Introduction to Epistemology and Islamic Epistemology

1:1

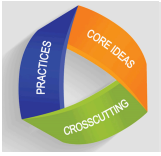
Unit: 1
Lesson: 1

Time Length: 45–50 min

REASONING EXERCISES IN ISLAM & SCIENCE

How Do We Apply Human Reasoning?

(Sources of Knowledge and the Spectrum of Certainty)



NGSS Instructional Outcomes

Next Generation Science Standards

Science and Engineering Practices:

Asking Questions and Defining Problems: Students are encouraged to ask questions about the nature of scientific thought and religious thought.

Engaging in Argument from Evidence: The examination of propositions (rational, revelatory, empirical) and their justifications fits this practice.

Crosscutting Concepts:

Cause and Effect: Understanding the relationship between different types of knowledge and how they influence beliefs and understanding.

Systems and System Models: Exploring how different systems of thought (scientific and religious) interpret and understand the world.

CCSS Instructional Outcomes

Common Core State Standards

English Language Arts Standards (ELA): Science & Technical Subjects, Grades 6-12:

CCSS.ELA-Literacy.RST.6-8.l & 9-10.1: Cite specific textual evidence to support analysis of science and technical texts.

CCSS.ELA-Literacy.RST.6-8.8 & 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 & 11-12.1: Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 9-12 topics and texts.

Mathematics Standards (for critical thinking and logical reasoning aspects):

CCSS.Math. Practice MPl: Make sense of problems and persevere in solving them.

CCSS.Math.Practice.MP3: Construct viable arguments and critique the reasoning of others.

Content Learning Outcomes:

- Identify and explain the sources of knowledge and their relationship to each other.
- 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:

- Instructional/Teacher Facilitation: Slides 1.1-1.16
- Triple-Entry Vocabulary Journal Instructions
- Triple-Entry Journal Template
- YouTube Video: Galileo Galilei in a Nutshell
- Sources of Knowledge Graphic Organizer
- Lesson 1.1 Assessment

Instruction/Teacher Facilitation Slides for Lesson 1.1

- **Slide 1.1.** Religion and Science: Scenario: "I leave my Islam at the door"
- **Slide 1.2.** Religion and Science: Islamic Paradigm
- **Slide 1.3.** Religion and Science: How do we apply human reason?
- **Slide 1.4.** Galileo: Science and the Church
- **Slide 1.5.** What was Galileo saying?
- **Slide 1.6.** Triple-Entry Vocabulary Journal
- **Slide 1.7.** Define Epistemology
- **Slide 1.8.** What is a Proposition?
- **Slide 1.9.** What is Truth?
- **Slide 1.10.** Sources of Knowledge
- **Slide 1.11.** The Five Senses—*al-ḥawāṣṣ al-khams*
- **Slide 1.12.** The Intellect—*al-ʿaql*
- **Slide 1.13.** The Principle of the Excluded Middle (PEM)
- **Slide 1.14.** True Reports—*al-khabar al-ṣādiq*
- **Slide 1.15.** Inspiration/Intuition—*ilhām*
- **Slide 1.16.** Student Activity: Sources of Knowledge Graphic Organizer

Instruction/ Teacher Facilitation

SLIDE 1.1: Religion and Science:

Scenario: "I leave my Islam at the door"

Religion and Science

Scenario: "I leave my Islam at the door"

Discussion Questions:

- Is this the right approach? Why or why not?
- How would you define "Scientific Thought"
- How would you define "Religious Thought"

Scenario: *Share the scenario of a particular medical doctor describing his approach to the relationship between his scientific work and his religion:* A medical doctor says that the way he lives as a Muslim research scientist is that he wakes up as a Muslim and does everything as a Muslim (praying, eating, dressing, and so on) but when he gets to work, puts on his lab coat, and enters his lab, he says, "I leave my Islam at the door. When I am done doing my research for the day, and exit my lab and take off my lab coat, I am a Muslim again and continue my day as a Muslim would."

There are many people of faith, Christians, Jews, and others, who do the same, leave their religion at the door. They also seem to have this same approach towards religion and science.

Q: What do you think about this scenario? Is this really the approach we should be taking, leaving our Islam at the door when it comes to scientific endeavors and our professional life? [Students discuss whether or not they agree with this approach.]

Q&A

A: The answer is obviously that this is not the right approach, as we will see through this unit of study. God exists outside the lab, but also inside the lab as well. God created what people are researching, the tools they are using to research, and even created the researcher himself. There is no way to isolate God from the realm of science. This is why it is important to have a proper understanding of epistemology and how empirical and rational propositions relate.

Students can discuss whether or not they agree with this approach. Introduce the topic by asking the students how they would define "Scientific Thought" and "Religious Thought." Usually science is considered to be "rational" and discusses logical thinking skills and processes. On the other hand, religion is deemed beyond logic and thus separated from the realm of rational inquiry.

Slide 1.2: Religion and Science:
Islamic Paradigm

Religion and Science

Islamic Paradigm:

Theology and Science have much overlap
Theologians were the scientists!

- Is science neutral? – Influenced by scientist
- Are religious questions also scientific questions?

There is a misconception of separation and/or conflict. In reality Islam prizes rational thought, and, therefore in the Islamic worldview, religion and science are not separate domains. Both are subject to rational inquiry. Historically, many theologians were also scientists.

Q&A

Q1: Regardless of whether science does or does not work well with religion, do we believe science to be neutral?

Q2: Is science simply describing and reporting the observable/what we experience in the world, OR does it have its own philosophical/metaphysical commitments?

[Give students an opportunity to answer these questions.]

A1: *Science is not neutral, it supposes/posits a specific understanding of what is knowable and of reality.*

A2: *When scientists study and report, they come with their own beliefs and values, and commitments. Those beliefs and commitments influence the scientists' interpretation of their findings.*

This is an important aspect to consider and keep in mind when going through this unit. Looking at religion and science, the main aspect of religion is belief in God. According to the famous scientist and a main contributor to the New Atheist movement/belief, Richard Dawkins, the question "Does God exist?" is a scientific question. He believes science should be able to answer this question.

Q&A

Q3: Do you believe this is a scientific question?

A3: *It cannot be a scientific question because science is the study of natural phenomenon of time and space/place. So if we say that this question is a scientific hypothesis, then we are inferring that God must be within space and time. And as Muslims, this goes directly against our theology/aqīda. We know that Allah (swt) as mentioned in the Qur'an, transcends space and time. This is the limit of science, it can only study natural phenomena within space and time. Science can only study certain aspects of reality, not all aspects of reality.*

Science is not just about learning facts, there are a lot of assumptions made in the field of science and in the process of inquiry, particularly biological sciences, and in order to understand the study of science, this needs to be made clear.

Slide 1.3: Religion and Science:
How do we apply human reason?

Religion and Science

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

Step 2: Ask questions!

﴿فَأَيْنَ تَذْهَبُونَ﴾

- In Islam, we are encouraged to ask questions, with the right intentions, such as to benefit from this newly gained knowledge, and to increase obedience to Allah (swt).

- The Qur'an also asks questions to us as humans, for us to question our own intentions and purposes, and to make us think deeply.

- For example, in the Qur'an, Allah (swt) asks us in Sūrah al-Takwīr (81:26): **فَأَيْنَ تَذْهَبُونَ** - So where are you going?

- So what questions are we asking?

People of the past did ask questions, and they looked for answers; but not without conflict and clashes with religious thought.

Slide 1.4 Galileo: Science and the Church

Galileo Galilei in a Nutshell

- Watch the video: "**Galileo Galilei – in a Nutshell**," 3 March 2014.

Slide 1.5: What was Galileo Saying?

Q&A

Ask students these comprehension and critical thinking questions, after viewing the video:

Q1: What was Galileo's point? What was he saying?

A1: *We should observe physics in the world through scientific methods: observing, hypothesizing, and testing/experimenting. Galileo discussed these three concepts: acceleration, that objects fall at the same rate regardless of size/weight, and argued for heliocentrism (the sun is the center of the universe and the Earth rotates around it).*

Important to note here is that scientific findings can change with further discoveries and reinterpretation.

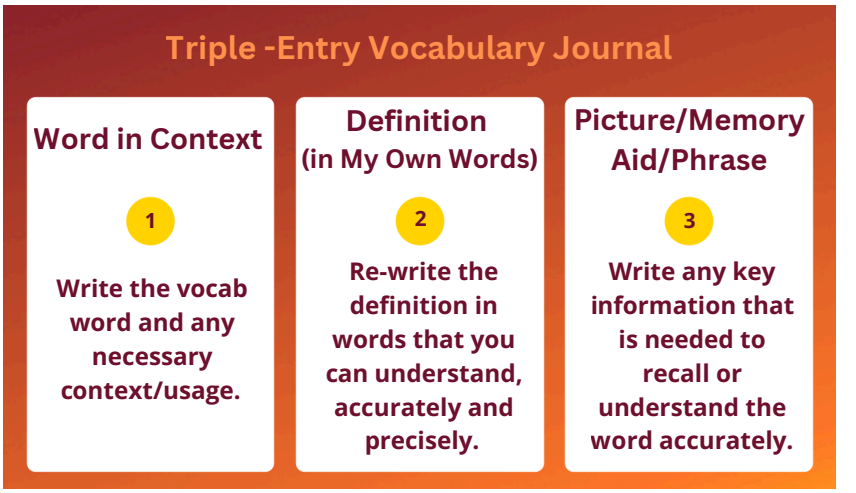
Q2: What was the Church saying? What was their response to Galileo?

A2: *The Church felt that his findings contradicted their doctrine, for example, Geocentricism: the Earth is the center of the universe. Feeling challenged, the church put Galileo under house arrest. This set the precedent for conflict between science and religion.*

Q3: What does it mean for religion and science to conflict?

A3: *People say not to bring religion into science because there is this history of conflict and the expectation of conflict, inevitably. It confuses people because science tells us something and religion tells you something else. Many Muslims have adopted this view uncritically, sometimes subtly through the influnce of popular media. So, just like the doctor who left his religion at the door, we have been trained to separate science and religion into different compartments. If we look at Islamic history, we will not find such a total disconnect between religion and science. In modern times, however, the idea is almost universally held, and perhaps wrongly so.*

Slide 1.6: Triple-Entry Vocabulary Journal



Triple-Entry Vocab Journal Template

Introduce students to the Triple-Entry Journal (See p. 35).

Model how to create the Triple-Entry Vocabulary Journal by displaying the Triple-Entry Journal template (which is included in the slide deck) or drawing three columns on the board and label as in the template. Distribute a copy of this template to students (See p. 38).

Stressing the importance of understanding the vocabulary associated with any topic to attain comprehensive and more complete understanding, and avoiding confusion.

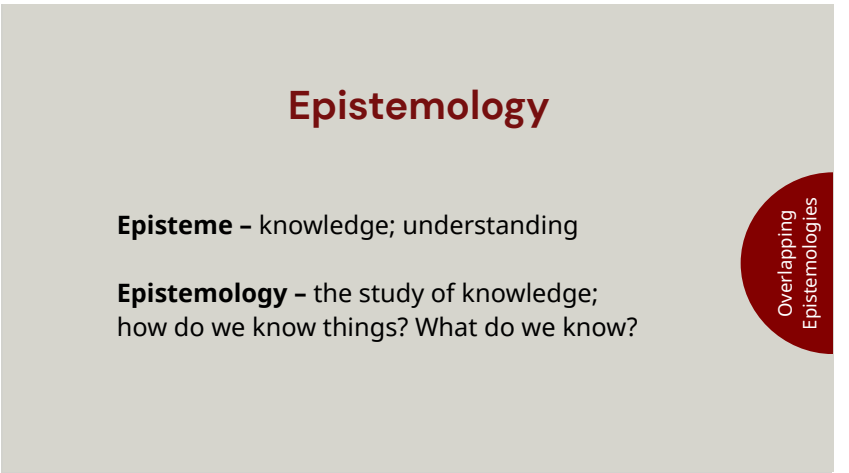
The teacher should explicitly have students pause and add words to their journal throughout the lesson, specifically terms that students do not know or might not fully understand (other columns can be filled later if needed).

- Students can also add words that are new to them or are difficult for them to comprehend or remember.

- After formally instructing students to keep adding words to the journal, this task can be placed as the student's responsibility.

First things first, we have to correct our thinking, our process of thinking, and our predispositions of thought in general.

Slide 1.7: Define Epistemology



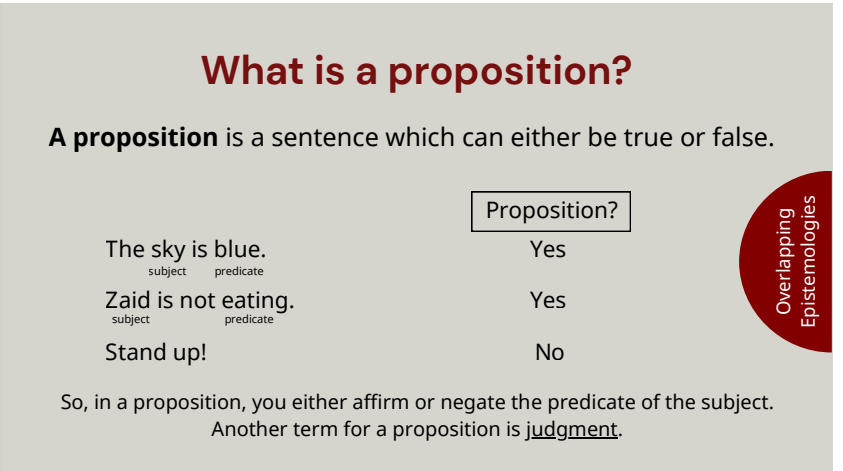
Epistemology is a branch of philosophy.

- Episteme- means "knowledge or understanding," -ology means "the study of."

- Epistemology is the study of knowledge, how do we know things, what do we know, what can we know, and to what degree of certainty can we know it.

Instruct students to add "Epistemology" to their vocabulary journal.

Slide 1.8: What is a Proposition?



A **proposition**, or **judgment** (*ḥukm*), is a sentence/statement which can either be true or false.

Ask students: to determine if each example is a proposition or not:

> The sky is blue.
> • Yes, a proposition because you can observe it and verify it is truth or falsehood. Sky - subject; blue - predicate.
>
> Zaid is not eating.
> • Yes, a proposition because you can see if he is eating or not and verify. Zaid - subject; eating - predicate.
>
> Stand up!
> • NOT a proposition, because you cannot ascertain it is truth or falsehood, it is a command.

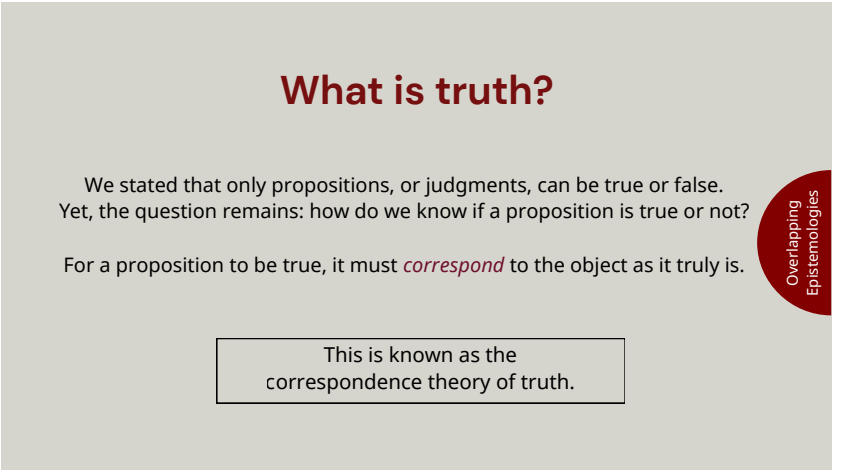
A proposition, or judgment, has two essential parts: a subject and a predicate.

In a proposition/judgment, you either affirm (*ithbāt*) or negate (*nafi*) the predicate of the subject, all knowledge is propositional knowledge.

Propositional knowledge is a concept found in Islamic theology as well.

Instruct students to add “judgment” or “proposition” (ḥukm) to their vocabulary journal.

Slide 1.9: What is Truth?

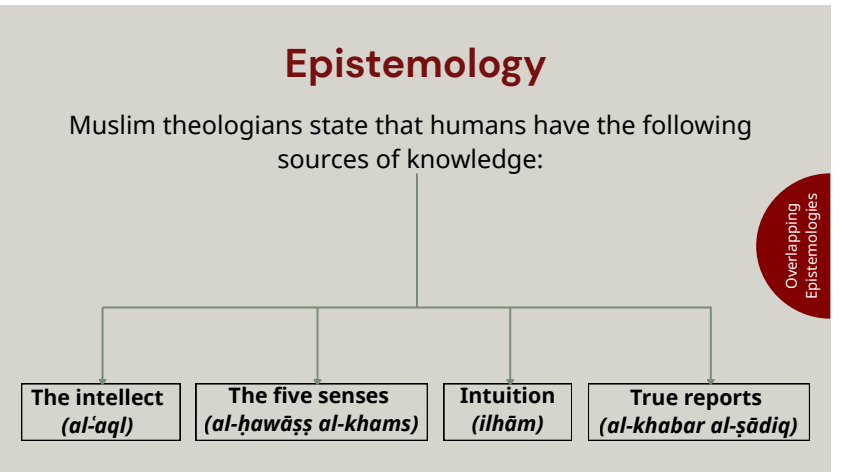


We stated that only propositions, or judgments, can be true or false. Yet, the question remains: How do we know if a proposition is true or not? For a proposition to be true, it must correspond to the object as it truly is.

This is known as the **correspondence theory of truth**, which states that the truth or falsity of a statement is determined only by how it relates to the world and whether it accurately describes that world.

In simple words, the correspondence theory says that truth is a connection to reality. To be true is to accurately describe – in other words, match, picture, depict, express, conform to, agree with, or correspond to – the real world or parts of it.

Slide 1.10: Sources of Knowledge



Muslim theologians state that humans have, at least, these sources of knowledge:

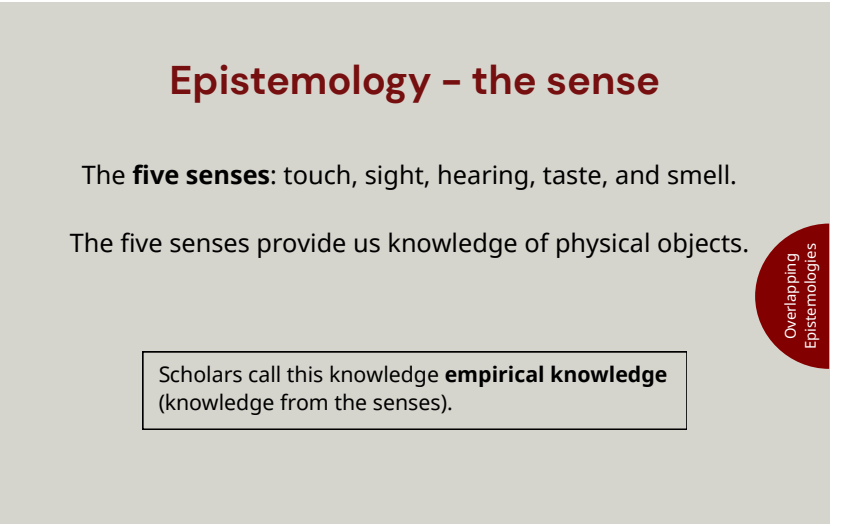
- The five senses *(al-ḥawāṣṣ al-khams)*
- The intellect *(al-ʿaql)*
- True reports *(al-khabar al-ṣādiq)*
- Intuition/Inspiration *(ilhām)*

Thought Exercise: to demonstrate this understanding of the sources of knowledge, give the scenario of a person coming to visit your home and is present at the door:

- You hear a knock at the door. (Five senses - hearing)
- You can use your intellect to understand that since you heard a knock, someone must be at the door. (Intellect)
- Your sibling/member inside the house also heard the knock and told you that someone is at the door. (True report)
- A few days earlier, you had an inexplicable "feeling" that a person was going to come to visit you and that you should prepare to meet him in a specific manner. (Intuition/Inspiration)

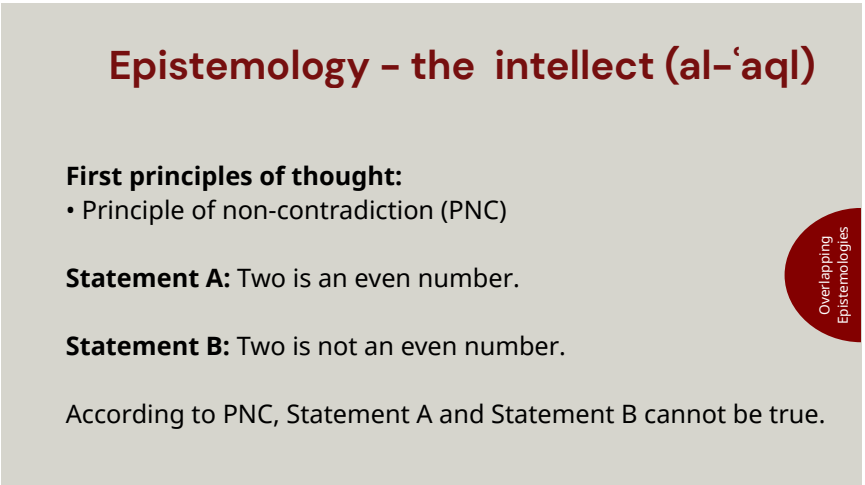
Use this scenario and the examples to connect back to for each of the sources of knowledge as they are explained more in-depth.

Slide 1.11: The Five Senses
al-ḥawāṣṣ al-khams



The five senses—*al-ḥawāṣṣ al-khams*—are touch, sight, hearing, taste, and smell. They provide us with knowledge of physical objects. Touch is the first sense we develop as a fetus, then taste and smell around the same time, then hearing, and lastly sight. So these senses are our first means of exposure to the world. This is called **empirical knowledge**—knowledge gained from the senses.

Slide 1.12: The Intellect—*al-ʿaql*



The Intellect - *al-ʿaql* — our reasoning and logical capacity (the science of logic is called manṭiq).

The first principles of rational/intellectual thought (or Laws of Thought) are:

The **principle of non-contradiction (PNC)** states that contradictory propositions cannot both be true in the same sense, at the same time.

PNC is the most important, foundational principal. Islamic scholars say that this principle is the source of all rational thought. If we do not have this principle, we would not be able to define knowledge and communicate that clearly. (Remember: this is regarding rational knowledge, not empirical knowledge.)

For example: Two *is* an even number.
Two is *not* an even number.

- Both of these are propositions/judgments.
- According to PNC, both statements cannot be true. Only one has to be true and the other has to be false.

Slide 1.13: The Principle of the Excluded Middle (PEM)

Epistemology – the intellect (*al-ʿaql*)

First principles of thought:
• Principle of excluded middle (PEM)

Statement A: Two is an even number.

According to PEM, Statement A is either true or false.
There is no middle state between true and false.

Overlapping Epistemologies

The **principle of the excluded middle (PEM)** states that a proposition can either be true or false, not both. There is no middle state between true and false.

> For example: Two is an even number.
>
> • According to PEM, this statement is either true or false. No middle category between true and false.

This is how intellectual thought is structured; the basis of all reasoning.

Slide 1.14: True Reports—*al-khabar aṣ-ṣādiq*

Epistemology – true reports

Knowledge gained from true reports (*al-khabar aṣ-ṣādiq*) refers to knowledge we gain based on the testimony of others.

Testimonial knowledge rests on the reliability of the person conveying the knowledge.

Can you provide me with examples of knowledge we gain from true reports?

Overlapping Epistemologies

True reports (*al-khabar aṣ-ṣādiq*) refers to knowledge gained based on the testimony of others.

Testimonial knowledge is dependent on the reliability of the person conveying the report or knowledge. Therefore, this is knowledge that must be vetted for truth. Most of what we know falls under this category.

Thought Exercise:

Q: Can you give me examples of knowledge we gain from true reports?

A: *Textbook information is of this type because it is written through the author's interpretation and point of view.*

A: *Data—the collection of data is empirical knowledge.*

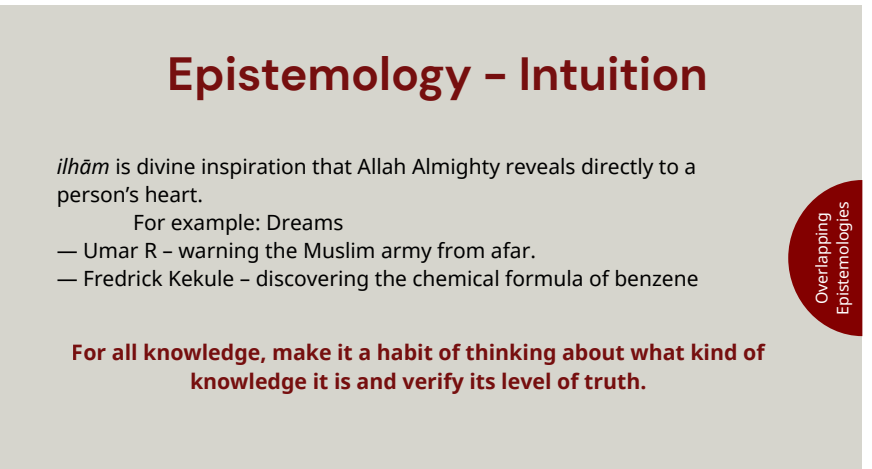
A: *The researcher's interpretation and written report (to share his findings) can be considered as a true report.*

A: *Someone comes and tells you what he/she saw or heard.*

A: *News reports*

A: *Even Google Maps is based on reports.*

Slide 1.15: Inspiration/Intuition—*ilhām*



Inspiration/Intuition (*ilhām*) - this is a very specified knowledge and can be very individualized; not for everyone.

Something that a person knows from Allah (swt), revealed directly to his/her heart.

Dreams can be a form of *ilhām*. A very important form of knowledge. It is a Sunnah to get dreams interpreted.

Allah (swt) swears: "[by] the soul and He who proportioned it; And inspired it [with discernment of] its wickedness and its righteousness." (Sūrah al-Shams, 91:7–8).

llhām/divine inspiration to Umar (R): While delivering a sermon in Medina, Umar (R) suddenly paused and called out, "*Ya Sariya, al jabal!*" which translates to "O Sariya, [watch] the mountain!"

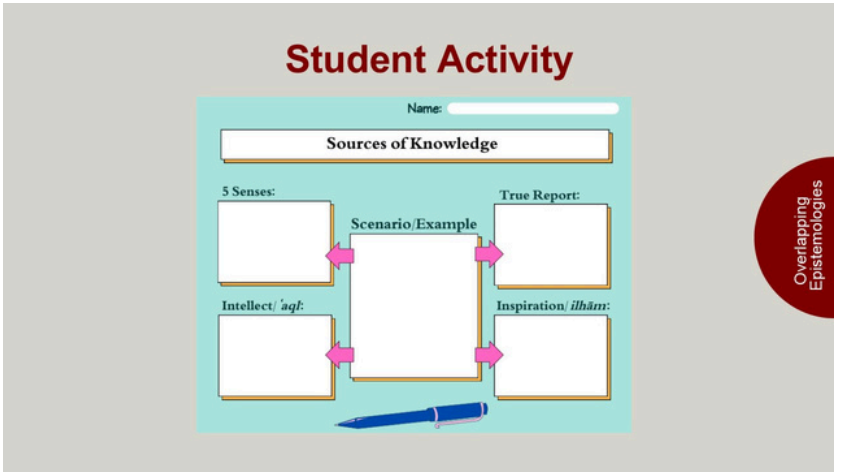
> Sariya (R) was a Companion who was the commander of the Muslim army engaged in a battle in a place called Nahawan. Sariya (R) and his troops heard Umar (R)'s warning and changed their strategy accordingly, which helped them avoid an ambush and win the battle.

Also mentioned in the Qurʾan: "*And your Lord inspired/revealed to the honey bee: Make homes in the mountains, in the trees and in the structures they raise.*" (Sūrah An-Nahl 16:68)

Frederick Kekulé, the German chemist who discovered the chemical formula for benzene in 1865, claimed that he had a dream about the C_6H_6 ring formula with the alternating single and double bonds. Through this *ilhām*/intuition, he discovered the structure of benzene.

We see that *ilhām* has a role even in scienctific discoveries. We need to develop this habit of thinking about what kind of knowledge a statement is based on and then verify its truthfulness.

Slide 1.16: Student Activity:
Sources of Knowledge Graphic Organizer



Student Activity: Instruct students to think of an example or a scenario that would incorporate all four sources of knowledge; similar to the example of the person knocking at the door. Have them fill out the **Sources of Knowledge Graphic Organizer**.

Sources of Knowledge Graphic Organizer

- This can be used in the form of a Think/Pair/Share classroom activity or group activity.
- It can also be used as an assignment to check for student understanding.
- Students should then share examples/scenarios with the class.

Name:

Sources of Knowledge

5 Senses:

Scenario/Example

True Report:

Intellect/ *ʿaql*:

Inspiration/ *ilhām*: