



IAEA

International Atomic Energy Agency

The IAEA TCP 2018-2021 on
“Educating Secondary Students
and Science Teachers on
Nuclear Science and Technology”
RAS0079

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Supporting Sustainability and Networking of National Nuclear Institutions in Asia and the Pacific Region, RAS0065

To support technological refurbishment of national nuclear institutions in the Asia and the Pacific region through promotion of regional networking among them to exchange expertise in areas of relative excellence and comparative technological advantage.

2012-2015

Supporting Sustainability and Networking of National Nuclear Institutions in Asia and the Pacific Region, RAS0065 (2012-2015)



Dec 2012: Workshop on innovative approaches to a model for sustainable human resources development and outreach.

- To highlight common elements for HRD and outreach programmes, based on international good practices and lessons learned;
- To develop a hybrid model for HRD and outreach programmes that can be tailored according to national needs



Conclusions (2012)

- The approaches of **HRD and outreach** vary from country to country and that there is **still little synergy** between the two areas, both from an organizational and conceptual perspective.
 - Some countries are already carrying out several activities of outreach and HRD, developing educational materials, and establishing public information centres, however in most cases these outreach and HRD are considered separate areas, hence a cause of duplication of efforts
- Common issues faced by some countries:
 - public concern about nuclear power and their national plans;
 - need for resources (e.g. human and financial);
 - potential of social media for communicating with the population;
 - early education to youngsters, including those in primary education; and
 - programmes in schools to provide quality education in science and technology.

Follow-up action

RAS0065 to support the implementation of outreach activities to potential future nuclear scientists, engineers and technologists through specific extra-curricular activities in the pilot exercises.

The following actions were suggested to participating countries:

- Identification of secondary schools to run the pilot exercise
- Gathering of information on the educational system (via survey)
- Sharing and discussing the information gathered in IAEA meeting



Second meeting — November 2013

Specialist advisory meeting for the development of a portfolio of extra-curricular activities for secondary schools on nuclear science and technology

Produce a portfolio of instructional materials, to be used by Member States as supplementary and complementary for the extracurricular activities and academic curriculum, to support the enhancement of awareness and appreciation of nuclear science and technology in secondary levels.

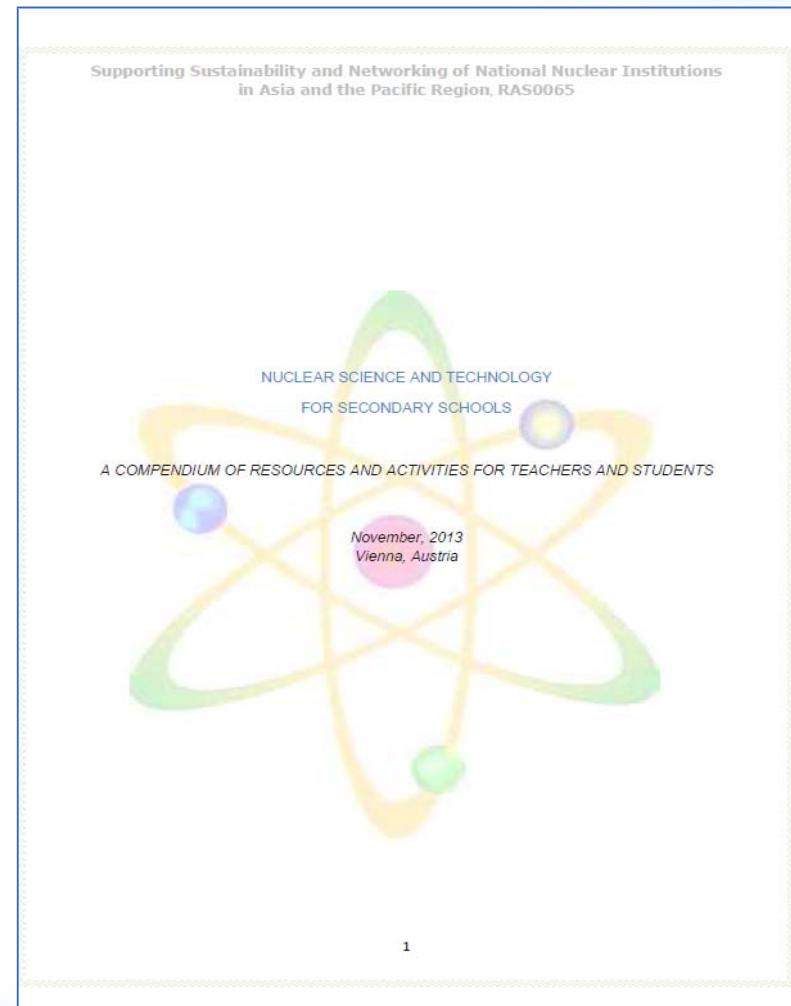
Experts from: Australia, Finland, India, Israel, **Japan**, Republic of Korea, and USA.

The Compendium

with the technical inputs from Australia, Finland, India, Israel, Japan, Republic of Korea, United Kingdom and the USA



Reference of activities to generate curiosity, understanding, and acceptance to demystify the stakeholders, students and teachers as well as general public about STEM

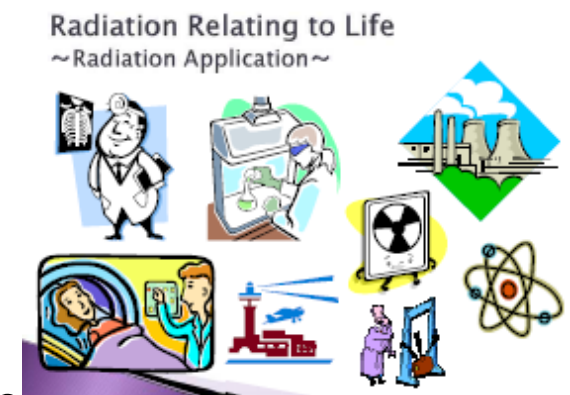


Objectives: Revitalizing Nuclear Science and Technology in Schools



Specifically

- To inculcate scientific thinking
- To introduce, explain, exhibit, and demonstrate
- To develop easy and understandable methods
- To empower teachers
- To impart correct knowledge about nuclear science and technology and its relevancy to society.





Pilot Phase: Oct 2014- Oct 2015

Indonesia, Malaysia, Philippines, UAE



January — July 2015:

- National Implementation
- Expert support
- Teachers Exchange Programme
- Training of Star Teachers

Dec 2015

- Evaluation
- Good practices and lessons
- Improvement of the compendium



Students at South Tangerang 1 State High School conducting Rukawa Fun Experiment during Physics Science Class (Photo by Nita Fitriani)



- From different regions and profiles: rural, fully residential, urban
- Multi partnership: Ministries, nuclear institutions, school officials, local authorities, teachers community
- 10-12 graders; teachers and students





Technical
Cooperation
Programme

Introducing Nuclear Science and Technology in Secondary Schools



Supporting a new generation of nuclear scientists and technologists

- *Empowering teachers for teaching young people about the relevance of nuclear science and technology through easy and understandable methods of teaching*
- *Building skills in scientific thinking through Learning by Doing: introducing, explaining, exhibiting and demonstrating nuclear science and technology*



Building a Reference Compendium to strengthen science curricula in schools

- *A collection of nuclear science teaching activities to generate curiosity about, and understanding of, nuclear science and technology*

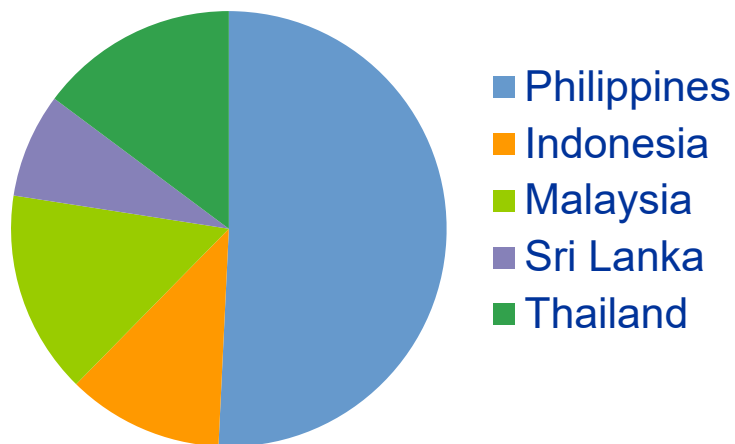


Through the IAEA technical cooperation project RAS0065, 'Supporting Sustainability and Networking of National Nuclear Institutions in Asia and the Pacific Region'
with the support of

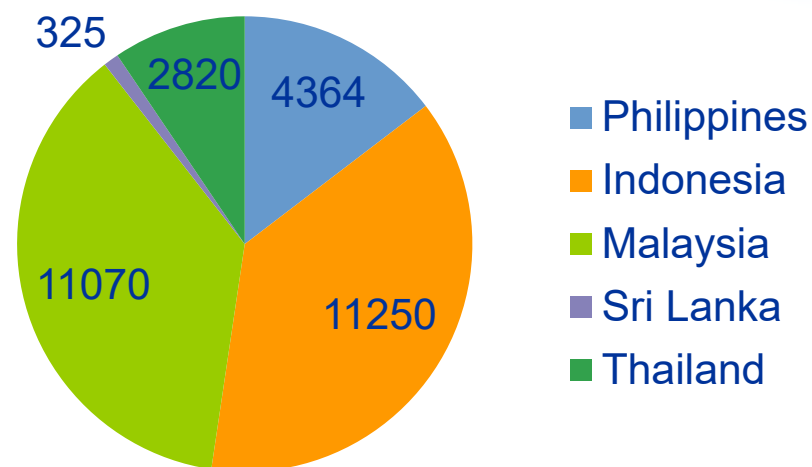


Multiplier Effect Cascade the Benefits!

Teachers Trained



Number of Students Impacted



From 15 FE to 1364 beneficiaries →

24,717 students



The Pilot Phase

- A **critical mass** of trained teachers has been created in the pilot countries for propagation of the program.
- The cooperation and knowledge sharing between Member States in the region, as well as within the participating institutions in the pilot countries is an **important factor to success**.
- Engagement / endorsement of stakeholders like **education authority** with the mandate for secondary education and of the **nuclear sector** in the implementation of compendium is essential.

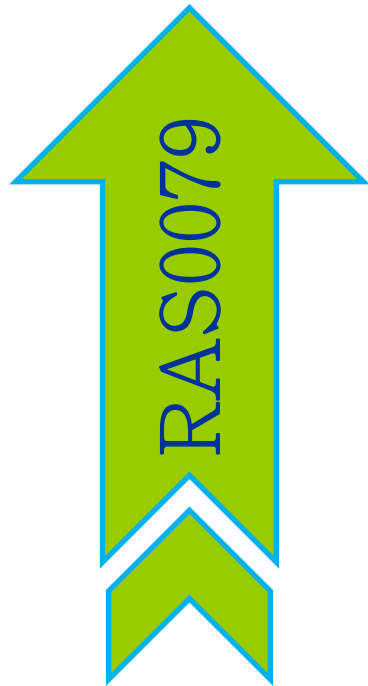




“Science is one of the cornerstones of economic progress and without technological advancement human development goals are much harder to achieve.”

Yukiya Amano
IAEA Director General

The PROJECT



*“Educating Secondary Students
and Science Teachers
on Nuclear Science and
Technology”*

to institutionalize NS&T
in secondary school curriculum

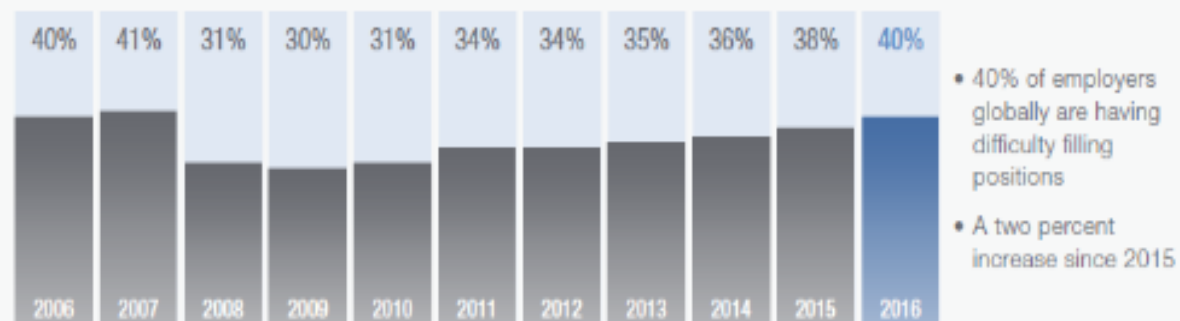


2018 - 2021

Synergy of nuclear institutions and education sector

- ✓ A global survey indicates that as of 2016, the region faces 'talent shortage' of 40 percent, with the most in-demand categories mainly comprising STEM-related occupations (ManpowerGroup, 2016)

Globally, employers report the **HIGHEST TALENT SHORTAGE** since 2007

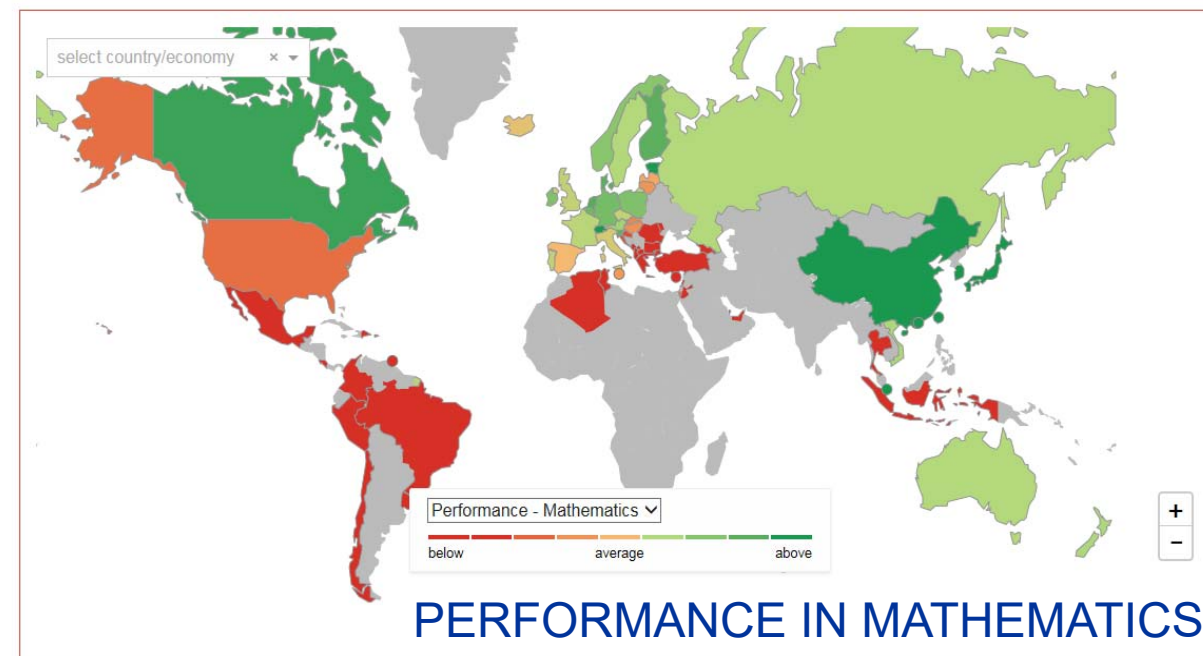
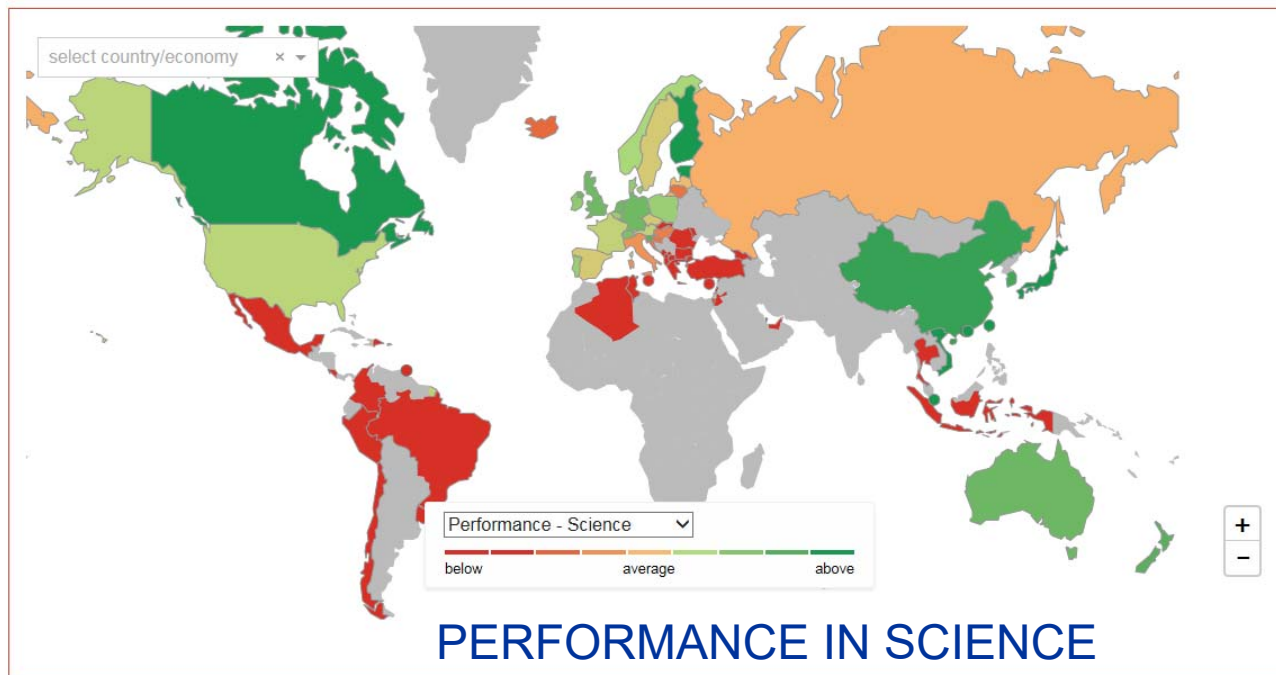


The Need

ASIA PACIFIC

- 1 IT Personnel
- 2 Sales Representatives
- 3 Engineers
- 4 Skilled Trades
- 5 Accounting & Finance staff
- 6 Technicians
- 7 Management / Executive (Management/Corporate)
- 8 Sales Managers
- 9 Production Operators/Machine Operators
- 10 Researchers (R&D)

The Need



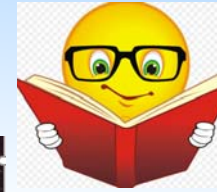
Further information

👤 PISA Governing Board Representative

👤 National Project Manager

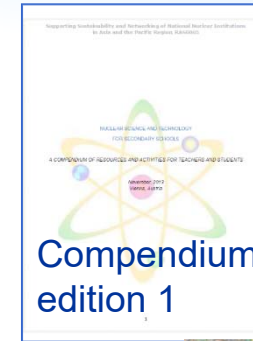
📅 Years in PISA: 2000, 2003, 2006, 2009, 2012, 2015

TARGET RESULTS



2021

Well-informed knowledgeable **students** on NS&T and its applications.

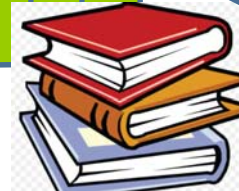


2020



2019

science teachers on nuclear science and technology with tools for teaching



2018

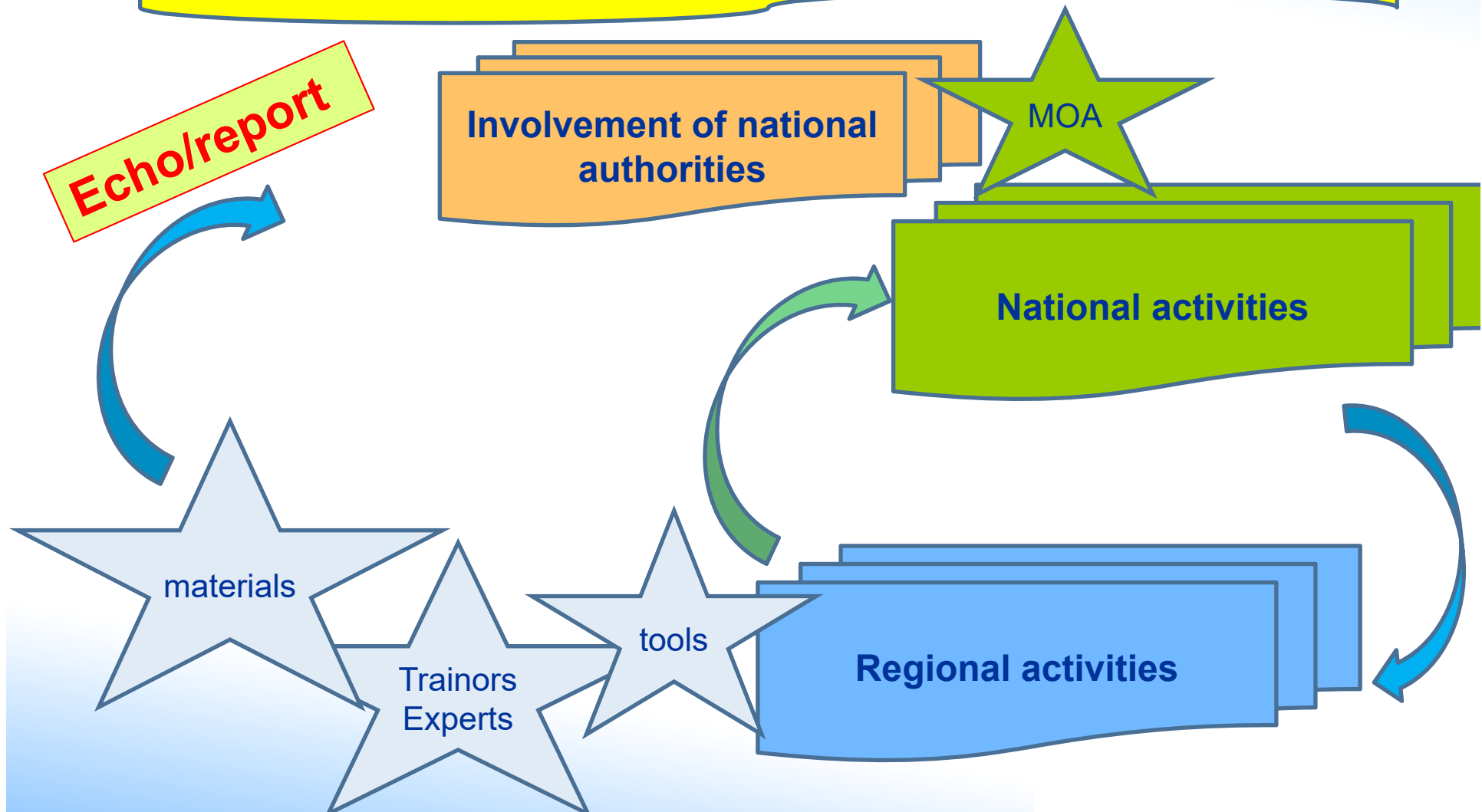
REGIONAL NS&T COMPETENCY FRAMEWORK
as a reference for the national curriculum

Implementation strategy



REGIONAL NS&T COMPETENCY FRAMEWORK

as a reference for the national curriculum



HOW -- Implementation strategy:

- Develop and produce information, education and communication materials as well as hands-on/practical exercises
- Regional approaches:
 - training course, seminars, workshops for secondary school science teachers
 - Teachers Exchange Program
- National Events- Seminars, Workshops, Focus Group Discussion
 - Experts mission to countries
- Regional and national student activities such as Nuclear Youth Summit, competitions, among others
- Feedback mechanisms such as surveys

Forthcoming teacher Trainings




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Regional Training Course for Teachers to Introduce Nuclear Sciences in Secondary Schools through Innovative Approaches

PROSPECTUS

Project Number & Title: RAS/0/079 - Educating Secondary Students and Science Teachers on Nuclear Science and Technology

Place: Yogyakarta, Indonesia

Dates: 16-27 April 2018

Deadline for Nominations: 24 February 2018



April 16-27, 2018


 Argonne
 NATIONAL LABORATORY

TRAINING FOR TEACHERS TO INTRODUCE NUCLEAR SCIENCES IN SECONDARY SCHOOLS THROUGH INNOVATIVE APPROACHES




 IAEA 60 Years
 Atom for Peace and Development

COURSE OUTLINE (UN AREA OF GROWTH AND DEVELOPMENT):

- MODULE 1: FUNDAMENTALS OF NUCLEAR SCIENCE
- MODULE 2: FUNDAMENTALS OF RADIATION
- MODULE 3: NUCLEAR POWER
- MODULE 4: ACCELERATORS AND ISOTOPE PRODUCTION
- MODULE 5: NUCLEAR MEDICINE
- MODULE 6: FOOD AND AGRICULTURE APPLICATIONS
- MODULE 7: THE MANY USES OF ISOTOPIES

INCLUDED TOURS:

- U.S. COMMERCIAL NUCLEAR POWER PLANT
- ARGONNE ACCELERATORS
- NUCLEAR MEDICINE FACILITIES
- RADIATION LABORATORIES
- ARGONNE NUCLEAR ENERGY EXHIBIT (WORLD'S FIRST NUCLEAR REACTOR)

THE UNIVERSITY OF CHICAGO | U.S. DEPARTMENT OF ENERGY | Argonne National Laboratory is a U.S. Department of Energy laboratory managed by UChicago Argonne, LLC

Aug 20-31, 2018



Participating MS

- Australia, Bangladesh, Indonesia, Japan, Jordan, Malaysia, Myanmar, Nepal, Oman, Pakistan, Philippines, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates, etc.....

Important Partners

- ANSTO, Australia
- Tokyo University and Team Japan
(JPN-HRD, RADI, JSF, JAEA, MEXT, MOFA)
- EDF, UK
- Argonne National Lab, NPI, Texas A&M, USA
- Plus CERN, UNESCO, scientific societies, development organizations, etc



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Thank you!

