

Unit 1: What Do We Know and How Do We Know It?

Reasoning Exercises in Islam and Science

Lesson 2 - The Spectrum of Certainty and Judgment Types

Time Length: 45-50 min.

INSTRUCTIONAL OUTCOMES

NGSS (Next Generation Science Standards)

Science and Engineering Practices:

- Analyzing and Interpreting Data: Students analyze different types of propositions and judgments, assessing their truth and validity.
- Engaging in Argument from Evidence: The activity of classifying various propositions and providing justifications aligns with this practice.

Crosscutting Concepts:

- Cause and Effect: Understanding the sources of various types of knowledge and how they lead to different conclusions.
- Systems and System Models: This lesson involves considering how different systems of thought (scientific and religious) process and interpret information.

Common Core State Standards (CCSS)

Mathematics Standards:

CCSS.Math.Practice.MP2: Reason abstractly and quantitatively. This is applicable as students are dealing with abstract concepts like rational and empirical judgments.

CCSS.Math.Practice.MP3: Construct viable arguments and critique the reasoning of others, particularly relevant in discussing and justifying types of judgments.

English Language Arts Standards for Literacy:

CCSS.ELA-Literacy.RST.6-8.2 & 9-10.2: Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

CCSS.ELA-Literacy.RST.6-8.8 & 9-10.8: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

English Language Arts Standards for Speaking and Listening:

CCSS.ELA-Literacy.SL.9-10.1 & 11-12.1: Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 9-12 topics and texts.

Content Learning Outcomes:

- Define, provide examples, and explain the relationship between the three types of propositions (rational, revelatory, empirical).
- Classify various propositions and provide justification.
- Demonstrate the position of scientific propositions in the Islamic epistemological framework.

Materials:



- **Presentation Slides - Slides 20-30**
- **Judgment/Proposition Worksheet**
- **God's Existence** - Rational Judgment (Supplemental Material)
- **Proofs of Prophethood** - Rational Judgment (Supplemental Material)
- **Spectrum of Certainty**
- Unit 1: Lesson 2 Assessment Questions - **Instructor's Version** and **Student's Version**

Instruction/Teacher Facilitation:

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- ❖ Begin by reminding students/asking students about the sources of knowledge from the previous lesson.
 - Sources of knowledge -
 - The five senses
 - The intellect (al-'aql)
 - True reports
 - Inspiration (Ilhaam)
- ❖ Is everything that we know, from these various sources of knowledge, all on the same level of certainty? How do we know that knowledge is true; is it fully true or is it possible that it might be true? Is everything I know 100% certain, or are there things that I know, or I think I know, that are not exactly 100% true? There are other things that I know that are not true at all, 100% false, and other things that I think are not true, but I don't know for sure. This demonstrates the fact that there are degrees of certainty.

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- ❖ **The Spectrum of Certainty** -
 - [Teacher can post this spectrum so that it is visible to students and easy to refer to.]
 - Take the proposition of climate change - Is climate change real/occurring?
 - Research is being done and is ongoing, but how certain are we?
 - Certain it is true (*yaqeen*, **qat'i**) - 100% true (verified or guaranteed)
 - Probable (likely) to be true (**zann rajah**) - 51-99% true
 - Doubt (*shakk*) - 50% true i.e. 50/50 chance that it is true or it is false
 - Improbable (unlikely) to be true (**zann marjuh**) - 49-1% true
 - Certain it is false (*baatil*) - 0% true or 100% false
- (Note: the percentages used are only for comprehension purposes.)

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- As a Muslim, this is how we interpret our findings.
 - Ex: Allah Almighty refers to this concept in Surah An-Nisa: Ayah 157
 - وَقَوْلِهِمْ إِنَّا قَتَلْنَا الْمَسِيحَ عِيسَى ابْنَ مَرْيَمَ رَسُولَ اللَّهِ وَمَا قَتَلُوهُ وَمَا صَلَبُوهُ وَلَكِنْ شُبِّهَ لَهُمْ وَإِنَّ الَّذِينَ اخْتَلَفُوا فِيهِ لَفِي شَكٍّ مِّنْهُ مَا لَهُمْ بِهِ مِنْ عِلْمٍ إِلَّا اتِّبَاعَ الظَّنِّ وَمَا قَتَلُوهُ يَقِينًا 157
 - And [for] their saying, "Indeed, we have killed the Messiah, Jesus the son of Mary, the messenger of Allāh." And they did not kill him, nor did they crucify him; but [another] was made to resemble him to them. And indeed, those who differ



over it are in **doubt** about it. They have no **knowledge** of it except the following of **assumption**. And they did not kill him, for **certain**.

- Allah Almighty is stating the true-ness of the statement about Isa (A)
- The proposition being made in this verse is “Indeed, we have killed the Messiah.” So now its level of truth is being examined.
- Yaqeen (certainty), shakk (doubt) and zann (uncertainty/plausible) are used in this ayah.
- The Jewish view is mentioned (that they killed Isa (A)) and the Christian view is mentioned (that Isa A was crucified) which is both in doubt/shakk but then Allah Almighty makes a statement of the truth, that is qat'i = yaqeen, in other words absolutely certain. Also emphasizing that what they say, they *think* they know, in reality, they *do not* know with certainty, i.e. it is *certainly* false.
- So we need to analyze the information or knowledge we are presented with and judge its level of truth/certainty. We also need to look at what type of judgment is being made.

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- ❖ Judgments or Propositions (hukum): **(propositions were introduced in the last lesson, remind students that a proposition is a statement that can be *either* true or false.)**

[Hand out the **Judgment/Proposition Worksheet**.]

- There are 3 types of Judgements
 - Revelatory Judgments - these are statements that are only known from ALLAH Almighty and HIS Messenger ﷺ.
 - Ex: Fasting during Ramadan is fard/obligation.
 - Ex: The previous example about Isa A.
 - Source of knowledge = true report
 - Rational Judgment - these are statements we know that do *not* require our senses nor revelation.
 - Ex: $1+1=2$, 7 is not an even number
 - Source of knowledge = intellect/aql (we can think about it ourselves)
 - Empirical Judgment - these are statements we know only from our five senses.
 - Ex: fire burns, the speed of light is 299,792,458 m/s
 - Source of knowledge = 5 senses
- Part of critical thinking and using aql is to be able to identify and categorize propositions/ judgments *correctly*.
- Under judgments, we also have two classifications:
 - Self-evident (badi-hi) - Judgments which do *not* require thought
 - It's obvious, it comes to your mind without putting in specific thought.
 - Inferential - Judgments that require thought
 - Revelatory Judgement - Self-evident: the 5 pillars of Islam
 - Inferential: there is no zakat on diamonds
 - Rational Judgement - Self-evident: one is half of two
 - Inferential: 40 divided by 4 divided by 10 is 1



- Empirical Judgment - Self-evident: fire burns
 - Inferential: Pepto Bismol treats indigestion

{SLIDE 23} Judgment/Proposition Worksheet

- ❖ **Group Practice:** Give students 5 minutes to fill out the chart below on their worksheets on their own. And then go over the answers with them as a whole group.

Rational, Empirical, or Revelatory?			
Judgment	Rational	Empirical	Revelatory
Water boils at 212°F		✓	
God Exists	✓		
Force is mass times acceleration		✓	
Paradise exists			✓
Muhammad is the Messenger of God	✓		
Tylenol relieves pain		✓	
Humans will be resurrected			✓

[Note: This information can be connected to or made reference to a Biology/Chemistry

topic of physical properties vs chemical properties which falls under empirical, but the thought and reasons why it is categorized that way should be explored.]

- ❖ Discuss the reasons for each answer:
 - Water boils at 212°F - Empirical - observable; when the thermometer reaches 212, the water boils
 - **God Exists** - Rational - confirmed with empirical observation and revelatory text, but actually a rational judgment.
 - Fits the definition of what a rational judgment is. A judgment that does not require empirical knowledge and revelatory knowledge. I can sit and think about it without other sources of knowledge.
 - Strengthened with empirical knowledge and revelatory knowledge.



- Force is mass times acceleration - Empirical - also observable, it can be calculated to see if this is the case.
- Paradise exists - Revelatory - We know the existence of Paradise, and likewise hell, only because it has been mentioned in revelatory texts, can not be observed or rationally thought out.
- **Muhammad ﷺ is the Messenger of God** - Rational - Yes it is mentioned in revelatory text, but when we look at the life/seerah of the Prophet ﷺ we can come to the rational conclusion that he had to be able to do what he did only if he was the Prophet of ALLAH Almighty.
 - Sahaba experienced him ﷺ - We use testimonial knowledge or true reports.
 - Proofs of Prophethood - We have proof from a variety of aspects that verify Muhammad ﷺ's Prophethood and its legitimacy.
- Tylenol relieves pain - Empirical - A person can take the medicine and feel its effects.
- Humans will be resurrected - Revelatory - We would not know this information unless it was told to us through a Revelatory Text.

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- ❖ Judgments can be further categorized by need or probability.
 - Both Rational and Empirical can be further divided into 3 categories:
 - Necessary - that which cannot be negated.
 - Possible - that which can be affirmed or negated.
 - Impossible - that which cannot be affirmed.
 - Ex: "Zaid is eating." This is a possible statement. It is impossible for Zaid to be eating and not eating at the same time.

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- ❖ **Guided Practice:** Determine if each of these propositions is necessary, possible, or impossible.
 - Rational Judgments

Rational Proposition	Necessary	Possible	Impossible
The sum of the parts of a thing can be greater than the whole			✓
Extraterrestrial life exists		✓	
Matter takes up space	✓		
The creation of the cosmos		✓	
My hand burns when I put it in fire		✓	
The sun is 91.414 million miles away from the earth		✓	



A human can be 1 mile away from the sun and not burn		✓	
A square circle			✓
God does not exist			✓

➤ Rationally speaking, do these statements imply contradictions?

- The sum of the parts of a thing can be greater than the whole - which implies a contradiction, how can it be greater? Therefore, contradiction is present which makes this then impossible. The whole should be equal to the sum of its parts.
- Extraterrestrial life exists - Possible
- Matter takes up space - Necessary, because this is the very definition of matter.
- The creation of the cosmos - Possible
- My hand burns when I put it in fire - Possible, not necessary because perhaps it didn't burn the person, maybe they were wearing something or did it for a literal second, etc. For example Ibrahim A, the fire didn't burn him.
- The Sun is 91.414 million miles away from the Earth - Possible; they did not go out and measure it, but it is a rough estimation.
- A human can be 1 mile away from the Sun and not burn - Again, possible, maybe they are 1 mile away in a protective pod, ALLAH decides it will not burn, etc.
- A square circle - again, by definition, this is impossible.
- God does not exist - Impossible, going back to the rational proofs of God's existence.

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➤ Empirical Judgments

Empirical Proposition	Necessary	Possible	Impossible
Human beings can live without the Sun			✓
Sound travels four times faster in water than it does in air	✓		
There are 118 elements on the periodic table		✓	
Carbon can have 20 electrons			✓
On Earth, water boils at 20 degrees Celsius			✓



The Sun is 91.414 million miles away from the Earth		✓	
A human can be 1 mile away from the Sun and not burn			✓
Thick clothing conceals my body	✓		

- Human beings can live without the Sun - Impossible, we see in the world how dependent the world and all that lives in it is upon the sun.
Sun > Plants > Animals > Us, therefore, won't have humans if no sun
- Sound travels four times faster in water than it does in air - Necessary - aquatic life depends on such a phenomenon. The reason is that the particles are much closer in water so they can quickly transmit vibration energy from one particle to the next particle.
- There are 118 elements on the periodic table - Possible - More could be discovered, but this is how many we know of as of now.
- Carbon can have 20 electrons - Impossible - If an element had 20 electrons, it would be calcium. Carbon is carbon due to its 6 electrons.
- On Earth, water boils at 20 degrees Celsius - Impossible - water boils at 100 degrees Celsius, 212 F. an empirical fact
- The Sun is 91.414 million miles away from the Earth - Possible - Can be observed through instruments.
- A human can be 1 mile away from the Sun and not burn - Impossible - the heat of the sun would burn the person, practically/empirically speaking (as a Rational judgment, it is possible).
- Thick clothing conceals my body - Necessary - definition of thick clothing, it conceals.

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- Relationship between rational judgments and empirical judgments?
 - ALL empirical judgments can *only* fall under *possible* rational judgments.
 - Impossible rational judgments can never be observed anyway; can never exist (because it is impossible).
 - *Scientific* judgments then fall under the category of *possible* empirical judgments.

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- ❖ Judgments - what about the level of certainty of such judgments?
 - Are they qat'i - Conclusive - a proposition that we are *absolutely certain* of or a text that does *not* admit to more than one meaning (can have *only one meaning*).
 - Or are they Zanni - Probabilistic - a proposition that we are *not certain* of or a text that does admit to *more than one meaning*.
 - Remember, "certain" means 100% true

