



Fostering students' creativity and critical thinking in science education: lessons for innovation

Cassie Hague, Centre for Educational Research and Innovation



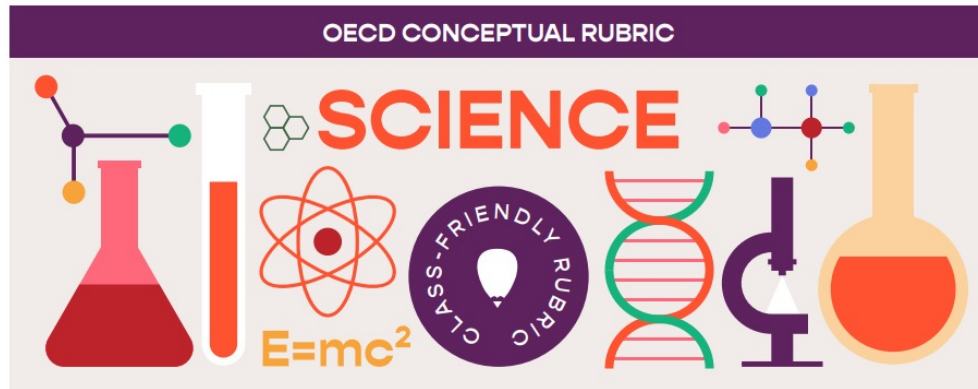
An international action research project around innovation in education



<https://www.oecd.org/education/ceri/assessingprogressionincreativeandcriticalthinkingskillsineducation.htm>



Rubrics: a common language



	CREATIVITY Coming up with new ideas and solutions	CRITICAL THINKING Questioning and evaluating ideas and solutions
 INQUIRING	Make connections to other scientific concepts or conceptual ideas in other disciplines	Identify and question assumptions and generally accepted ideas of a scientific explanation or approach to a problem
 IMAGINING	Generate and play with unusual and radical ideas when approaching or solving a scientific problem	Consider several perspectives on a scientific problem
 DOING	Pose and propose how to solve a scientific problem in a personally novel way	Explain both strengths and limitations of a scientific solution based on logical and possibly other criteria (practical, ethical, etc.)
 REFLECTING	Reflect on steps taken to pose and solve a scientific problem	Reflect on the chosen scientific approach or solution relative to possible alternatives



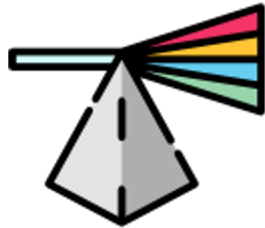
Examples of tasks in science to foster creativity and critical thinking



1. Explain physical phenomena



3. Imagine scientific counterfactuals



2. Design artefacts



4. Solve environmental problems



5. Challenge a theory





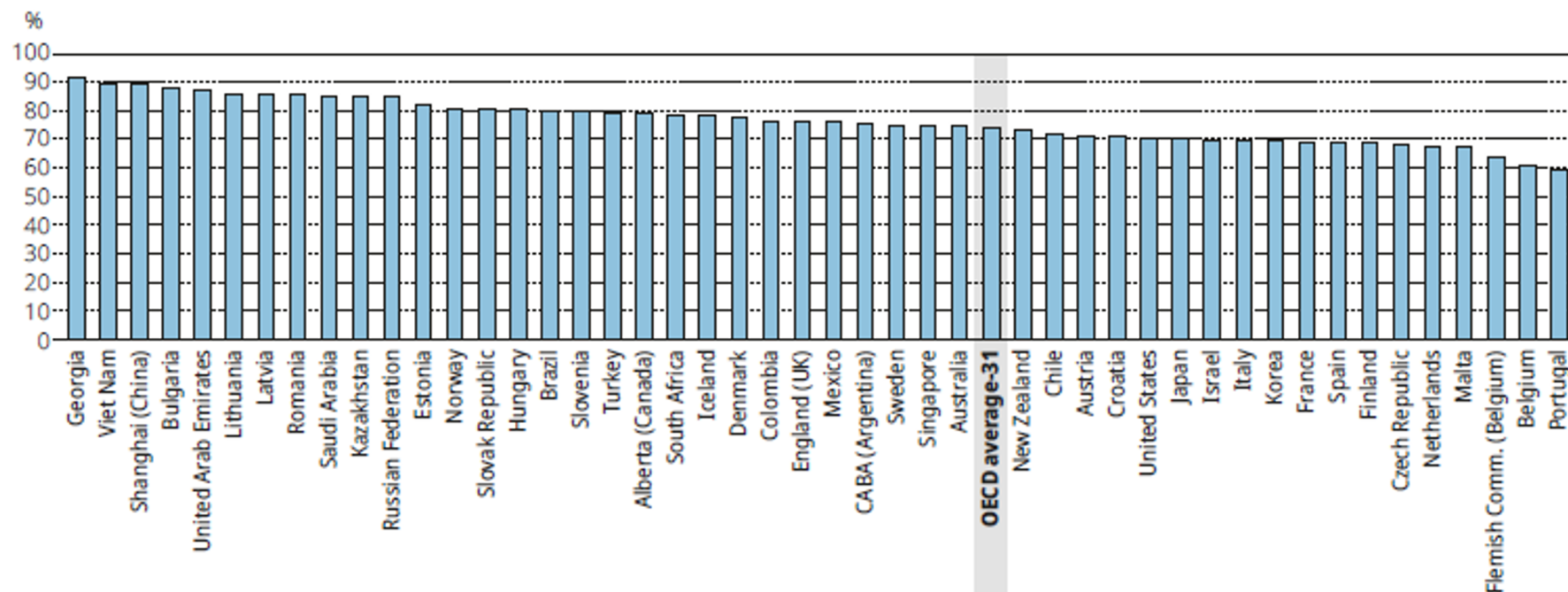
Making a bank of pedagogical resources available to teachers



Teachers are open to innovation


Figure I.2.12 **Teachers' views on their colleagues' attitudes towards innovation**

Percentage of lower secondary teachers who "agree" or "strongly agree" that most teachers in the school are open to change (OECD average-31)



Countries and economies are ranked in descending order of lower secondary teachers' views on their colleagues' openness to change.

Source: OECD, TALIS 2018 Database, Table I.2.35.

StatLink  <http://dx.doi.org/10.1787/888933932114>