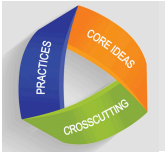
1:2

Unit: 1
Lesson: 2

Time Length: 45–50 min

The Spectrum of Certainty and Judgment Types

REASONING EXERCISES IN ISLAM & SCIENCE



NGSS Instructional Outcomes

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.

CCSS Instructional Outcomes

Common Core State Standards

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 (ELA) Standards for Literacy

CCSS.ELA-Literacy.RST.6–8.2 and 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 and 9–10.8: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

ELA Standards for Speaking and Listening

CCSS.ELA-Literacy.SL.9–10.l and 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 an Islamic epistemological framework.

Materials:

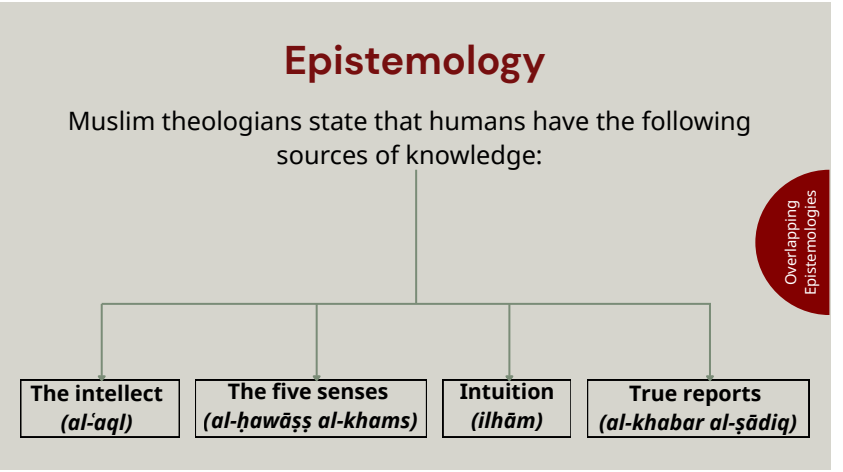
- Instruction/Teacher Facilitation: Slides 1.17–1.27
- Worksheet: Judgment or Propositions (ḥukm)
- Supplemental Material: God's Existence
- Supplemental Material: Proofs of Prophethood: *Ithbāt an-Nubuwwa*
- Lesson 1.2 Assessment

Instruction/Teacher Facilitation: Slides for Lesson 1.2

- **Slide 1.17.** Spectrum of Certainty
- **Slide 1.18.** Epistemology
- **Slide 1.19.** Judgments
- **Slide 1.20.** Rational, Empirical, or Revelatory?
- **Slide 1.21.** Judgments
- **Slide 1.22.** Rational Judgments
- **Slide 1.23.** Empirical Judgments
- **Slides 1.24–1.26.** The Relationship between Rational Judgments and Empirical Judgments
- **Slide 1.27.** The Level of Certainty of Judgments

Instruction/ Teacher Facilitation

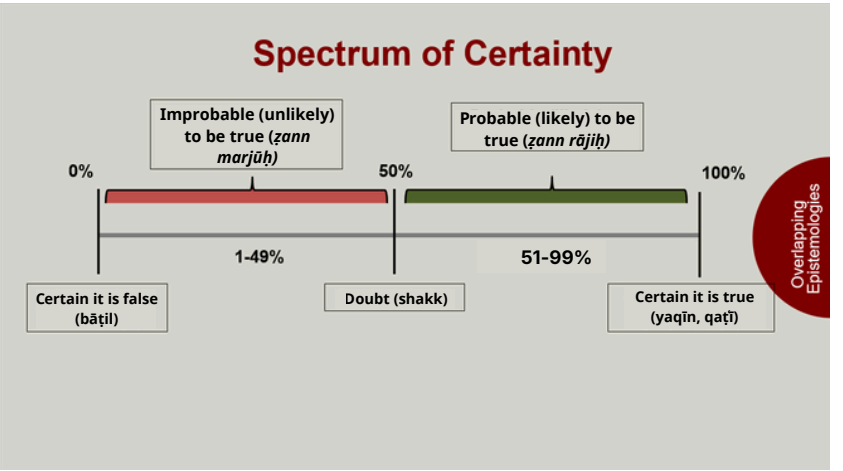
Begin by reminding students/asking students about the sources of knowledge from the previous lesson (Slide 1.10).



1. The five senses *(al-ḥawāṣṣ al-khams)*
2. The intellect *(al-ʿaql)*
3. True reports *(al-khabar aṣ-ṣādiq)*
4. Intuition/Inspiration *(ilhām)*

Is everything that we know, from these various sources of knowledge, all on the same level of certainty? Is everything I know 100 percent certain, or are there things that I know, or I think I know, that are not exactly 100 percent true? There are things that I know that are not true at all, 100 percent false, and other things that I know that might not be true, but I do not know for sure. This demonstrates that there are degrees of certainty.

Slide 1.17: Spectrum of Certainty



Teachers can post this **spectrum of certainty** 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 (*yaqīn, qaṭ'ī*), 100 percent true (verified or guaranteed).
- Probable (likely) to be true (*ẓann rājiḥ*), 51-99 percent true.
- Doubt (*shakk*) is 50 percent true, that is, 50/50 chance that it is true or it is false.
- Improbable (unlikely) to be true (*ẓann marjūḥ*), 49–1 percent true.
- Certain it is false (*bāṭil*), 0 percent true or 100 percent false.

(Note: the percentages used are only for comprehension purposes.)

Slide 1.18: Epistemology

Epistemology

وَقَوْلِهِمْ إِنَّا قَتَلْنَا ٱلْمَسِيحَ عِيسَى ٱبْنَ مَرْيَمَ رَسُولَ ٱللَّهِ وَمَا قَتَلُوهُ
وَمَا صَلَبُوهُ وَلَـٰكِن شُبِّهَ لَهُمْ ۚ وَإِنَّ ٱلَّذِينَ ٱخْتَلَفُوا۟ فِيهِ لَفِى شَكٍّ
مِّنْهُ ۚ مَا لَهُم بِهِۦ مِنْ عِلْمٍ إِلَّا ٱتِّبَاعَ ٱلظَّنِّ ۚ وَمَا قَتَلُوهُ يَقِينًۢا ١٥٧

Overlapping Epistemologies

"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**."

(Sūrah al-Nisā' 4:157)

As Muslims, we interpret claims across zones of probability.

> For example, Allah (swt) refers to these concepts in Sūrah al-Nisā' (4:157).

وَقَوْلِهِمْ إِنَّا قَتَلْنَا ٱلْمَسِيحَ عِيسَى ٱبْنَ مَرْيَمَ رَسُولَ ٱللَّهِ وَمَا قَتَلُوهُ وَمَا صَلَبُوهُ وَلَـٰكِن
شُبِّهَ لَهُمْ ۚ وَإِنَّ ٱلَّذِينَ ٱخْتَلَفُوا۟ فِيهِ لَفِى شَكٍّ مِّنْهُ ۚ مَا لَهُم بِهِۦ مِنْ عِلْمٍ إِلَّا ٱتِّبَاعَ ٱلظَّنِّ ۚ
وَمَا قَتَلُوهُ يَقِينًۢا ١٥٧

> "And [for] their saying, 'Indeed, we have killed the Messiah, Jesus (Īsā) the son of Mary, the messenger of Allāh.' While 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."

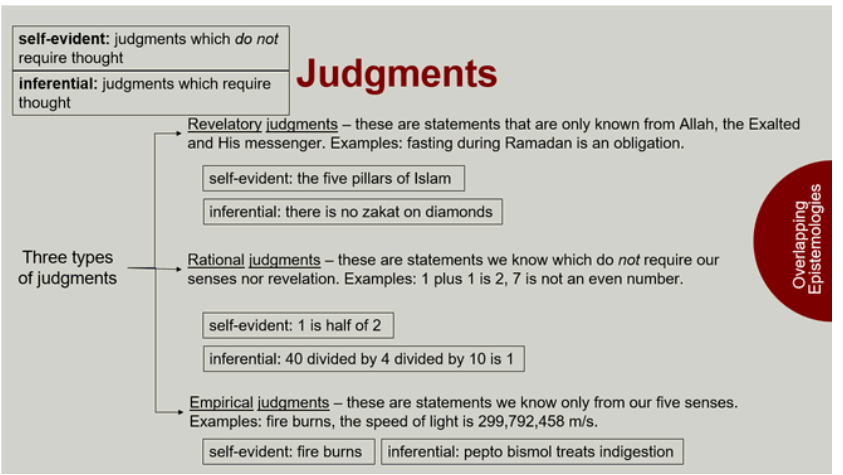
> Allah (swt) is stating the truthfulness of the statement about Īsā (pbuh).

> The proposition being made in this verse is "Indeed, we have killed the Messiah." So now its level of truth is being examined.

> *Yaqīn* (certainty), *shakk* (doubt) and *ẓann* (uncertainty/ plausible) are all used in this verse.

> The Jewish view is mentioned (that they killed Īsā (pbuh)) and the Christian view is mentioned (that Īsā (pbuh) was crucified). The verse asserts that both groups were making doubtful claims. When Allah (swt) denies that they killed Īsā (pbuh), He uses the term *yaqīn*; this indicates absolute certainty. 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.

Slide 1.19: Judgments



Judgment or Propositions Worksheet

Judgments or Propositions (*ḥukm*): (propositions were introduced in Lesson 1.1)

[Hand out the **Judgment or Propositions (*ḥukm*) Worksheet** on p. 57.]

There are three types of judgments:

1. **Revelatory Judgments:** these are statements that are only known from Allah (swt) and His Messenger (pbuh).
   - For example, fasting during Ramadan is *farḍ*/obligation.
   - For example, the previous example about Īsā (pbuh).
   - Source of knowledge = Qurʾan and ḥadīth
2. **Rational Judgments:** these are statements that we can comprehend without requiring experimentation or revelation.
   - For example, 1+1=2, 7 is not an even number.
   - Source of knowledge = *ʿaql/intellect* (we can think about it ourselves)
3. **Empirical Judgments:** these are statements we know only from our five senses and through experimentation.
   - For example, fire burns, the speed of light is 299,792,458 m/s.
   - Source of knowledge = 5 senses

Part of critical thinking and using *ʿaql* is to be able to identify and categorize propositions/judgments correctly.

Under judgments, we also have two classifications:

1. Self-evident (*badi-hi*) Judgments, which do not require thought.
   - Something that is obvious and does not require extensive thought processes.
2. Inferential (*istidlāli*) Judgments, that require thought.

Revelatory Judgment

- Self-evident: the 5 pillars of Islam
- Inferential: there is no zakat on diamonds

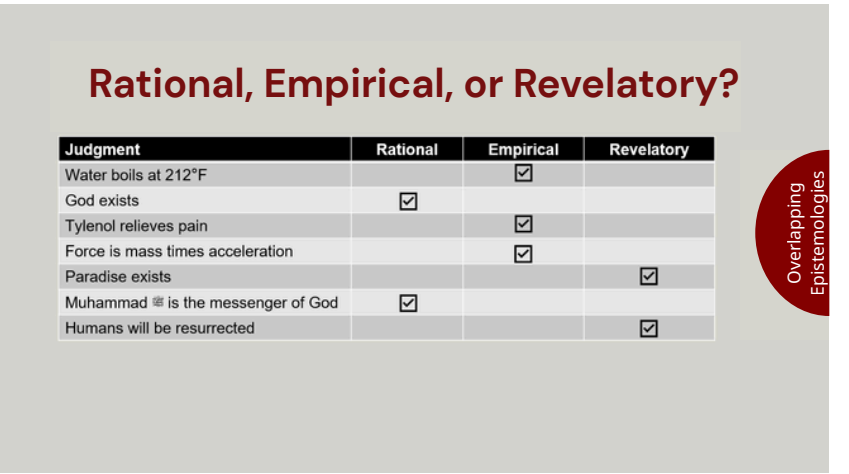
Rational Judgment

- Self-evident: one is half of two
- Inferential: 40 divided by 4 is 10

Empirical Judgment

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

Slide 1.20: Rational, Empirical, or Revelatory?



Guided Practice

Give students 5 minutes to fill out the chart below. Then go over the answers with them as a group.

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

[Note: This chart can be connected to a Biology/Chemistry topic of physical properties vs chemical properties which falls under the empirical category, but the thought and reasons why it is categorized that way should be explored.]

Discuss the reasons for each answer:

1. Water boils at 212°F - Empirical: observable; when the thermometer reaches 212°, the water boils.
2. God Exists - Rational (cf. contigency arguments for God's existence): and also based on revelatory texts,

Fits the definition of what a rational judgment is: a judgment that does not require empirical knowledge and revelatory knowledge. One can sit and think about it without other sources of knowledge.

Strengthened with empirical knowledge and revelatory knowledge.

[For more resources and detailed explanations, see **Supplemental Material: God's Existence** on p. 61.]

3. Force = mass times acceleration - Empirical: This is confirmed through testing and calculation.
4. Paradise exists - Revelatory: We know the existence of paradise, and likewise hell, only because they are mentioned in scriptural texts. They cannot be observed or rationally thought out.
5. Muhammad (pbuh) is the Messenger of God - Rational: Yes, it is mentioned in revelatory texts, but when we look at the life/seerah of the Prophet (pbuh), we can come to a rational conclusion that he was able to do what he did only because he was the Prophet of Allah (swt).

Sahābah experienced him (pbuh): We use testimonial knowledge or true reports.

Proofs of Prophethood [See **Supplemental Material: Proofs of Prophethood Ithbât an-Nubuwwa** on p. 62]: We have proof from a variety of aspects that verifies Muhammad's (pbuh) Prophethood and its legitimacy.

6. Tylenol relieves pain - Empirical: A person can take the medicine and feel its effects.
7. Humans will be resurrected - Revelatory: We only know this because it is mentioned in revelatory (scriptural) texts.

Slide 1.21: Judgments

Judgments

How do we apply human reason?

Step 1: Have the right intention
— to learn, to understand, and benefit
— to increase *yaqīn* (certainty)
— to increase obedience to Allah Almighty

Overlapping Epistemologies

Both Rational and Empirical Judgments can be further divided into three categories:

1. Necessary: that which cannot be negated.
2. Possible: that which can be affirmed or negated.
3. Impossible: that which cannot be affirmed.

> For example, "Zaid is eating." This is a possible statement. It is impossible for Zaid to be eating and not eating at the same time.

Slide 1.22: Rational Judgments

Judgments – Rational

Rational Propositions	Necessary	Possible	Impossible
The sum of the parts of a thing can be greater than the whole			☑
Extra terrestrial life exists		☑	
Matter takes up space	☑		
The creation of the cosmos		☑	
My hand burns when I put it in a fire		☑	
The Sun is 91.414 million miles away from the Earth		☑	
A human being can be 1 mile away from the Sun and not burn		☑	
A square circle			☑
God does not exist			☑

Necessary - that which cannot be negated
Possible - that which can be affirmed or negated
Impossible - that which cannot be affirmed

Overlapping Epistemologies

Guided Practice

- Determine if each of these propositions is necessary, possible, or impossible.

Necessary, Possible, or Impossible?			
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			✔

Discuss the reasons for each answer:

Rationally speaking, do these statements imply contradictions?

1. The sum of the parts of a thing can be greater than the whole: Impossible, because there is a contradiction within the statement itself. The whole should be equal to the sum of its parts.
2. Extraterrestrial life exists: Possible
3. Matter takes up space: Necessary, because this is the very definition of matter.
4. The creation of the cosmos: Possible
5. My hand burns when I put it in fire: Possible, not necessary because perhaps it does not burn the person, if he/she is wearing something protective, or puts their hand in the fire only for a second. For example, when Ibrāhīm (pbuh) was thrown into the fire, it did not burn him.
6. 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 based on probability techniques.
7. A human can be 1 mile away from the Sun and not burn: Possible, maybe they are 1 mile away in a protective pod, or Allah (swt) decides it will not burn.
8. A square circle: Impossible; by definition, this is Impossible.
9. God does not exist: Impossible, go back to the rational proofs of God's existence.

Slide 1.23: Empirical Judgments

Judgments – Empirical

Empirical Propositions	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 being can be 1 mile away from the Sun and not burn			☑
Thick clothing conceals my body	☑		

Necessary - that which cannot be negated
Possible - that which can be affirmed or negated
Impossible - that which cannot be affirmed

Overlapping Epistemologies

Guided Practice

- Determine if each of these propositions is necessary, possible, or impossible.

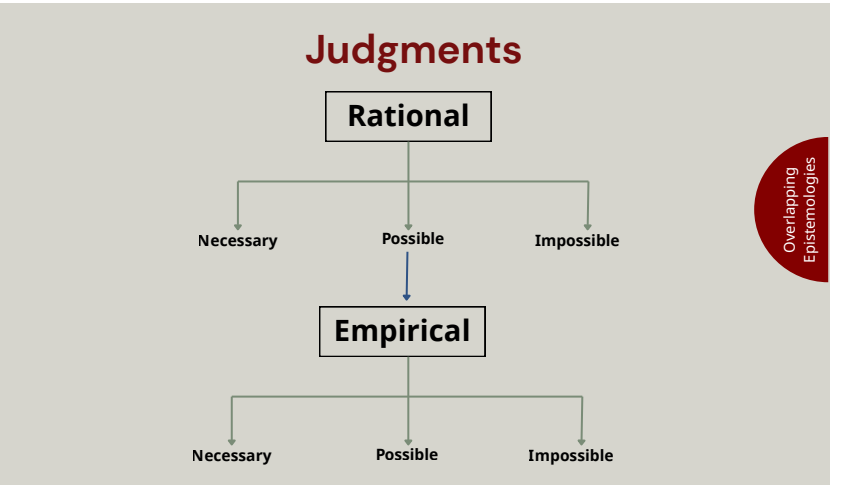
Necessary, Possible, or Impossible?			
Empirical Proposition	**Necessary**	**Possible**	**Impossible**
Human beings can live without the Sun			✔
Sound travels four times faster in water than it does in air	✔		
There are 118 elements on the periodic table		✔	
Carbon can have 20 electrons			✔
On Earth,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

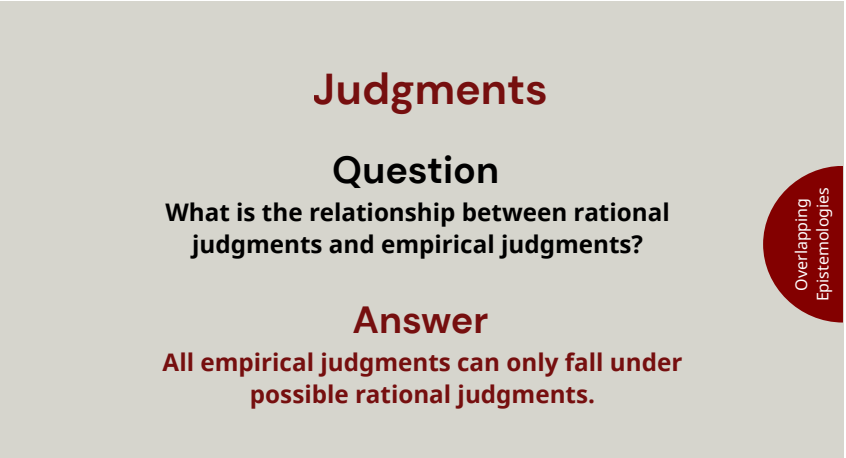
Discuss the reasons for each answer:

1. Human beings can live without the Sun: Impossible, we see how dependent the world and all that lives in it is upon the sun. Sun > Plants > Animals > Us, therefore, won't have human beings if there is no sun.
2. Sound travels four times faster in water than it does in air: Necessary, because particles are much closer in water so they can quickly transmit vibration energy from one particle to another.

3. There are 118 elements on the periodic table: Possible, because more can be discovered, but this is the state of our knowledge today.
4. Carbon can have 20 electrons: Impossible, because if an element has 20 electrons, it would be calcium. Carbon is carbon due to it is 6 electrons.
5. On Earth, water boils at 20° Celsius: Impossible, because water boils at 100° Celsius, 212° F. This is an empirical fact.
6. The Sun is 91.414 million miles away from the Earth: Possible, because this can be observed through instruments.
7. A human can be 1 mile away from the Sun and not burn: Impossible, because the heat of the sun would burn the person, practically/ empirically speaking (As a Rational judgment, it is possible).
8. Thick clothing conceals my body: Necessary, because by definition, thick clothing is one that conceals.

Slides 1.24–26: The Relationship between Rational Judgments and Empirical Judgments

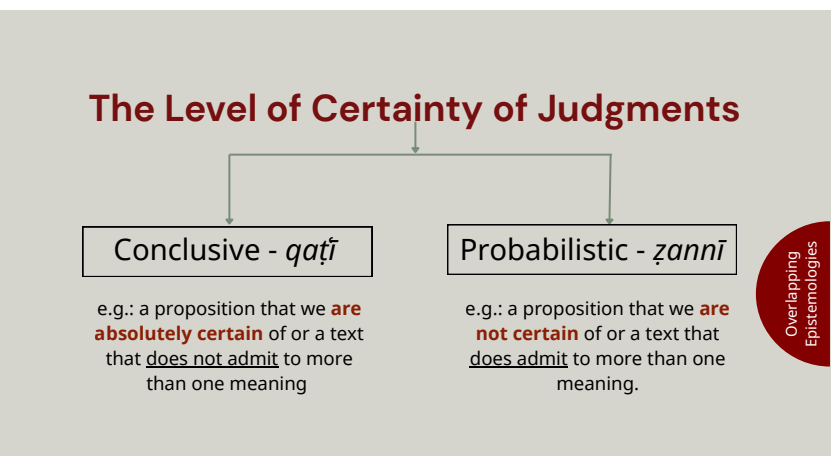




What is the relationship between rational judgments and empirical judgments?

- ALL empirical judgments can only fall under possible rational judgments.
  - Impossible rational judgments can never be observed in any way; they can never exist (because it is impossible).
  - Scientific judgments fall under the category of possible empirical judgments.

Slide 1.27: The Level of Certainty of Such Judgments

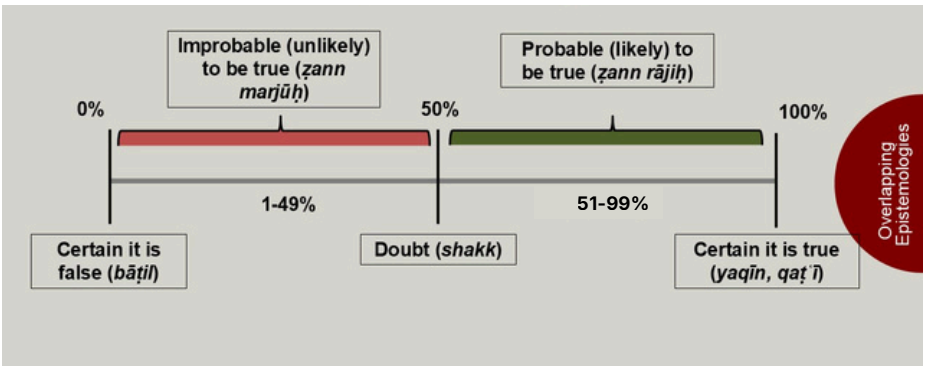


What about the level of certainty of such judgments?

- Are they *qaṭʿī*—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 *ẓannī*—Probabilistic: a proposition that we are not certain of or a text that can have more than one meaning.
  - Remember, "certain" means 100 percent true.

Spectrum of Certainty (Truth)

[Note: percentages are used only for understanding purposes.]



- Certain it is true (*yaqīn*, *qaṭʿī*): 100 percent true (verified or guaranteed): Qurʾan and mutawātir ḥadīth
- Probable (likely) to be true (*ẓann rājiḥ*): 51–99 percent true
- Doubt (*shakk*): 50 percent true, that is, 50/50 chance that it is true or it is false
- Improbable (unlikely) to be true (*ẓann marjūḥ*): 1–49 percent true
- Certain it is false (*bāṭil*): 0 percent true (or 100% false)

Example: Proposition of climate change Is climate change real/occurring?

Research is being done and is ongoing, but how certain are we?