality is determined, in large part, by social factors (e.g. Feyerabend, 1975; Latour and Woolgar, 1979).

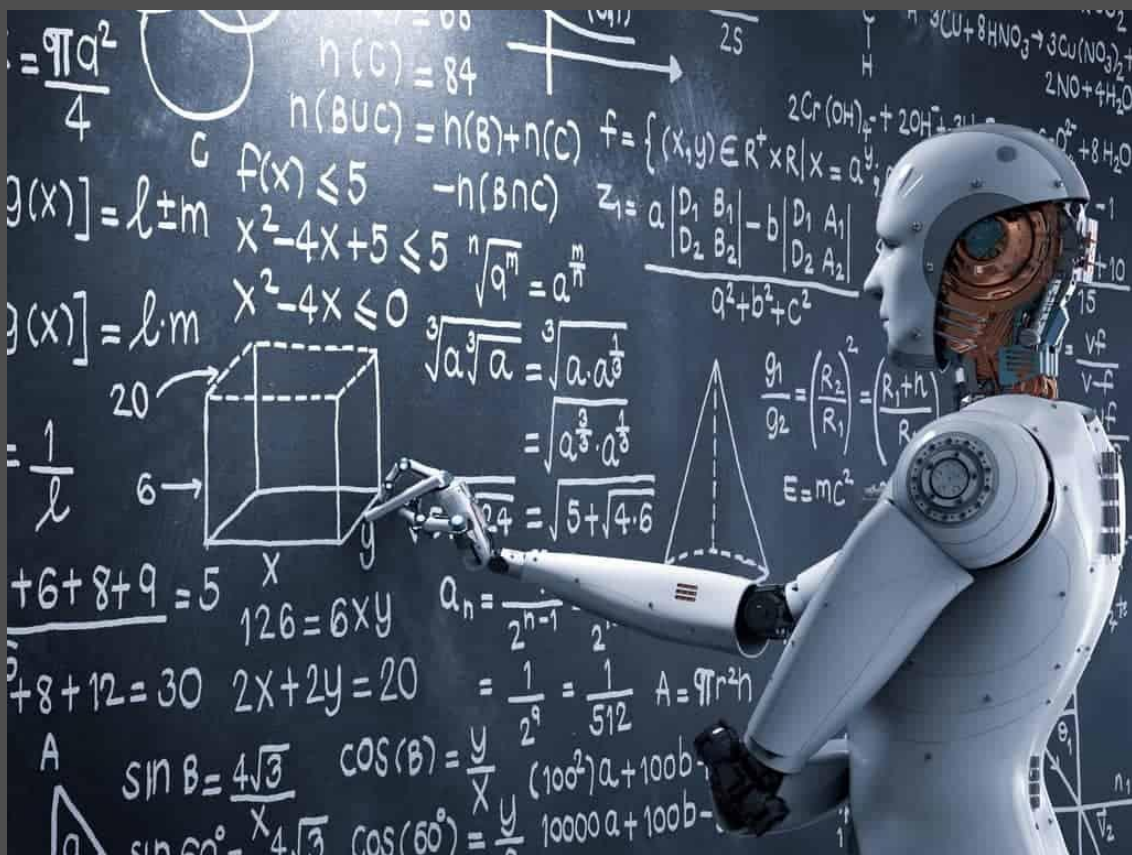
Ok so the
doctorate ...

Realism and constructivism

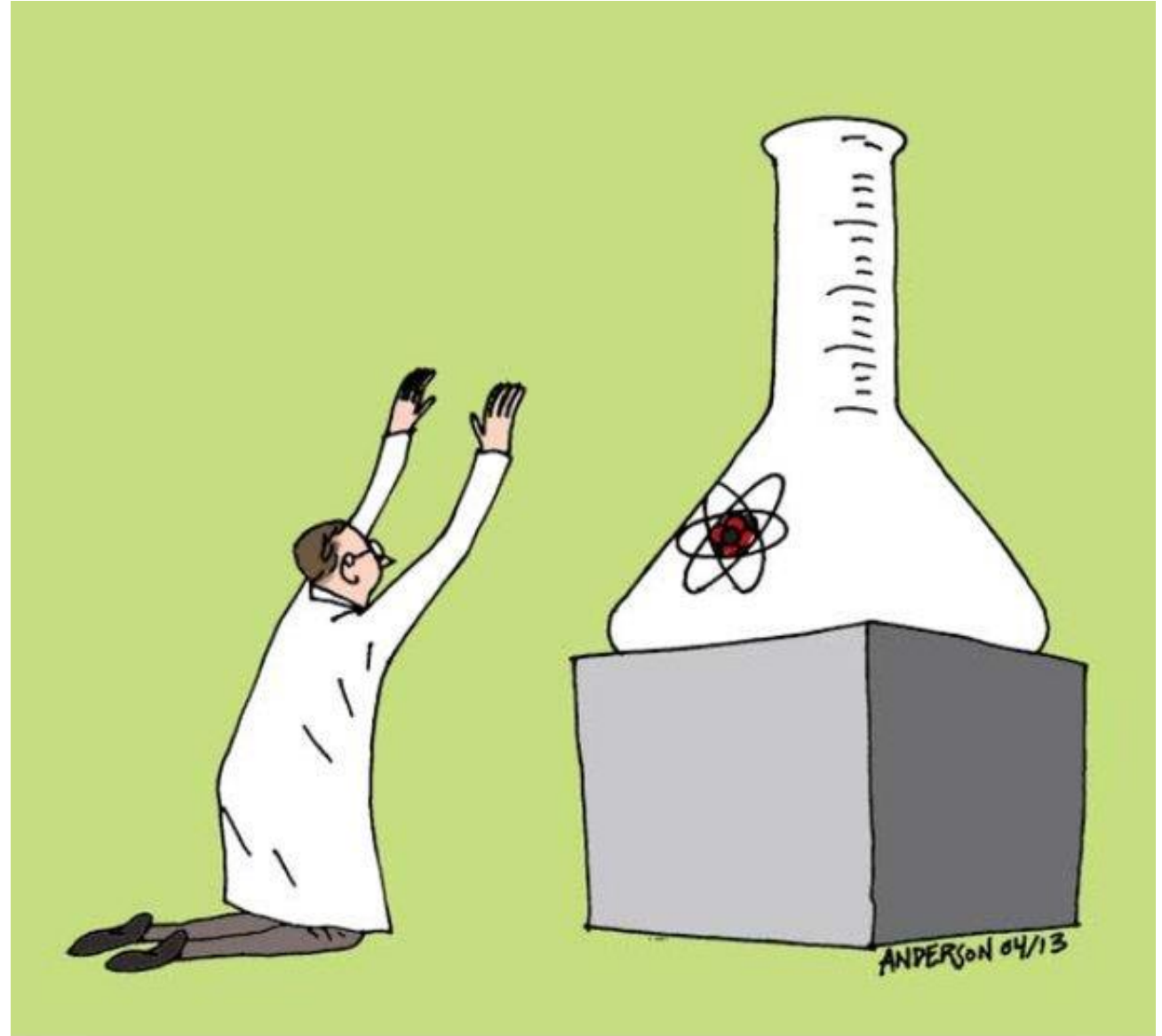
	Realism	Constructivism
Nature of observed reality	Partial but immutable	Socially constructed
Role of manager	Reactor, information processor.	Actor, generator of contexts.
Nature of strategic choice	Rational, response to contingencies.	Ideological actions of sub-organisational interest groups.
Organisational identity	Overt, singular.	Multiple, fragmented.
Theories of measurement	Replication as key to accuracy.	Context as key to perspective.

R v C

- REALISTS - those who are committed to the idea that there exists a physical reality independent of human perceptions, and that science is in the business of systematically uncovering that reality.
- CONSTRUCTIVISTS - those who feel that human activity, specifically our psychology and sociology, shapes our reality. They think that, to a large degree, humans construct their reality.



Science
epistemically
superior



Crux is the paradigm

- And so Kuhn called the “paradigm” that structures and guides everything that happens in a field of science, from the initial formulation of research questions, to constructing relevant experiments, to explanations of observable phenomena.
- **Without a paradigm, scientists would be unable to follow a consistent overall plan for what to do or how to do it, and their field of study would not achieve the kind of success we come to expect from a real scientific discipline.**

Paradigms are incommensurable

- Kuhn does not allow for any paradigm-neutral way of comparing two rival paradigms in order to say that the newly adopted paradigm is better than the old one or that the shift represents an overall scientific advance.
- Any method we are tempted to use to evaluate the quality of one paradigm may not be applicable in the other paradigm, and so the paradigms are (as Kuhn called them) incommensurable.

If Kuhn is correct

- Scientific theories ultimately are shaped by social forces rather than by an objective nature.
- Kuhn's work set the stage for constructivists to argue that science is not any better at uncovering facts about nature than are religion, politics, or folklore.
- Instead, they argue that what we accept as reality is determined, in large part, by social factors (e.g. Feyerabend, 1975; Latour and Woolgar, 1979).



The power of constructivism

- Through the latter 20th century, realists struggled to re-establish the reliability of science in the face of constructivist arguments.

A person with long brown hair, wearing a dark blue long-sleeved shirt and blue jeans, is crouching on a wooden floor. They are working on a large whiteboard that is covered with numerous colorful sticky notes (yellow, green, pink, orange) and hand-drawn sketches. The sketches include a building, a person, and various diagrams. The text "To Sum Up..." is overlaid in large white letters on the whiteboard. The background is a solid blue wall.

To Sum Up...

To sum up

- Kuhn used the term ‘paradigm’ in two ways:
 - 1. to represent a particular way of thinking that is shared by a community of scientists in solving problems in their field and
 - 2. to represent the “commitments, beliefs, values, methods, outlooks and so forth shared across a discipline” (Schwandt, 2001, p. 183-4).

Paradigm

- A paradigm is a way of describing a world view that is informed by philosophical assumptions about the
 - nature of social reality (known as ontology – that is, what do we believe about the nature of reality?)
 - ways of knowing (known as epistemology – that is, how do we know what we know?)
 - and ethics and value systems (known as axiology – that is, what do we believe is true?) (Patton, 2002).
- A paradigm thus leads us to ask certain questions and use appropriate approaches to systematic inquiry (known as methodology – that is, how should we study the world?).

Ologies

- Ontology relates to whether we believe there is one verifiable reality or whether there exist multiple, socially constructed realities (Patton, 2002).
- Epistemology inquires into the nature of knowledge and truth. It asks the following questions: What are the sources of knowledge? How reliable are these sources? What can one know? How does one know if something is true?
- For instance, consider that some people think that the notion that witches exist is just a belief.
- Epistemology asks further questions: Is a belief true knowledge? Or is knowledge only that which can be proven using concrete data? For example, if you say witches exist, what is the source of your evidence? What methods can you use to find out about their existence?
- Together, these paradigmatic aspects help to determine the assumptions and beliefs that frame a researcher's view of a research problem, how he/she goes about investigating it, and the methods he/she uses to answer the research questions.

Table 2.1 **Four Worldviews Used in Research**

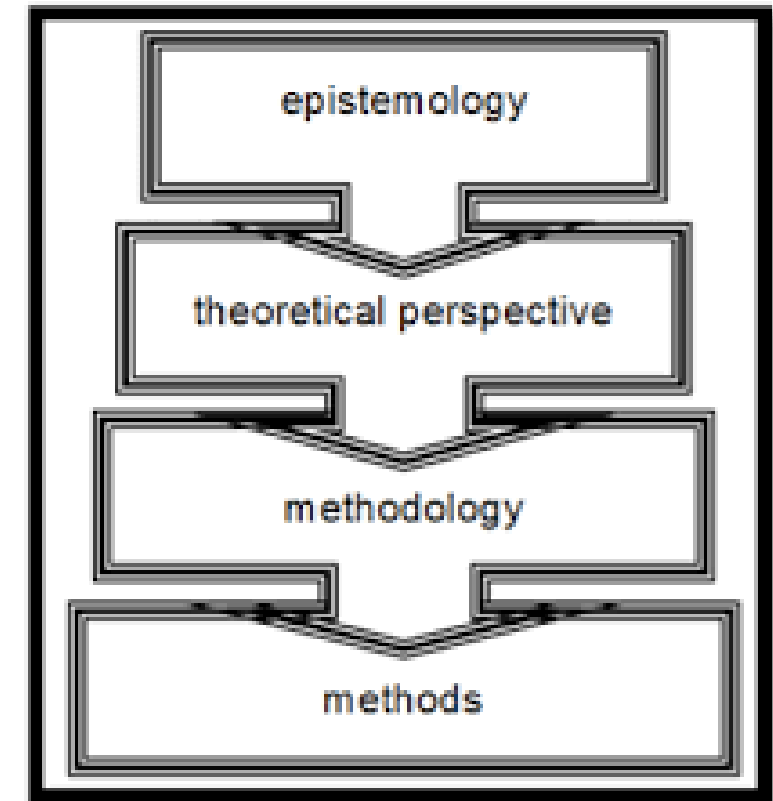
<i>Postpositivism</i>	<i>Constructivism</i>	<i>Advocacy and Participatory</i>	<i>Pragmatism</i>
• Determination • Reductionism • Empirical observation and measurement • Theory verification	• Understanding • Multiple participant meanings • Social and historical construction • Theory generation	• Political • Empowerment and issue oriented • Collaborative • Change oriented	• Consequences of actions • Problem centered • Pluralistic • Real-world practice oriented

SOURCE: Creswell (2003). Reprinted with permission of Sage Publications.

Creswell

Crotty

Paradigm	Ontology <i>What is reality?</i>	Epistemology <i>How can I know reality?</i>	Theoretical Perspective <i>Which approach do you use to know something?</i>	Methodology <i>How do you go about finding out?</i>	Method <i>What techniques do you use to find out?</i>
Positivism	There is a single reality or truth (more realist).	Reality can be measured and hence the focus is on reliable and valid tools to obtain that.	Positivism Post-positivism	Experimental research Survey research	Usually quantitative, could include: Sampling Measurement and scaling Statistical analysis Questionnaire Focus group Interview
Constructivist / Interpretive	There is no single reality or truth. Reality is created by individuals in groups (less realist).	Therefore, reality needs to be interpreted. It is used to discover the underlying meaning of events and activities.	Interpretivism (reality needs to be interpreted) - Phenomenology - Symbolic interactionism - Hermeneutics - Critical Inquiry - Feminism	Ethnography Grounded Theory Phenomenological research Heuristic inquiry Action Research Discourse Analysis Feminist Standpoint research etc	Usually qualitative, could include: Qualitative interview Observation Participant Non participant Case study Life history Narrative Theme identification etc
Pragmatism	Reality is constantly renegotiated, debated, interpreted in light of its usefulness in new unpredictable situations.	The best method is one that solves problems. Finding out is the means, change is the underlying aim.	Deweyan pragmatism Research through design	Mixed methods Design-based research Action research	Combination of any of the above and more, such as data mining expert review, usability testing, physical prototype
Subjectivism	Reality is what we perceive to be real	All knowledge is purely a matter of perspective.	Postmodernism Structuralism Post-structuralism	Discourse theory Archaeology Genealogy Deconstruction etc.	Autoethnography Semiotics Literary analysis Pastiche Intertextuality etc.
Critical	Realities are socially constructed entities that are under constant internal influence.	Reality and knowledge is both socially constructed and influenced by power relations from within society	Marxism Queer theory feminism	critical discourse analysis, critical ethnography action research ideology critique	Ideological review Civil actions open-ended interviews, focus groups, open-ended questionnaires, open-ended observations, and journals.



EasterbySmith
in Cohen

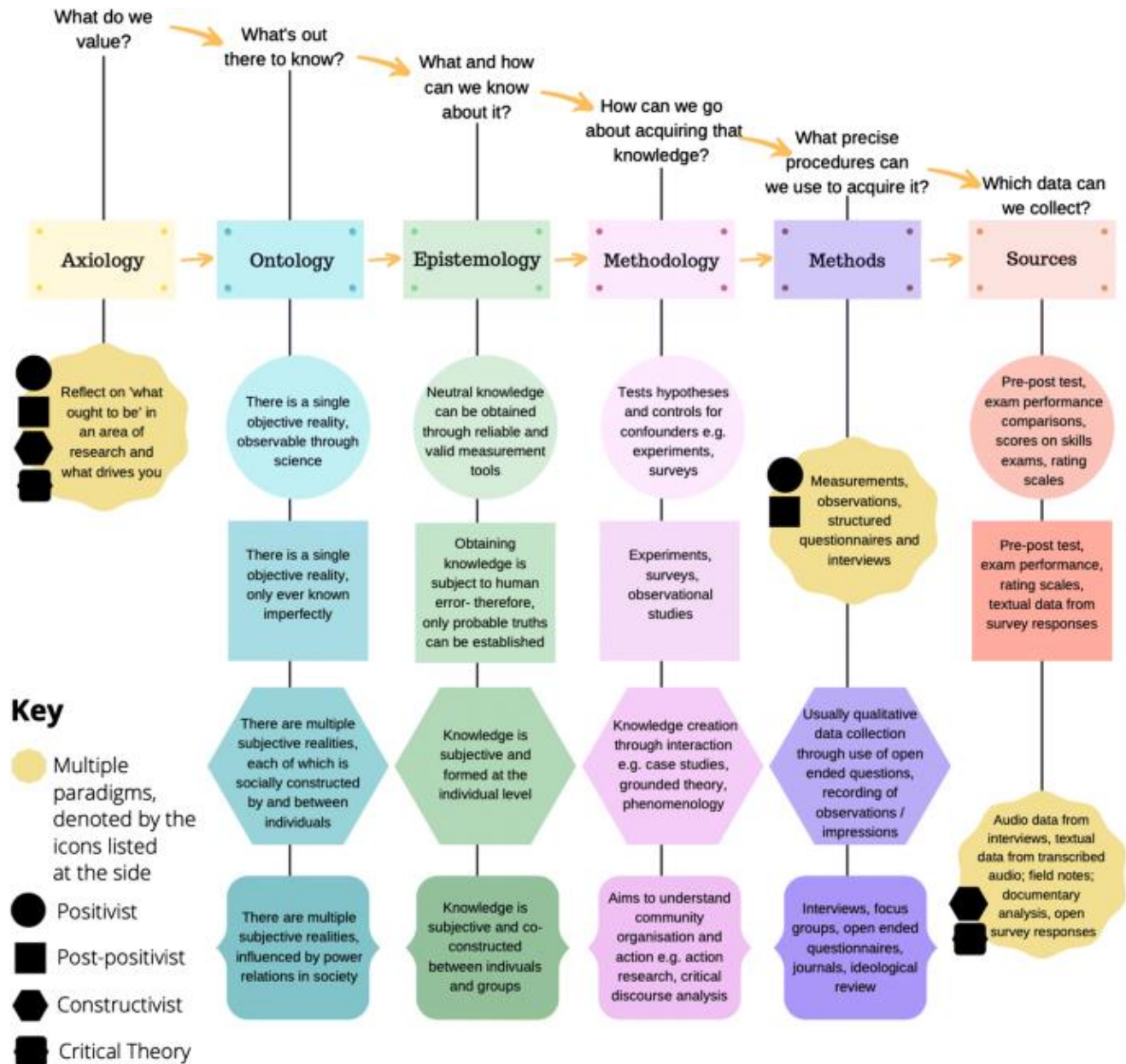
Features of research paradigms

Positivistic paradigm	Interpretivist paradigm
World is external and objective	World is socially constructed and subjective
Observer is independent	Observer is part of what is being observed
Science is value free	Science is driven by human interests
Look for causality	Understand what is happening
Reduce phenomena to simple elements	Look at totality of each situation
Focus on facts	Focus on meaning
Generalises from sample to population	Generalises from one setting to another
Tends to produce quantitative data	Tends to produce qualitative data
The location is artificial	The location is natural
Concerned with hypothesis testing	Concerned with generating theories



Easterby Smith, et al, 2004

Mackenzie and Knipe



Mertens 2005 and Creswell 2003

Positivist/ Postpositivist	Interpretivist/ Constructivist	Transformative	Pragmatic
Experimental Quasi-experimental Correlational Reductionism Theory verification Causal comparative Determination Normative	Naturalistic Phenomenological Hermeneutic Interpretivist Ethnographic Multiple participant meanings Social and historical construction Theory generation Symbolic interaction	Critical theory Neo-marxist Feminist Critical Race Theory Freirean Participatory Emancipatory Advocacy Grand Narrative Empowerment is sue oriented Change-oriented Interventionist Queer theory Race specific Political	Consequences of actions Problem-centred Pluralistic Real-world practice oriented Mixed models
Adapted from Mertens (2005) and Creswell (2003)			

Iofrida

	Positivism-oriented		Interpretivism-oriented	
	Positivism	Post-positivism	Interpretivism	Constructivism
Ontology: What is reality?	Naïve realism. Objective reality.	Critical realism. Reality is imperfectly apprehendable.	Subject and object are dependent. The real essence of the object cannot be known. Reality is constructed.	
Epistemology: How do you know?	Dualism researcher-research. Replicable findings are "true". Reality can be explained.	Dualism is not possible. Replicated findings are "probably" true. Impossible to fully explain reality.	Knowledge is interpreted. Reality can be understood.	Knowledge is constructed. Reality can be constructed.
Methodologies: How do you find it out?	Experimental, deductive. Mainly quantitative. Relationship cause-effect. Statistical analysis.	Experimental. Mainly quantitative methods, manipulative. Scientific Community plays an important role of validation. Statistical analysis. Probability sampling.	Interpretation. Mainly qualitative methods. Purposive and multipurpose sampling.	Mainly qualitative methods. Purposive and multipurpose sampling. Stakeholders involvement.

Guba and Lincoln

<i>Paradigm</i>	<i>Positivism</i>		<i>Interpretive</i>		<i>Critical</i>
<i>Sub paradigm Assumption</i>	<i>Early Science</i>	<i>Post-positivism</i>	<i>Constructivism</i>	<i>Participatory</i>	
Axiology	Value-free	Value-free	Value-laden	Value-laden	Value-laden
Inquirer's posture	Disinterested scientist	Disinterested scientist	Passionate participant	Self-reflective actor	Transformative intellectual
Ontology	Naive Realism- "real" reality but apprehendable	Critical Realism- "real" reality but only imperfectly and probabilistically apprehendable	Relativism- Local and Specific constructed realities	Participative reality- subjective-objective reality, co-created by mind and given cosmos	Historical realism- Virtual-reality shaped by social, political, cultural, economic, ethnic, and gender values, crystallized over time
Epistemology	Dualist/ Objectivist; Findings true	Modified Dualist/ Objectivist; Critical Tradition/ Community; Findings Probably true	Transactional/ Subjectivist; Created findings	Critical subjectivity in participatory transaction with cosmos; extended epistemology of experiential, propositional, and practical knowing; co-created findings	Transactional/ Subjectivist; Value-mediated Findings
Methodology	Experimental/Manipulative; Verification of hypotheses; Chiefly quantitative methods	Modified Experimental/Manipulative Falsification of hypotheses; May include Qualitative methods	Hermeneutical/ dialectical	Political participation in collaborative action inquiry; primacy of the practical; use of language grounded in shared experiential context	Dialogic/ Dialectical

Sources: Guba and Lincoln, 2005, pp. 193-196; Creswell, 2007; Bailey, 2007

Cohen et al. (2011)



Guba & Lincoln (2005)

positivism

postpositivism

critical
theories et al.

constructivism

participatory

Lincoln, Lynham & Guba (2011)

positivism

→ realists, "hard"
science

postpositivism

→ modified form of
postivism

critical theories
(+ feminism +
race)

→ create change, to
the benefit of those
oppressed by power

constructivism
(or interpretivist)

→ gain understanding by
interpreting subject
perceptions

participatory (+
postmodern)

→ transformation based on
democratic participation
between researcher &
subject

Lather (2006)

Table 1. Revised paradigm chart

Predict	Understand	Emancipate	Brk	Deconstruct	Next?
*Positivist	*Interpretive	*Critical		Poststructural	Neo-positivism
Mixed methods	Naturalistic	Neo-Marxist		Postmodern	
	Constructivist	< Feminist >			
	Phenomenological	Critical race theory		Queer theory	
		Praxis-oriented		< Discourse analysis	
	Ethnographic	Freirian participatory			
		< action research			
	Symbolic/ interaction			Postcolonial	Post-theory
	Interpretive mixed methods			Post-Fordism	Neo-pragmatism
				Post-humanist	Citizen inquiry
				Post-critical	Participatory/ dialogic
					Policy analysis
		Gay and lesbian theory		Postparadigmatic diaspora (John Caputo)	
		Critical ethnography		Post everything (Fred Erickson)	Post-post

(Patti Lather & Bettie St Pierre, 2005)

Notes: *Indicates the term most commonly used; < > indicates cross-paradigm movement. Brk (Break) Indicates a shift from the modernist, structural, humanist theories/discourses on the left to the postmodernist, poststructural, posthumanist theories/discourses on the right. In the post theories, all concepts (language, discourse, knowledge, truth, reason, power, freedom, the subject, etc., are deconstructed). Though all these paradigms operate simultaneously today, there is a historical sense to their articulation. August Comte (1778-1857) proposed positivism in the nineteenth century; social constructivism is often dated from Peter Berger and Thomas Luckmann's (1966) book, the *Social construction of reality*. The emancipatory paradigms grew from the Frankfurt School and the social movements of the 1960's and 1970's; and the post paradigms, from the critiques following the Second World War, include those of Michel Foucault (1926-84), Jacques Derrida (1930-2004), and Gilles Deleuze (1925-95). Paradigm shifts occur as reaction formations to the perceived inadequate explanatory power of existing paradigms. Therefore, someone who works in emancipatory paradigms, for example, is often aware of the theoretical assumptions as well as the critiques of positivism and interpretivism. Note also that some theories that start out in one paradigm change considerably when they are taken up in another; e.g. poststructural feminism is considerably different from liberal, emancipatory feminism. Conventional science is positivist but when science's assumptions are rethought in interpretive or post paradigms, it is not the same; i.e. science is not the same in all paradigms in terms of ontology, epistemology and methodology.

Source: Based on: Lather, Patti (1991) *Getting smart: Feminist research and pedagogy within the postmodern* (New York, Routledge). [see p. 7 of this book for an earlier version of this chart.] Derived from the following: Habermas, Jurgen (1971) *Knowledge and human interests* (Jeremy J. Shapiro, Trans.) (Boston, Beacon Press). (Original work published 1968)

Creswell (2003, 2007)

- Paradigms used by qualitative researchers:
 - postpositivism
 - social constructivism (often combined with interpretivism)
 - advocacy / participatory
 - pragmatism (focus on the outcomes of the research; the emphasis is on the problem being studied and the questions asked about this problem and not the method; compatible with multiple methods approaches (2007, p. 22))

Using this Answer the questions
on the next slide

Paradigm	Methods (primarily)	Data collection tools (examples)
Positivist/ Postpositivist	Quantitative. "Although qualitative methods can be used within this paradigm, quantitative methods tend to be predominant . . ." (Mertens, 2005, p. 12)	Experiments Quasi-experiments Tests Scales
Interpretivist/ Constructivist	Qualitative methods predominate although quantitative methods may also be utilised.	Interviews Observations Document reviews Visual data analysis
Transformative	Qualitative methods with quantitative and mixed methods. <i>Contextual and historical factors described, especially as they relate to oppression</i> (Mertens, 2005, p. 9)	Diverse range of tools - particular need to avoid discrimination. Eg: sexism, racism, and homophobia.
Pragmatic	Qualitative and/or quantitative methods may be employed. Methods are matched to the specific questions and purpose of the research.	May include tools from both positivist and interpretivist paradigms. Eg Interviews, observations and testing and experiments.

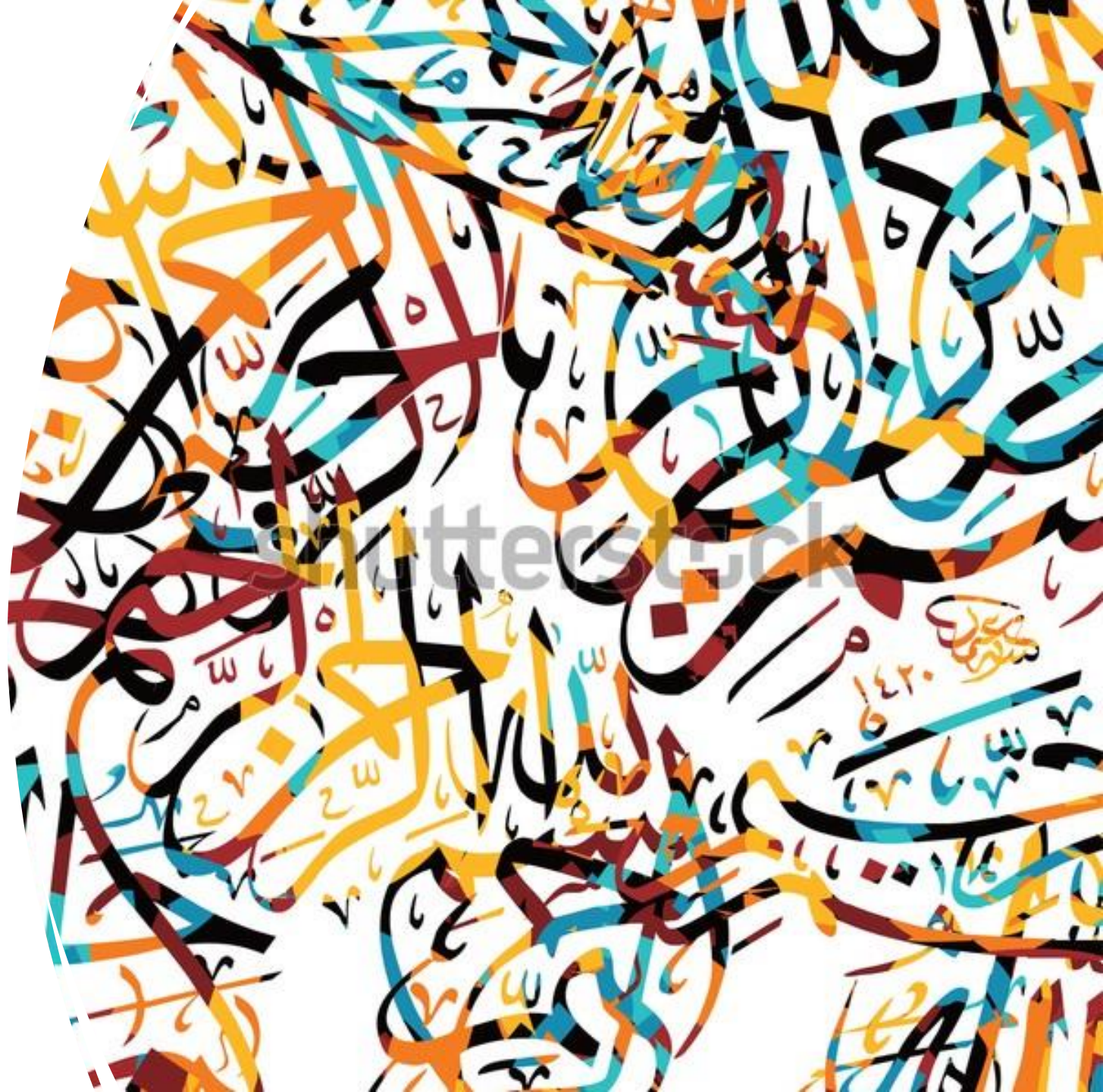
Questions

What are the main paradigms ?

What is the view of reality for each of the paradigms ?

What place do values hold in each of the paradigms ?

What types of knowledge are valued in each of the paradigms ?



Resources

- Trochim, W.M.K. (2006). Research methods knowledge base (2nd ed.). Retrieved from <http://www.socialresearchmethods.net/kb/>