Framework for PISA 2015

What 15-year-olds should be able to do

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### Categories of occupations according to average salaries

<table>
<thead>
<tr>
<th>Occupational group</th>
<th>1984</th>
<th>2004</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Managers and Senior Officials</td>
<td>12.1%</td>
<td>15.3%</td>
<td>+3.2%</td>
</tr>
<tr>
<td>9 Professional Occupations</td>
<td>8.4%</td>
<td>11.8%</td>
<td>+3.4%</td>
</tr>
<tr>
<td>8 Associate Professional and Technician</td>
<td>10.1%</td>
<td>14.3%</td>
<td>+4.2%</td>
</tr>
<tr>
<td>7 Administrative and Secretarial</td>
<td>15.0%</td>
<td>12.6%</td>
<td>-2.4%</td>
</tr>
<tr>
<td>6 Skilled Trades Occupations</td>
<td>16.4%</td>
<td>11.4%</td>
<td>-5.0%</td>
</tr>
<tr>
<td>5 Personal Service Occupations</td>
<td>4.1%</td>
<td>7.5%</td>
<td>+3.4%</td>
</tr>
<tr>
<td>4 Sales and Customer Service</td>
<td>6.1%</td>
<td>8.0%</td>
<td>+2.1%</td>
</tr>
<tr>
<td>3 Process, Plant and Machine Operatives</td>
<td>11.8%</td>
<td>7.9%</td>
<td>-3.9%</td>
</tr>
<tr>
<td>2 Non-routine elementary occupations</td>
<td>9.1%</td>
<td>6.2%</td>
<td>-2.9%</td>
</tr>
<tr>
<td>1 Routine Elementary occupations</td>
<td>7.0%</td>
<td>5.1%</td>
<td>-1.9%</td>
</tr>
</tbody>
</table>
Figure 5.1: Relative share of qualified workers in occupational deciles, 1981
Figure 5.2: Relative share of qualified workers in occupational deciles, 2008

- High quals (degree or higher)
- Level 3 academic
- Level 2 academic
- Level 2-3 voc
- Below level 2
- No quals
Students at level 1a or < Students at level 2 or >
At level 2 or above
- Hungary 85.8%
- Slovenia 85.2%
- UK 85.0%
- France 80.7%

Knowledge of facts: France, Slovenia, UK, Hungary
Application of facts: France, Slovenia, UK, Hungary
Use in new contexts: France, Slovenia, UK, Hungary
Definition of Scientific Literacy

Scientific Literacy is the ability to engage with science-related issues, and with the ideas of science, as a reflective citizen.
Scientific Literacy Framework

Contexts
Personal, local/national & global situations that involve science and technology

Competencies
- Explain
- Understand
- Interpret

Knowledge
- Knowledge about the natural world (content knowledge)
- Knowledge of the practices and concepts of enquiry (procedural knowledge)
- Knowledge of the epistemic features of science (epistemic knowledge)

Attitudes
- Displaying an interest in science
- Valuing scientific approaches

Student Questionnaire

Frameworks for PISA 2015
## Categorization of Scientific Literacy Tasks

<table>
<thead>
<tr>
<th></th>
<th>Personal</th>
<th>Local/National</th>
<th>Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Natural Resources</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Environmental Quality</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hazards</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Frontiers of Science and Technology</td>
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</table>
Definition of Environmental Literacy

Environmental literacy is the knowledge necessary to understand the environment as an ecological system, the insight in the impact of human behaviour on the natural world and the disposition and motivation to apply one's knowledge, skills and insight in order to make environmentally beneficial decisions about one's own behaviour and to evaluate environmentally critical developments as rational citizen.
Environmental Literacy Framework

**Contexts**
Citizens confront environmental situations

**Competencies**
- Identify
- Evaluate
- Propose

**Knowledge**
- What you know about:
  - Ecological Systems
  - Environmental Issues
  - Sociopolitical Systems

**Dispositions**
- Your disposition toward the environment:
  - Interest
  - Sensitivity
  - Locus of Control
  - Responsibility

**Actions**
- What you can do about environmental issues:
  - Intention to Act
  - Strategies for Addressing Environmental Issues
## Categorization of Environmental Literacy Tasks

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<tr>
<th></th>
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<th>Global</th>
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<tbody>
<tr>
<td>Biodiversity</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Population Growth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Quality and Health</td>
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<td></td>
<td></td>
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<tr>
<td>Natural Hazards and Extreme Weather</td>
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<td></td>
<td></td>
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<tr>
<td>Land Use</td>
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Definition of Collaborative Problem Solving

Collaborative problem solving competency is the capacity of an individual to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution.
Frameworks for PISA 2015

Collaborative Problem solving competencies
- Establishing & maintaining shared understanding
- Taking appropriate action
- Establishing and maintaining team organisation

Team composition
- Symmetry
- Heterogeneity
- Gender balance
- Size

Task
- Openness
- Number of correct solutions
- Do you get necessary data in once?
- Homogeneous-Heterogeneous
- Symmetry of status
- Symmetry of roles
- Relationship to school
- Context

Contexts skin
- Personal
- Social
- Workplace
- Global
- Technology / non-technology

Medium
- Richness
- Cost of grounding
- Referentiality

Problem solving skills (PS 2012)
- Explore and Understand
- Represent and Formulate
- Plan and Execute
- Monitor and Reflect

Student prior knowledge
- Maths
- Reading
- Science & Environment
- Everyday learning

Collaboration skills
- Grounding
- Audience design
- Perspective taking
- Explanation
- Argumentation
- Mutual regulation
- Coordination
- Distribution

Student characteristics
- Attitudes
- Motivation
- Cognitive ability
# Categorization of Collaborative Problem Solving Tasks

<table>
<thead>
<tr>
<th></th>
<th>Establishing Understanding</th>
<th>Taking action</th>
<th>Establishing organisation</th>
</tr>
</thead>
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<tr>
<td><strong>Exploring and Understanding</strong></td>
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<td><strong>Representing and Formulating</strong></td>
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<td><strong>Planning and Executing</strong></td>
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<tr>
<td><strong>Monitoring and Reflecting</strong></td>
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Framework for PISA 2015: What 15-year-olds should be able to do

PISA aims to inform countries how successful their educational systems are in preparing young people to start participating in the society they live in. Traditionally two main areas of education are distinguished. I will discuss the 21st century requirements as they develop in both these areas and how we aim to represent them in the PISA Framework.

**Vocational Education**
Manufacturing and maintenance of appliances and equipment, laying out transportation and communication networks, exploring and mining natural resources, producing and transporting food remain important activities in the 21st century. After a period wherein many of these activities have moved to the so-called developing countries, we know that participating in a large core of these activities will remain necessary in developed countries too as GDP levels increase in the developing world we will see that manufacturing and maintenance will flow back to the developed world. Manufacturing and maintenance in the 21st century however require high level knowledge and skills and flexibility from the operators to keep abreast of the continuous technological development where manufacturing and maintenance require process management and collaborative problem solving rather than muscle.

**Academic Education**
Participation in academic (tertiary) education worldwide is about 12% of the eligible population (15- to 24-year-olds), but the variance among countries is extremely large going from a low of less than a half percent for Mozambique and Malawi to over 40% for Korea, USA and Finland. Degree of participation in tertiary education is a significant parameter for economic and social well-being of a state and its citizens.