Islam and Science - Supplementary Notes for Teachers

Slide 2 of 21 – Think. Pair. Share.

(A) Knowledge and understanding

- Understand how science helps us in our everyday lives.

(B) Ideas and insights

- Students should work in pairs and consider the impact of science in our everyday lives, e.g., technology, home comforts such as light and electricity, medicine, transport etc. Collate ideas and display in a mind map/brainstorm for the whole group to see.

Slide 3 of 21 – Aims and Objectives

(A) Knowledge and understanding

- Understand the aims and objectives of this topic, as listed on the slide.

(B) Ideas and insights

- Initial questions for Students to Consider: Do you think Islam encourages Muslims to seek education?
- Does Islam have any bearing on scientific developments?
- The answer to both questions is yes. The importance of education in Islam is often misunderstood and, as we shall see in this topic, Muslims are encouraged to seek knowledge and to utilise it for the service and betterment of society. Muslims have also been at the forefront of scientific developments, for example in 1979, Dr Mohammad Abdus Salam became the first Pakistani and the first Muslim from an Islamic Country to receive a Nobel Prize in science and the second from an Islamic country to receive any Nobel Prize. For more information see https://en.wikipedia.org/wiki/Abdus_Salam.

Slide 4 of 21 – Key Vocabulary

(A) Knowledge and understanding

- Explain the definitions of Civilisation, Conquer, Scholar, Calligraphy and Astronomy, as set out on the slide.

(B) Ideas and insights

- To reinforce understanding of their meanings, ask students to write a sentence containing each of the key vocabulary words.

Slides 5, 6 and 7 of 21 – Islamic Civilisations

(A) Knowledge and understanding

- The map on Slide 5 shows the areas of the world conquered by the Early Islamic civilisations. Early Islam began in Makkah (Mecca) but how far and wide did it reach across the world? Point out the cities on the map.
- Most Islamic towns were formed due to availability of a water supply and land being fertile to sustain communities. Trade routes were also very important in the Middle East to attract people with skills and to help expand the knowledge of the people in the towns. Notice the main centres are along trade routes and/or near coastal ports.
- From the mid-600s, the Islamic Empire spread throughout the Middle East, west across North Africa and Spain, and east as far as present-day India.
- Note that Constantinople is now known as Istanbul (which was the capital city of Turkey before 1920 when it changed to Ankara).

(B) Ideas and insights

- Print the map shown on Slide 5 and cover the names of Constantinople, Damascus, Cordoba and Baghdad. Ask Students to locate the missing cities.
- You may wish to show the first minute of the following video: https://www.bbc.co.uk/bitesize/topics/z4v6m39/articles/zw8nhcw#zpqm2v4
- Invite students to consider the questions on Slide 6 – Using the map on Slide 5, how many cities can they list from the ancient Islamic world? What is special/significant about these cities?
- Notable facts about some of the cities are as follows:
- Medina, Saudi Arabia: the first city belonging to the Islamic civilisation where the Holy Prophet Muhammad[pbuh] migrated to in 622 AD.
- Baghdad, Iraq: the first Islamic city with a paper mill.
- Baghdad, Iraq: Ibn Al-Haytham was a medieval mathematician, astronomer, and physicist who invented a camera that helped explain how the eye sees.
- Fez, Morocco: The University of al-Qarawiyyin, was founded by a Muslim lady named Fatima al-Fihri in 857–859. This university is the oldest existing, continually operating and the first degree-awarding educational institution in the world according to UNESCO and Guinness World Records.
- Basra, Morocco: A mint issued coins allowing the city to serve as an administrative, commercial and agricultural centre for the Islamic civilization between ca AD 800 and AD 1100. Basra produced many goods for the extensive Mediterranean and sub-Saharan trade market, including iron and copper, utilitarian pottery, glass beads, and glass objects.
- See https://www.thoughtco.com/ancient-islamic-cities-171371 for more examples.
- Arabic is the original language of the Holy Qur'an and was the language spoken by the early Muslims. It is still the major language spoken in many middle eastern countries. Many Arabic words are used in science, particularly in the fields of mathematics, physics, astronomy, medicine, and chemistry. Some examples are shown in Slide 7.
- GROUP DISCUSSION: Invite Students to share if they have visited any Muslim countries. What was it like? Can they recall any differences between a Muslim city and a city in the Western world? For example, in some Muslim cities you can hear

the 'Adhan' or the Call to Prayer being recited from Mosques before each of the 5 daily prayers.

Slide 8 of 21 – Islamic teachings about seeking knowledge

(A) Knowledge and understanding

- Learning and seeking knowledge is a fundamental part of Islamic teachings. Both men and women are encouraged to seek knowledge, gain an education and to utilise this for the service of Humanity.
- The verse from the Holy Qur'an shown on Slide 8 is one that many Muslim children learn and recite from an early age.
- The Holy Prophet Muhammad[pbuh] also emphasised the significance of seeking knowledge and said that this is obligatory upon every Muslim man and woman. This particular saying of the Holy Prophet Muhammad[pbuh] is set out on Slide 8.
- The simplest type of early Muslim education was offered in the Mosques, where scholars who had congregated to discuss the Holy Qur'an began, before long, to also teach the religious sciences to interested adults. As many as 12,000 Mosques, most of them with schools attached, were reported in Alexandria, Egypt in the 14th century. Each Mosque usually contained several study circles (ḥalqah), so named because the teacher was, as a rule, seated on a dais or cushion with the pupils gathered in a semicircle before them.
- Students were expected to memorise the Holy Qur'an as perfectly as possible. Some schools also included in their curriculum the study of poetry, elementary arithmetic, ethics (manners), and elementary grammar.

(B) Ideas and insights

- What are the benefits of education? Discuss the importance of attending school and the repercussions faced when children don't attend or are denied access to basic education due to political or other circumstances.
- Discuss methods of learning outside of school/ does all learning take place in a school setting?

Slide 9 of 21 – Early Islamic Scholars

(A) Knowledge and understanding

- Al-Razi - Born c. 854 in Rayy, Persia (now in Iran) - died 925/935, Rayy. He is widely regarded as one of the most important figures in the history of medicine. He served as chief physician in hospitals both in Rayy and in Baghdad for some time. He was the first person to clinically distinguish between smallpox and measles and suggest treatment to the former.
- Ibn Sina – Also known as Avicenna, was a Persian philosopher and scientist. Born 980, near Bukhara, Iran [now in Uzbekistan]—died 1037, Hamadan, Iran. He was particularly noted for his contributions in the fields of Aristotelian philosophy and medicine. He composed the Kitāb al-shifāʾ (Book of the Cure), a vast philosophical

and scientific encyclopaedia, and Al-Qānūn fī al-ṭibb (The Canon of Medicine), which is among the most famous books in the history of medicine. When the Sultan of Bukhara fell ill with an ailment that baffled the court physicians, Ibn Sina was called to his bedside and cured him. Ibn Sina began his writing career at age 21. Some 240 titles still in existence bear his name.

- Al-Zahrawi - Born c. 936, near Córdoba [Spain]—died c. 1013. He was a medieval surgeon of Andalusian Spain, whose comprehensive medical text, combining Middle Eastern and Greco-Roman classical teachings, shaped European surgical procedures until the Renaissance. His books contained many original observations, including the earliest known description of hemophilia. His book *Al-Taṣrīf li-man ʿajaz ʿan al-taʾālīf*, or *Al-Taṣrīf* ("The Method") contains drawings of more than 200 instruments, and constitutes the first illustrated independent work on surgery.
- Ibn Nafis - (Born c. 1213 Damascus - died 1288 Cairo). An Arab physician who first described the circulation of the blood. In finding that the wall between the right and left ventricles of the heart is solid and without pores, he disputed earlier scientific views that the blood passes directly from the right to the left side of the heart. It was only in the 20th century that his work was brought to light. He studied in Damascus and then went to Egypt to take charge of the Nāṣirī Hospital in Cairo.

(B) Ideas and insights

- Students can choose one of the 4 early Islamic Scholars mentioned on this Slide to research in greater depth and prepare a poster about their life and achievements.

Slides 10-18 of 21 – Task Outline and Fact Files on Scholars from Early Islam

(A) Knowledge and understanding

- Understanding how the different Islamic civilisations heavily impacted the spreading of scientific knowledge.

(B) Ideas and insights

- INDIVIDUAL/HOMEWORK TASK: Each Student could be given a printout of the Table from Slide 10, together with the fact files in Slides 11-18. Using the information in the fact files, students could complete the Table.
- CLASS TASK: Split the class into four groups. Provide each group with a fact file. Students could work in groups to complete the Table and then feed back to the class. This way, by the end of all 4 presentations each student would have a completed table of all 4 cities.

Slides 19-20 of 21– Islamic Inventions

(A) Knowledge and understanding

- Learning about some of the early scientific discoveries made by Muslims and understanding that Muslim scholars and inventors were inspired and motivated by the teachings of Islam.

(B) Ideas and insights

- From carpets, optics and coffee to degree-awarding universities and hospitals, Islamic inventors have had a significant impact on the modern-day world as we know it. Talented and hardworking Muslim scholars, who were also students of the sciences, discovered things that we still hold onto now.
- It is important to note that Muslim scientists, researchers and inventors of the 'Islamic Golden Age' (a period of scientific, economic and cultural development in the history of Islam traditionally dated from the 8th to 13th century) were inspired and motivated by their religion, Islam. Allah, in the Holy Qur'an instructs Muslims to "think" and "ponder" over the "creation of the heavens and earth". Allah talks about the "alternation of the night and day" and how He causes plants to grow and flourish. The Holy Qur'an covers topics across biology, geology, embryology, astronomy and many more sciences. At the same time, it communicates to its readers to ponder and reflect.
- Look at the images on this Slide. They provide examples of some of the inventions made by Muslims. These include Coffee, Surgical instruments, Algebra, Toothbrushes, Maps, Camera/Magnifying glass and Astrolabes (an instrument used in Astronomy to enable astronomers to calculate the position of the Sun and prominent stars).
- For more information about early Muslim inventors/inventions, have a look at the following:
  https://www.alhakam.org/5-muslim-inventions-that-shaped-our-world/
  http://edition.cnn.com/2010/WORLD/meast/01/29/muslim.inventions/index.html

Slide 21 of 21 – Topic Recap - Test your knowledge Quiz

Notes - After saying the name Prophet Muhammad[pbuh], as a sign of respect, Muslims say or write 'peace and blessings be upon him'. Throughout the presentations 'pbuh' is used to represent this phrase.