Science & Technology Ethics and Promotion of Nonproliferation of Dual-Use Materials/Technologies: Learning from the Ancient Civilizations”

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http://www.ecosf.org

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Given the boundless destructive capabilities of nuclear weapons, it is difficult to understand why some states choose to acquire or retain them today.

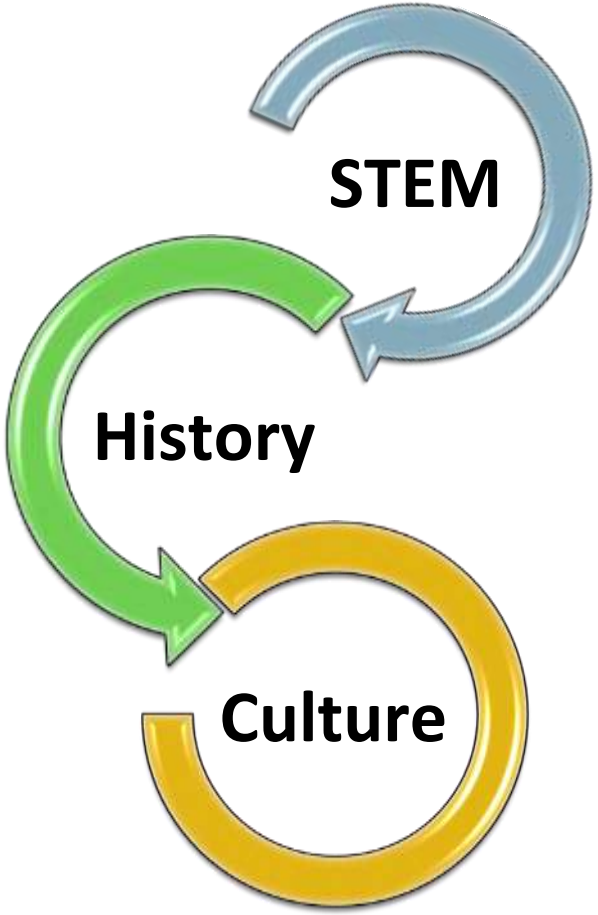
Engaging Natural Scientists in Disarmament and Non Proliferation

Significant structural and institutional reasons why natural scientists often remain outside of the arms control debate:

- **Focused nature of science education**
- **Lack of interdisciplinary study**
- **Scientists relation with society**

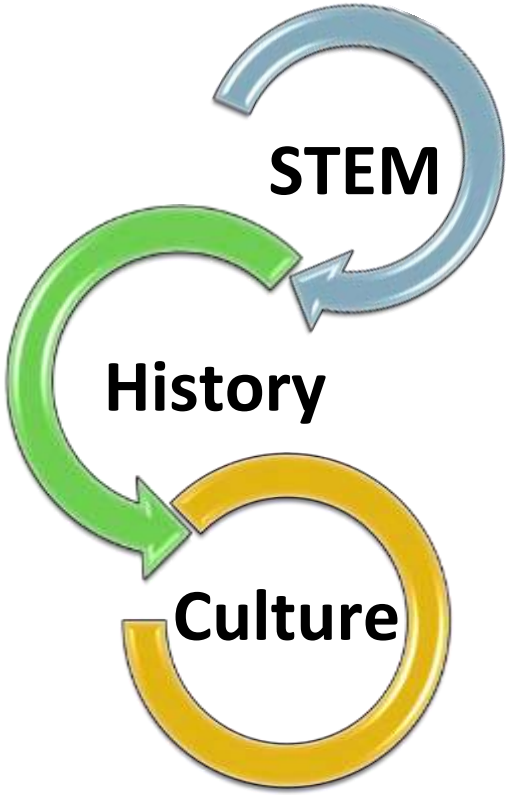
Creating a culture of responsibility, safety and security!

Integration of STEM Education, History and Culture to Promote Nonproliferation of Dual Use Technologies



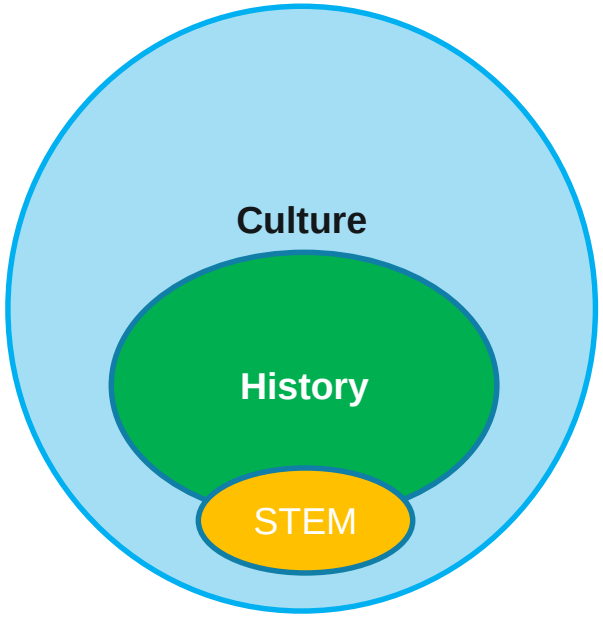
- **History** is our best teacher. The glory of the ancient civilization/silk routes shows that geographical distance is not insurmountable. If we take the first courageous step towards each other, we can embark on a path leading to friendship, shared development, peace, harmony and a better future.
- **History** is a mirror. Only by drawing lessons from history can the world avoid repeating past calamity. The past cannot be changed, but the future can be shaped.





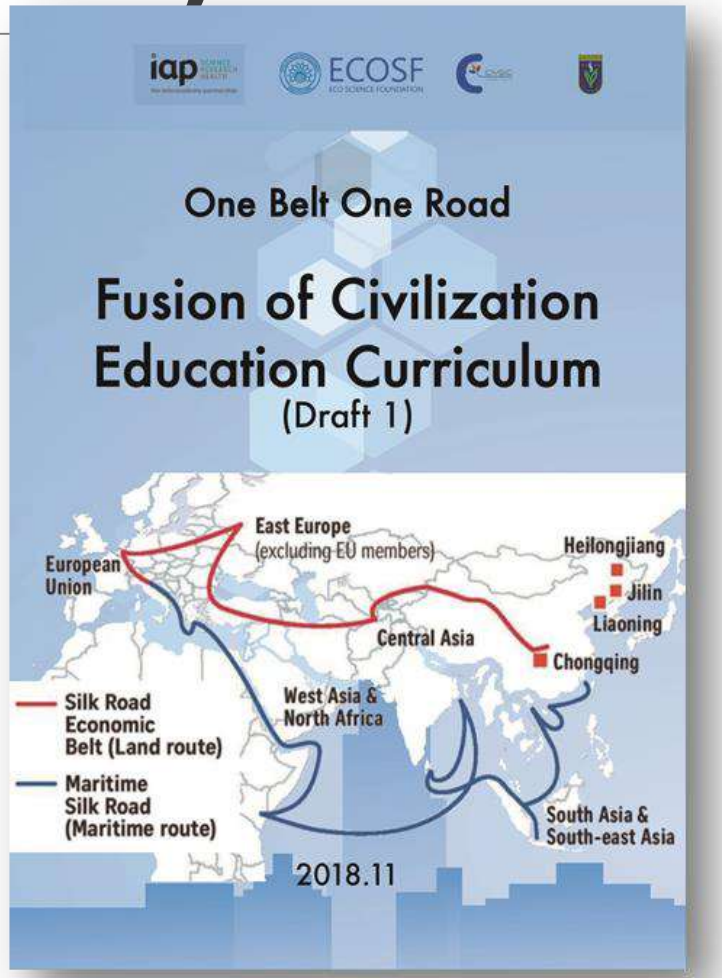
- **Fusion of Civilization** is about connecting of different civilizations that contribute to present day knowledge and bring global **peace and harmony.**

- Understanding the level of developments at which people live together in peacefully in communities.



Fusion of Civilization Curriculum Science Education Design (FoCED)

- ✓ FoCEd aims to promote tolerance and respect of other cultures and traditions
- ✓ Understanding of current scientific knowledge and discoveries in ancient civilizations
- ✓ Learning from ancient wisdom to inculcate global peace and harmony.
- ✓ Understanding the connectivity between cultures and civilizations can instill the awareness of living in peace.



China's One Belt and One Road Initiative

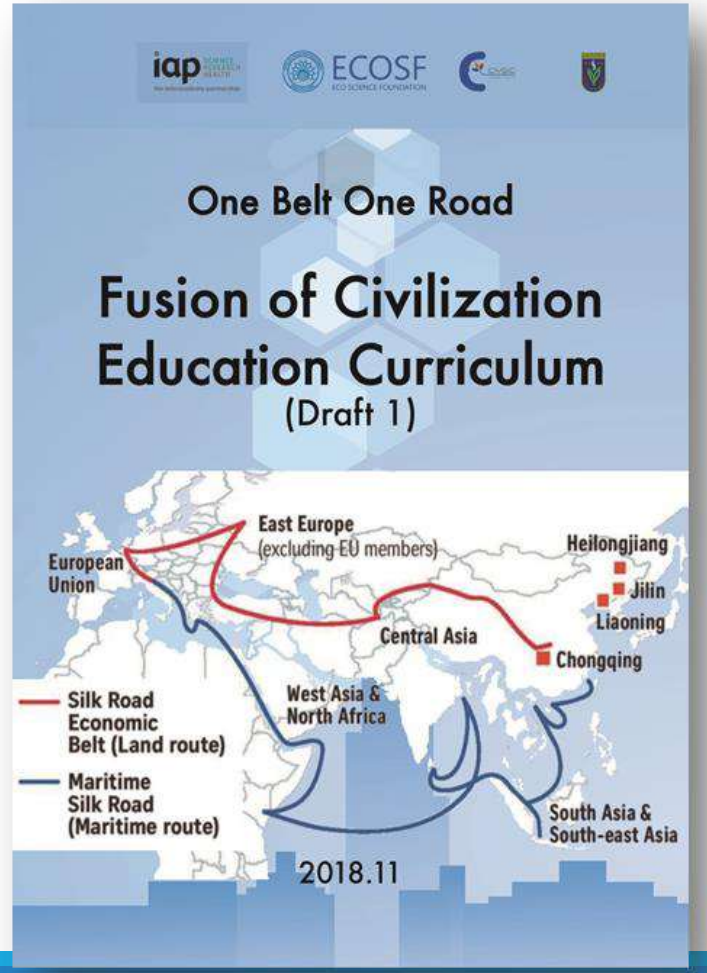
The IAP SEP "Fusion of OBOR Civilizations Curriculum Design" project is inspired by the Belt and Road Initiative of China, especially President Xi's Five Principles for OBOR Initiative.

"We should build the Belt and Road into a road connecting different civilizations. In pursuing the Belt and Road Initiative, we should ensure that when it comes to different civilizations, exchange will replace estrangement, mutual learning will replace clashes, and coexistence will replace a sense of superiority. This will boost mutual understanding, mutual respect and mutual trust among different countries."

------President Xi Jinping

FoCEd Curriculum

- **STEM (Science, technology, engineering and mathematics)** education have been recognized as the vehicle to enhance the **inborn curiosity and creative instincts** of children to face the rapid pace of development in industry 4.0 and the global digital economy.
- Thus stressing and promoting the importance stem education especially the **inquiry based science education (IBSE)** methodology has been given more emphasized in educational program of many countries.



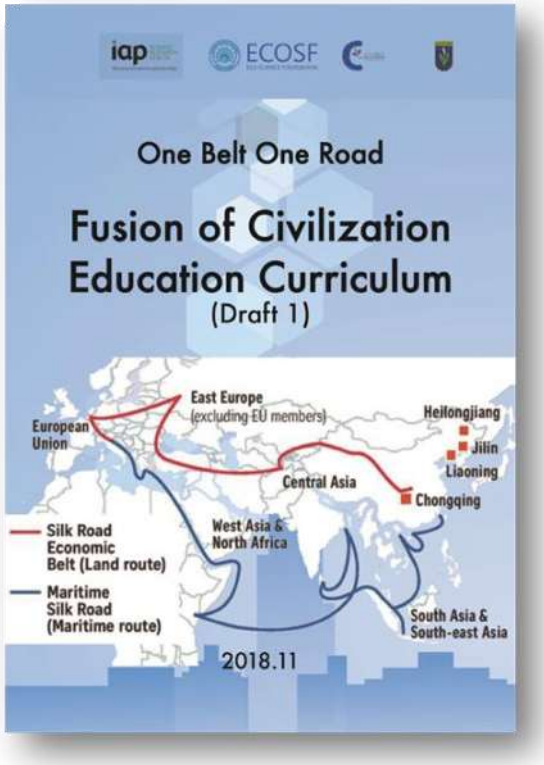
IAP SEP FoCED

An urgent need for the Fusion of OBOR Civilizations Curriculum Design Project, since the ancient silk routes embody the spirit of **peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit.**

This Project was conceptualized in the IAP SEP Science Education Forum in Beijing July 2017.

Contents of Teacher Guide

- **Land Silk Road**
  - Water Resources
  - Astronomy
  - Architecture
- **Maritime Silk Road**
  - History of great voyages
  - Ships
  - Spices (Food)
  - Stars and navigation



8 Innovation for Water Resources in the Silk Road

FUN FACTS

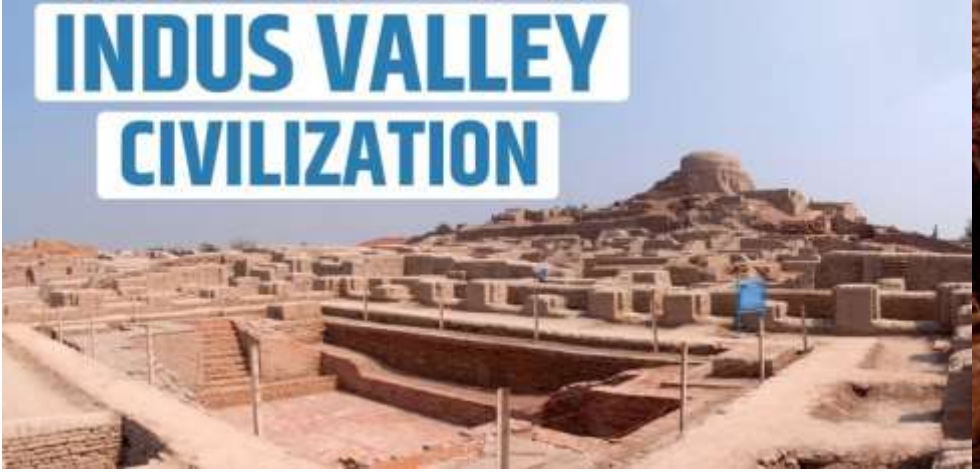
As early as in the 1000 BC, the Chinese working people invented windlass. In the Spring and Autumn Period, there was a record of using windlass to lift copper from the well. Later it was mainly used to raising water from deep wells. windlass consists of the stand, bobbin, handle, rope, bucket, etc. The rope is wound onto one drum while it unwinds from the other, with a movable pulley hanging in the bight between the drums. Turn the handle so that the bucket can get water up and down . The manufacture and application of windlass is closely connected with the development of agriculture in ancient times, and it is widely used in agricultural irrigation. Nowadays, windlass is gradually replaced by electric water pumps.

FOLLOW-UP

- What kind of tools can raise water from deep wells in your country? What theory is it based on?
- Could you find the shaft in your life?

Investigate more fun issues and stories related to science with history and culture, compare and understand

Find more questions to inquiry and investigate



- The largest of the four great ancient civilizations and probably the oldest (2600 BC to 1900 BC)
- Indus valley cities were engineering masterpieces of the time
- It had a more advanced sanitation system than many contemporary urban cities
- One of the most famous structures of IVC is the great bath
- Pioneered several techniques in metallurgy and handicrafts
- Indus valley people had knowledge of dentistry
- The people of Indus valley were peaceful and probably egalitarian
  - ***No evidence of an army and a lack of substantial amount of weapons to wage war.***

Source: https://learnodo-newtonic.com/

Conclusion

- **Ethics has a critical role to play** in Science and Technology (S&T) advancement.
- **We are all same under the skin and no civilization is superior than others.**
- **History and culture combined with science can nurture children - rational citizens of tomorrow who base their decisions on logic rather than emotions.**
- It can promote **tolerance, morality, ethics and mutual respect** through inquiry based learning for S&T advancements.
- This is intended path to **promote nonproliferation of dual-use materials** & technologies on sustainable basis

ECO Science Foundation (ECOSF) and the ECO Region?

10 Member States with Good Natural Resources

ECO Regional Snapshot

Variable	Unit	Quantity	% Share of the World
Population	Million	496	6%
Area	Million Sq. kM	8	2%
GDP Nominal	$US Trillion	$ 1.78	2%
GDP Purchasing Power Parity	$US Trillion	$ 4.98	4%
Primary Energy Consumption	MTOE	927	10%
Oil Reserves	Billion Barrels	1968	12%
Gas Reserves	Trillion CU M	48	25%
Annual Trade Volume	Billion	$600	-
Annual Intra-regional Trade	Billion	$58	-

Source: World Bank, BP Statistical Review of Energy 2015, ECO Secretariat & Ministry of Foreign Affairs

Objectives of ECOSF

(Established in 2011)

- Promote and fund STI research collaboration leading to Economic Development among the member states
- Popularize Science at grass root level (IBSE – Teachers Workshops, Travelling Science Expos, Science Camps, STI Fairs & STEM Policy Forums etc.)
- Harmonize Science, Technology and Innovation policies of ECO countries

Promotion of Science and Technology for Sustainable Development of the ECO Region

ECOSF pursues the goal of promoting research and technological development for sustainable development and economic growth in the ECO region through the following key objectives:

- Development of **Human Resource** Capacity for science, technology and innovation as well as science education in the ECO region.
- Strengthening **Institutional Capacity** in scientific research and technological development among its members.
- Scientific, Technological and Research **Collaboration and Cooperation** among its member states and the developed world.
- Exchange **(Dissemination)** of Information on Scientific and Technological Research and Development through workshops, conferences and meetings etc**.**

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Thank You!

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