

Competency framework for Citizen Science (consisting of citizen science, scientific literacy and data literacy competencies)

	Category	Description	Operational description	Secondary school I, Grade 5-6	Secondary school I, Grade 7-10	Teachers	Reference
DS /DL	Data Interpretation						
DS /DL		Read & interpret data	I am able to read and interpret data.	Ability to read and interpret data / graphical representations of statistical surveys	Ability to read and interpret data / graphical representations of statistical surveys	Ability to read and interpret data / graphical representations of statistical surveys	Physics + Mathematics Curriculum
SL		Read and interpret graphical representations of data					
DS /DL	Data Cleaning						
DS /DL		Clean Data	I am able to clean up data.	Ability to identify outliers	Ability to clean up data.	Ability to clean up data.	Mathematics Curriculum
DS /DL	Data Transformation						
DS /DL		Data Representation and Transformation (into information)	I am able to transform data into information and to transform information into decision to drive data-driven decision making.	/	Ability to process information from intra- or extra-informational contexts in appropriate, formalised structures and represent them through data.	extra-informational contexts in appropriate, formalised structures and represent them through data.	Computer Science Curriculum
DS /DL		Transform information into decision					
DL		Data-driven decision making					
	Data Evaluation						
DL		Evaluate decisions based on data (&sources)	I am able to evaluate decisions based on data, to evaluate outcomes , to interpret data and to use data tools for data evaluation.	Ability to evaluate data and interpretate data (trends, structure, relations)	Ability to evaluate data and interpretate data (trends, structure, relations)	Ability to evaluate data and interpretate data (trends, structure, relations)	Physics Curriculum
DI		Evaluate outcomes					
DL		Interpret data					
DL		Data Tools					
DL / CS /SL	Scientific Investigation Questions						
DL		Ask Question / Define	I am able to ask and to define questions	Ability of recognition of problems and formulation of questions	Ability of recognition of problems and formulation of questions	Ability of recognition of problems and formulation of questions	Computer Science Curriculum
CS / SL		Identifying & ask scientific questions	I am able to identify and to ask scientific questions.	Ability to identify and ask scientific questions.	Ability to identify and ask scientific questions.	Ability to identify and ask scientific questions.	Physics Curriculum
SL		Recognition of Scientific Issues	I am able to recognize scientific issues.	Ability to recognize scientific issues	Ability to recognize scientific issues	Ability to recognize scientific issues	New (own) formulation
DS / DL	Communicating with data						
DL		Communicating and presenting effectively with data	I am able to communicate and present data effectively.	Ability to present column and bar charts.	Ability to present and communicate different charts and easy statistics (median, mean ...).	Ability to present different charts and statistics.	Mathematics Curriculum
DS /DL		Data Presentation					
DL / CS / SL	Critical thinking						
DL		Critical thinking					
DL		Verify data / apply critical thinking	I am able to apply critical thinking and to verify data.	Ability to critically assess the significance of representational and work tools for answering questions and examine their relevance for opening up the spatial reality of life	Ability to critically assess the significance of representational and work tools for answering questions and examine their relevance for opening up the spatial reality of life	Ability to critically assess the significance of representational and work tools for answering questions and examine their relevance for opening up the spatial reality of life	Geography Curriculum

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CS/SL	Critical Thinking	Critical thinking	I am able to think critically	Ability to think critically (about science and to deal with scientific expertise)	Ability to think critically (about science and to deal with scientific expertise)	Ability to think critically (about science and to deal with scientific expertise)	New (own) formulation
DL	Data Access						
DL		Get / Access data	I am able to access data.	Ability to extract data from analog and digital media offerings.	Ability to extract data from analog and digital media offerings.	Ability to access data	Chemistry & Physics Curriculum
DL	Data Analysis						
DS/DL		Using data analytics (data analysis)	I am able to apply statistics as e.g. trend analysis and do predictions, distinguish between correlation and causality and I am able to analyze data and find insights from data.	Ability to evaluate data and interpretate data (trends, structure, relations)	Ability to evaluate data and interpretate data (trends, structure, relations)		Physics Curriculum
DS/DL		Analysis of (classroom) data					
DS/DL		Trend analysis / Predictions					
DL	Data Application						
DL		Specify data application	I am able to specify and to identify data applications.	/	applications and document them using suitable forms of representation.	document them using suitable forms of representation.	Computer Science Old Curriculum
DL		Identify data application					
DL	Data Collection						
DL		Discovery & acquisition of data		Ability to use data from media offerings (print media, Internet and formulary) for research	Ability to use data from media offerings (print media, Internet and formulary) for research	media offerings (print media, Internet and formulary) for research	
DS / DL		Data Collection	I am able to discover, acquire and collect data.	Ability to collect data	Ability to collect data	Ability to collect data	Mathematics Curriculum
DL		Data Discovery and Collection					
CS/SL	Handling data - data collection, data representation, drawing conclusions.	collecting, analyzing and interpreting data & scientific information	I am able to collect, analyze and to interpret data and scientific information	Ability to read and interpret data / graphical representations of statistical surveys	Ability to read and interpret data / graphical representations of statistical surveys	Ability to read and interpret data / graphical representations of statistical surveys	Physics + Mathematics Curriculum
DL	Data Conversion						
DL		Data Conversion	I am able to converse data	Ability to encode data for processing with an informatics system (DI),	Ability to encode data for processing with an informatics system (DI),	Ability to encode data for processing with an informatics system (DI),	Computer Science Curriculum
DL	Data Culture						
DL		Establish data culture					
DL		Data Culture	I am able to establish data culture.	/(not found)	/(not found)	/(not found)	
DL / DS	data ethics / privacy						
DL		personal data		personal and	personal and	Dealing with other people's data;	
DS / DL		privacy	I am aware of data ethics, privacy and that personal data must be protected.	Dealing with other people's data; data protection, Ability to respect privacy and information security	Dealing with other people's data; data protection, Ability to respect privacy and information security	Dealing with other people's data; data protection, Ability to respect privacy and information security	Medienkompetenzrahmen
DS / DL		Data ethics & Security					
DL	Data Evaluation						
DI		learning from data					
DL		Evaluate decisions based on data (&sources)					
DL		Evaluate outcomes	I am able to evaluate data and to evaluate decisions based on data and				Chemistry + Physics

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	Category	Description	Operational description	Secondary school I, Grade 5-6	Secondary school I, Grade 7-10	Teachers	Reference
DL		Data Tools	evaluate decisions based on data and to use data tools for data evaluation.	Ability to evaluate data.	Ability to evaluate data.	Ability to evaluate data.	Chemistry + Physics Curriculum
DL	Data Gathering						
DL		Finding / obtaining data	I am able to find and obtain data.	I am able to find and obtain online data.	I am able to find and obtain online data in different search engines.	I am able to find and obtain online data in different search engines.	
DL	Data Interpretation						
DL		Interpret data	I am able to interpret data.	Ability to interpret a column and a bar chart.	Ability to interpret data.	Ability to interpret data.	Mathematics Curriculum + Computer Science Curriculum
DS / DL	Data Management						
DI		techniques for managing big data	I am able to use techniques of data management, as for example data sharing, data organization, data providing, share data, curate data and giving access to data.	Ability to store, retrieve and retrieve data securely from different locations; ability to summarise, organise and store data in a structured way.	Ability to store, retrieve and retrieve data securely from different locations; ability to summarise, organise and store data in a structured way.	Ability to store, retrieve and retrieve data securely from different locations; ability to summarise, organise and store data in a structured way.	Medienkompetenzrahmen
DL		Data Sharing					
DS / DL		Creating (meta)-data					
DL		Managing data / Data Management					
DL		Data organization					
DL		Provide data					
DL		Data curation and reuse					
DL		Data Management					
DS / DL		Governing / giving access					
DL	Data Manipulation						
DL		Data Manipulation	I am able to manipulate data.	/ not found	/ not found		
DS / DL	Data Processing						
DS / DL		Clean Data	I am able to process data, e.g. clean, interact with, link, read and standardise data.	/ not relevant	Ability to process similar data with the help of a suitable tool	Ability to process similar data with the help of a suitable tool	Computer Science Curriculum
DL		Process data					
DL		Reading data					
DL	Data Quality						
DL		Evaluate (quality of) data	I am aware that quality insurance is an important topic and I am able to evaluate and ensure the quality of data.	Ability to recognise and critically evaluate data and their sources, as well as the strategies and intentions behind them.	Ability to recognise and critically evaluate data and their sources, as well as the strategies and intentions behind them.	Ability to recognise and critically evaluate data and their sources, as well as the strategies and intentions behind them.	Medienkompetenzrahmen
DL		Quality insurance					
DL		Evaluating and Ensuring Quality					
DL	Data Security						
DL		Security	I aware of security issues e.g. data security.	/ too early	Ability to describe the threat to data from defects and malware and name measures to protect data	Ability to be aware of security issues.	Computer Science Curriculum
DL	Data storage						
DL		systems for managing / storing data					
DL		Preserve data					

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	Category	Description	Operational description	Secondary school I, Grade 5-6	Secondary school I, Grade 7-10	Teachers	Reference
DL		Data storage	I am able to store data and to use systems for managing and storing data and I know the function principles of data stores.	Ability to store data	Ability to store data.	I am able to store data (e.g. excel) file and I know different cloud systems for data storage.	Computer Science Curriculum
DL		systems for storing big data					
DL		function principles of data stores					
DL	Data Transformation						
DL		Data Conversion and Interoperability	I am able to convert data, to transform data into information and to transform information into data.	/ too early	information or information contexts into appropriate, formalised structures and represent them through data.	information contexts into appropriate, formalised structures and represent them through data.	Computer Science Curriculum
DS / DL		Data Representation and Transformation (into information)					
DS / DL	Data Understanding						
DS / DL		Understanding data (used in business contexts)	I am able to understand data used in business contexts.	/	/		
DL	Data Use						
DL		Using data	I am able to use data.	Ability to use data	Ability to use data	Ability to use data	Mathematics Curriculum
DS / DL	Data Visualization						
SL	Scientific Investigation - Graph and models	Use graphs and algebraic models when explaining	I am able to visualize data and to use graphs and algebraic models when explaining scientific phenomena.	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Physics Curriculum
SL		Visualize data / create graphical representations					
DS / DL		Visualizing data	I am able to visualize data.	Ability to visualize data with bar and column charts.	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Mathematics curriculum & physics curriculum
DL	Databases & data formats						
DL		Databases & data formats	I know different databases and data formats.	/ too early	Ability to choose suitable data types & ability to store data	Ability to choose suitable data types & ability to store data	Computer Science Curriculum
DL	Decision making						
DL		Data-driven decision making	I am able to make data-driven decision making.	/	/		
DL	Design Principles						
DL		Cultures of practice	I am able to apply design principles.	/	/		
DL							
DL	Generate Questions						
DL		Generate questions (about their learning in classes)	I am able to generate questions.	Ability to ask questions about a given problem situation	Ability to generate /ask questions about issues	Ability to generate /ask questions about issues	Mathematics + Computer Science Curriculum
DL	Identify problems						
DL			I am able to identify problems using data.	Ability to interpret results of a data processing process	Ability to interpret results of a data processing process	Ability to interpret results of a data processing process	Mathematics Curriculum

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	Category	Description	Operational description	Secondary school I, Grade 5-6	Secondary school I, Grade 7-10	Teachers	Reference
		Identify problems using data		Ability to express problem situations in own words	Ability to express problem situations in own words	Ability to express problem situations in own words	Mathematics Curriculum
DL	Data Interpretation						
DL		Interpret results		Ability to relate elaborated solutions to the real situation and interpret them as an answer to the question			
DL		Develop inferences & explanations	I am able to inpret results und to develop inferences.	Ability to read and interpret graphical representations of statistical surveys.	Ability to interpret results of a data processing process	Ability to interpret results of a data processing process	Computer Science + Mathematics Curriculum
DL	mechanics						
DL		representing data on physical level	I am able to repressent data on physical level.	/ not found	Ability to explain the logical and arithmetic operation of computer systems based on the binary system.	Ability to explain the logical and arithmetic operation of computer systems based on the binary system.	Computer Science Curriculum
SL / CS							
CS		civic engagement					
CS		Measurable actions resulting from engagement in citizen science					
CS		new participation					
SL	Engagement in citizen science	11. engages in science/technology for excitement and possible explanations.	I am able to engage and participate in	Ability to engage and particip	Ability to engage and participate	Ability to engage and par	New (own) formulation
CS / SL	Use science, ethi	uses concepts of science and of techn	I use concepts of science and techno	Ability to use concepts of scie	Ability to use concepts of scient	Ability to use concepts of	New (own) formulation
CS / SL	Think scientifically	Ability to think scientifically	I am able to think scientifically.	Ability to think scientifically	Ability to think scientifically	Ability to think scientifically	New (own) formulation
CS / SL	Internet use	Use of the Internet	I am able to use the internet	Ability to use the internet.	Ability to use the internet.	Ability to use the internet	Computer Science Old (
CS / SL	Use Scientific Evidence	use scientific evidence	I am able to use scientific evidence	Ability to use scientific eviden	Ability to use scientific evidence	Ability to use scientific ev	New (own) formulation
CS	Scientific inquiry	using technology	I am able to use technology	Ability to use technology	Ability to use technology	Ability to use technology	New (own) formulation
CS		communicate					
CS	Communication	communicate conclusions	I am able to communicate in the scie	Ability to present facts in an a	Ability to present facts in an app	Ability to present facts in	Computer Science Curr
CS	Scientific inquiry	designing studies	I am able to design studies	Ability to participate in designi	Ability to participate in designin	Ability to participate in de	New (own) formulation
CS / SL	Evaluation of the validity of sources	Evaluate the validity of sources	I am able to evalaute the validity of sc	Ability to evaluate the validity	Ability to evaluate the validity of	Ability to evaluate the va	New (own) formulation
CS	Scientific inquiry	experimenting	I am able to conduct an experiment.	Ability to conduct qualitative a	Ability to conduct qualitative an	Ability to conduct qualitat	Physics Curriculum
CS	Scientific inquiry	reasoning / argumentation	I am able to reason / to argumentate.	Ability to represent their own	Ability to represent their own or	Ability to represent their	Geography Curriculum
CS / SL	Scientific Investic	Research skills (knowledge & skill, atti	I am able to apply research skills to fi	Ability to research in libraries	/	Ability to research in libr	Geography Curriculum
CS / SL	Role Model	Role model of the teacher	I am able to act as a role model as a	/	/	Ability to act like a role m	New (own) formulation

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	Category	Description	Operational description	Secondary school I, Grade 5-6	Secondary school I, Grade 7-10	Teachers	Reference
CS	Self-efficacy in science projects	Self-efficacy in relation to the participation in science projects Self-confidence to use science	I am self-confident to use science	Ability to have self-confidence	Ability to have self-confidence	Ability to have self-confidence	New (own) formulation
CS / SL	Scientific inquiry	Skills of scientific inquiry (procedural skills)	I have got the skills of scientific inquiry	/	Ability to understand the process	Ability to understand the process	Chemistry Curriculum
CS	Scientific inquiry	synthesizing	I am able to synthesize results	Ability to synthesize results	Ability to synthesize results	Ability to synthesize results	
CS / SL	Teaching media	Teaching media	I am able to teach media.	/	/	Ability to teach media	New (own) formulation
CS / SL	Teaching methods	Teaching methods (project-based, inquiry-based)	I am able to apply different teachings	/	/	Ability to apply different teachings	New (own) formulation
CS	Understanding of scientific process	Understanding of the scientific process and how science is done	I am able to understand the scientific process	Ability to understand the scientific process	Ability to understand the scientific process	Ability to understand the scientific process	Chemistry Curriculum
CS / SL	Independent work	Independence in learning science Self-learning science	I am able to learn science independently.		Ability to learn [...] independently	Ability to learn [...] independently	
CS / SL	Interest in world	Interest to science / environment related	I am interested in science and world-re	Interest in science and world-re	Interest in science and world-re	Interest in science and world-re	Computer Science + Physics Curriculum New (own) formulation
CS /SL	Knowledge of science-related issues	Knowledge of the essential content of science, nature of science and the ability to distinguish it from non-science.	I have got knowledge of the essential content of science	Knowledge of science-related issues	Knowledge of science-related issues	Knowledge of science-related issues	New (own) formulation
SL	Apply scientific knowledge (to solve problems)	PD3. Apply science for social purposes	I am able to apply scientific knowledge in solving problems	Ability to integrate facts / knowledge into problem contexts, develop solution strategies and apply these where possible.	Ability to integrate facts / knowledge into problem contexts, develop solution strategies and apply these where possible.	Ability to integrate facts / knowledge into problem contexts, develop solution strategies and apply these where possible.	Physics Curriculum
SL		Ability to apply scientific knowledge in solving problems					
SL		Apply scientific knowledge to a given situation					
SL	Appreciation of science	AD1. Appreciation for science	I appreciate science	Appreciation of science	Appreciation of science	Appreciation of science	New (own) formulation
SL	Awareness of science	the nature of science, including its relationship to culture and its applications	I am aware of the imperfection and nature of science.	Awareness of the imperfection and nature of science	Awareness of the imperfection and nature of science	Awareness of the imperfection and nature of science	New (own) formulation
SL		12. recognizes that science and technology are human endeavours;					
SL	Scientific Communication	PD4. Decode & encode scientific communications	I am able to decode and encode scientific communication.	Ability to exchange scientific knowledge and its applications using appropriate technical language	Ability to exchange scientific knowledge and its applications using appropriate technical language	Ability to exchange scientific knowledge and its applications using appropriate technical language	Physics Curriculum
SL	Decision Making	PD9. Take decisions	I am able to take decisions.	Ability to lead decisions on the basis of subject-related discussions	Ability to lead decisions on the basis of subject-related discussions	Ability to lead decisions on the basis of subject-related discussions	Mathematics Curriculum
SL	Design principles of science	CD4. Broad principles of science	I know the broad principles of science.	Knowledge of the broad principles of science (physical / chemical ...)	Knowledge of the broad principles of science (physical / chemical ...)	Knowledge of the broad principles of science (physical / chemical ...)	Chemistry & Physics Curriculum

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	Category	Description	Operational description	Secondary school I, Grade 5-6	Secondary school I, Grade 7-10	Teachers	Reference
SL	Distinguish information quality	distinguishes between scientific and technological evidence and personal opinion and between reliable and unreliable information;	I am able to distinguish between information quality.	/ not found	Ability to independently filter information from analogue and digital media offerings, analyse them in terms of their relevance, quality, usefulness and intention,	Ability to independently filter information from analogue and digital media offerings, analyse them in terms of their relevance, quality, usefulness and intention,	Chemistry Curriculum
SL		engages in responsible personal and civic actions after weighing the possible consequences of alternative options.	I am able to engage in responsible personal and civic actions after weighing the possible consequences of alternative options	Ability to weigh up criteria regarding use, economy, recyclability and environmental compatibility using the example of a (chemical) product.	Ability to weigh up criteria regarding use, economy, recyclability and environmental compatibility using the example of a (chemical) product.	regarding use, economy, recyclability and environmental compatibility using the example of a (chemical) product.	Chemistry Curriculum
SL		weighs the benefits/burdens of scientific and technological development;					
SL	Economic, moral and ethical aspects of science	considers the political, economic, moral and ethical aspects of science and technology as they relate to personal and global issues.	I am able to consider political , economic and moral aspects of science.	Ability to consider ethical, political, ecological and economic aspects of science.	Ability to consider ethical, political, ecological and economic aspects of science.	Ability to consider ethical, political, ecological and economic aspects of science.	Chemistry & Physics Curriculum
SL	Evaluation of the use and misuse of scientific information	Evaluate the use and misuse of scientific information	I am able to evaluate the use and misuse of scientific information.	Ability to independently analyse information in terms of their relevance, quality, usefulness and intention,	Ability to independently analyse information in terms of their relevance, quality, usefulness and intention,	Ability to independently analyse information in terms of their relevance, quality, usefulness and intention,	Chemistry Curriculum
SL	Explain phenomena scientifically	explain phenomena scientifically Explain or interpret phenomena scientifically and predict change	I am able to explain phenomena scientifically and to predict change.	Ability to analyse and interpret phenomena and facts	Ability to analyse and interpret phenomena and facts	Ability to analyse and interpret phenomena and facts	Chemistry & Physics Curriculum
SL		Explaining phenomena scientifically					
SL		offers explanations of natural phenomena testable for their validity;					
SL	Gain scientific knowledge	CD8. The attempt of scientific / technological knowledge	I am able to gain scientific knowledge	Ability to gain scientific knowledge	Ability to gain scientific knowledge	Ability to gain scientific knowledge	New (own) formulation
SL	Information Management for solving problems & making decisions	locates, collects, analyses, and evaluates sources of scientific and technological information and uses these sources in solving problems, making decisions, and taking actions	I am able to manage information and to evaluate sources of scientific and technological information.	Ability to independently analyse information in terms of their relevance, quality, usefulness and intention, and take decisions	Ability to independently analyse information in terms of their relevance, quality, usefulness and intention, and take decisions	Ability to independently analyse information in terms of their relevance, quality, usefulness and intention, and take decisions	Chemistry + Mathematics Curriculum
SL	Integration of knowledge	PD11. Integrate knowledge	I am able to integrate knowledge.	Ability to integrate knowledge	Ability to integrate knowledge	Ability to integrate knowledge	New (own) formulation
SL	Interest in world & science	8. displays curiosity about the natural and human-made world;	I am interested in the world and science and I like to stay up to date.	Interest in the world and science	Interest in the world and science	Interest in the world and science	New (own) formulation
SL		9. values scientific research and technological problem solving;					
SL		AD3. Inclination to stay up to date					
SL		Appreciation of and familiarity with science, including their sense of wonder and curiosity					
SL	Interpretation of scientific evidence	Interpret scientific evidence and draw and communicate conclusions	I am able to interpret scientific evidence and to draw and communicate conclusions.	Ability to interpret, evaluate and present experimental results in a subject-specific manner.	Ability to interpret, evaluate and present experimental results in a subject-specific manner.	Ability to interpret, evaluate and present experimental results in a subject-specific manner.	Chemistry Curriculum

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SL	Judging	PD8. Judge the validity of claims	I am able to judge the validity of claims.	Ability to judge the validity of claims	Ability to judge the validity of claims	Ability to judge the validity of claims	New (own) formulation
SL	Justify inferences, predictions and conclusions	Justify inferences, predictions and conclusions based on quantitative data	I am able to justify inferences, predictions and conclusions.	// too early	Ability to justify inferences, predictions and conclusions based on quantitative data	Ability to justify inferences, predictions and conclusions based on quantitative data	New (own) formulation
SL	Knowledge of science concepts and issues	CD1. Science concepts	I know science concepts and that science and technology are human efforts and that science is a social activity.	Knowledge of basic science concepts	Knowledge of science concepts	Knowledge of science concepts	Chemistry & Physics Curriculum
SL		CD10. Science and technology are human efforts					
SL		CD9. Science is a social activity					
SL	Knowledge of science vocabulary	CD3. Science vocabulary	I am able to communicate with science vocabulary.	Ability to use simple elements of technical language in appropriate forms of presentation.	Ability to use elements of technical language in appropriate forms of presentation.	Ability to use elements of technical language in appropriate forms of presentation.	Chemistry Curriculum
SL	Knowledge of science-related issues	Knowledge necessary for intelligent participation in science-based issues	I have got knowledge for participations in science-based issues and I am aware of the risks and benefits of science.	Ability to use physical knowledge to evaluate opportunities and risks of science-based issues	Ability to use physical knowledge to evaluate opportunities and risks of science-based issues	Ability to use physical knowledge to evaluate opportunities and risks of science-based issues	Physics Curriculum
		Knowledge of what is considered science					
SL	Knowledge of the physical world	CD2. The physical world	I have got knowledge of the physical world.	Knowledge of the physical world	Knowledge of the physical world	Knowledge of the physical world	New (own) formulation
SL	Monitoring of study	AD4. Inclination to monitor and act on SRSP*	I am able to monitor studies.	Ability to monitor studies	Ability to monitor studies	Ability to monitor studies	New (own) formulation
	Read & interpret data	Read and interpret graphical representations of data	I am able to read and interpret graphical representations of data.	Ability to read and interpret graphical representations of statistical survey / data.	Ability to read and interpret graphical representations of statistical survey / data.	Ability to read and interpret graphical representations of statistical survey / data.	Mathematics + Physics Curriculum
SL	Relations between science, technology and society	CD 14. Relations between science, technology and society	I know the relations between science and society and between science and technology.	Ability to identify scientific-technical facts and contexts and to describe social relations.	Ability to identify scientific-technical facts and contexts and to describe social relations.	Ability to identify scientific-technical facts and contexts and to describe social relations.	Chemistry Curriculum
SL		CD12. Relations between science and society					
SL		CD13. Relationships science to technology					
SL	Relations of science & history	16. connects science and technology to other human endeavours e.g. history, mathematics, the arts, and the humanities; and	I am able to connect science and technology to other human endeavours.	Ability to connect science and technology to other subjects or historical relations	Ability to connect science and technology to other subjects or historical relations	Ability to connect science and technology to other subjects or historical relations	Physics Curriculum
SL	Scientific Argumentation	defends decisions and actions using rational argument based on evidence; and	I am able to identify a valid scientific argument and to defend decisions and actions using rational arguments based on evidence.	Ability to argue in a fact-based, rational and coherent manner on the basis of scientific knowledge and scientific ways of thinking.	Ability to argue in a fact-based, rational and coherent manner on the basis of scientific knowledge and scientific ways of thinking.	Ability to argue in a fact-based, rational and coherent manner on the basis of scientific knowledge and scientific ways of thinking.	Chemistry Curriculum
SL		Identify a valid scientific argument					
SL		PD7. Reason and argue					

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SL		Formulate a simple model		Ability to illustrate, explain and predict scientific processes and phenomena with given models and to distinguish models from reality.	Ability to illustrate, explain and predict scientific processes and phenomena with given models and to distinguish models from reality.	Ability to illustrate, explain and predict scientific processes and phenomena with given models and to distinguish models from reality.	Chemistry Curriculum
SL		Make generalizations"		Ability to generalize results	Ability to generalize results	Ability to generalize results	Chemistry Curriculum
SI		Reflect on the social implications of the development of science and technology.		I am able to use techniques of scientific evidence, as for example formulating a simple model, making generalizations and to reflect on the social implications of the development of science and technology.	Ability to name and assess aspects of the effects of the application of scientific knowledge and methods in social contexts using selected examples.	Ability to name and assess aspects of the effects of the application of scientific knowledge and methods in social contexts using selected examples.	Ability to name and assess aspects of the effects of the application of scientific knowledge and methods in social contexts using selected examples.
SL	Scientific Evidence -Draw conclusions	draw and communicate conclusion	I am able to draw and to communicate conclusions.	Ability to draw and to communicate conclusions.	Ability to draw and to communicate conclusions.	Ability to draw and to communicate conclusions.	Physics Curriculum
SL		Draw conclusions					
SL	Scientific Inquiry	PD12. Engage in inquiry	I am able to engage in inquiry.	scientific knowledge in simple steps and to question it constructively	scientific knowledge in simple steps and to question it constructively	knowledge in simple steps and to question it constructively	Chemistry Curriculum
SL		Scientific inquiry					
SL	Scientific Investigation	Learning the main features of a scientific investigation	I know the main features of a scientific investigation	Ability to learn the main features of a scientific investigation	Ability to learn the main features of a scientific investigation	Ability to learn the main features of a scientific investigation	New (own) formulation
SL		Interpret and apply knowledge	I am able to interpret and to apply knowledge.	Ability to interpret and to apply knowledge	Ability to interpret and to apply knowledge	Ability to interpret and to apply knowledge	New (own) formulation
	Scientific Investigation - Graph and models	Use graphs and algebraic models when explaining	I am able to visualize data and to use graphs and algebraic models when explaining scientific phenomena.	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Ability to visualize data with linguistic, mathematical and pictorial means of representation	Physics Curriculum
		Visualize data / create graphical representations					
SL	Scientific Investigation - Hypothesis	Test hypotheses	I am able to test hypotheses.	Ability to test hypotheses	Ability to test hypotheses.	Ability to test hypotheses.	Chemistry & Physics Curriculum
SL	Scientific Investigation - Interpreting evidence	Identify the correct description, explanation, and prediction	I am able to identify the correct description, explanation and prediction.	Ability to describe and explain the meaning of texts	Ability to describe and explain the meaning of texts	Ability to describe and explain the meaning of texts	Physics Curriculum
	Scientific Investigation - Questions	Recognition of Scientific Issues	I am able to recognize scientific issues.	Ability to recognize scientific issues	Ability to recognize scientific issues	Ability to recognize scientific issues	New (own) formulation
SL	Scientific Investigation - Questions	Record, observe, and organize questions	I am able to record, observe and to organize questions.	Ability to recognise and develop questions	Ability to recognise and develop questions	Ability to recognise and develop questions	Physics Curriculum
SL	Scientific Investigation - Research	Identifying key words to find scientific information	I am able to identify key words to find scientific information.	Ability to identify keywords to find scientific information	Ability to identify keywords to find scientific information	Ability to identify keywords to find scientific information	New (own) formulation
SL	Scientific Investigation - Research	Becoming familiar with topics that can be investigated scientifically	I am familiar with topics which can be investigated scientifically	Being familiar with topics that can be investigated scientifically	Being familiar with topics that can be investigated scientifically	Being familiar with topics that can be investigated scientifically	New (own) formulation

Competency framework for Citizen Science (consisting of citizen science, scientific literacy and data literacy competencies)

	Category	Description	Operational description	Secondary school I, Grade 5-6	Secondary school I, Grade 7-10	Teachers	Reference
SL	Scientific Investigation-Analyse & interpretation outcomes of studies	analyses interactions among science, technology and society.	I am able to analyze interactions among science, technology and society.	Ability to recognize and to evaluate economical, social and political connections of technology	Ability to recognize and to evaluate economical, social and political connections of technology	Ability to recognize and to evaluate economical, social and political connections of technology	Physics Curriculum
SL	Solving problems	Solve problems using quantitative skills including probability and statistics	I am able to solve problems	Ability to select appropriate terms, contexts, procedures, media and tools for problem solving	Ability to select appropriate terms, contexts, procedures, media and tools for problem solving	Ability to use physical knowledge to evaluate opportunities and risks in selected examples of modern technologies.	Mathematics Curriculum
SL		solving problems					
SL	Strengths & limitations of science & technology	14. recognizes the strengths and limitations of science and technology for advancing human welfare	I recognize the strengths and limitations of science and technology.	Ability to use physical knowledge to evaluate opportunities and risks in selected examples of modern technologies.	Ability to use physical knowledge to evaluate opportunities and risks in selected examples of modern technologies.	Ability to use physical knowledge to evaluate opportunities and risks in selected examples of modern technologies.	Physics Curriculum
SL	Using tools	PD13. Use some of the tools of science	I am able to use tools of science.	Ability to use tools of science	Ability to use tools of science	Ability to use tools of science	New (own) formulation
SL	Understanding of scientific process	elements of research design and how they impact scientific findings / conclusions	I understand the elements of research design and how they impact scientific findings / conclusions.	Ability to understand the elements of research design and how they impact scientific findings / conclusions	Ability to understand the elements of research design and how they impact scientific findings / conclusions	Ability to understand the elements of research design and how they impact scientific findings / conclusions	New (own) formulation
SL		Understand methods of inquiry	I am able to understand the method of inquiry and the scientific process as such.	Ability to understand the method of inquiry and the scientific process as such	Ability to understand the method of inquiry and the scientific process as such	Ability to understand the method of inquiry and the scientific process as such	New (own) formulation
SL	Understanding standards	Understand and interpret basic standards	I am able to understand and to interpret basic standards.	Ability to understand and to interpret basic standards	Ability to understand and to interpret basic standards	Ability to understand and to interpret basic standards	New (own) formulation
SL	Using science	PD2. Use science in everyday life	I am able to use science in everydaylife.	Ability to use science in everydaylife	Ability to use science in everydaylife	Ability to use science in everydaylife	New (own) formulation
CS / SL	Critical Thinking	Critical thinking	I am able to think critically	Ability to think critically (about	Ability to think critically (about s	Ability to think critically (ε	New (own) formulation