



## Module 4: Understanding the competences and values

Guidance material	4.1.4 What is Problem- Solving?
What is the purpose of this material?	<ul style="list-style-type: none"> <li>This is a brief introduction to the competence of problem-solving</li> </ul>
When to use this material?	<ul style="list-style-type: none"> <li>When introducing the competences to teachers to support them in implementing this competence in their class programme.</li> </ul>
With whom to use this material?	<ul style="list-style-type: none"> <li>Teachers</li> </ul>
Have you considered these materials first?	<ul style="list-style-type: none"> <li>Introduce teachers to the SCF through: <ul style="list-style-type: none"> <li>1.2 Structure of the SCF activity</li> <li>1.4 Prior knowledge brainstorm activity</li> <li>1.3 Definitions matching activity</li> </ul> </li> <li>For further information on each of the competences, including student progressions, see 1.6 Close reading of ADEC SCF – Framework Requirements &amp; Exemplifications.</li> </ul>
How to use this material?	<ul style="list-style-type: none"> <li>This resource can be used in a range of ways, for example: <ul style="list-style-type: none"> <li>Share with teachers and discuss it in staff meetings or departmental meetings.</li> <li>Encourage teachers to plan using the ideas in this resource.</li> <li>Discuss the ideas and then ask teachers to share their own ideas for teaching this competence.</li> </ul> </li> <li>For more information on each competence read the <i>Framework Requirements &amp; Exemplifications</i> section of the <i>Abu Dhabi Education Council Student Competence Framework (SCF) for Private Schools - Competences for Abu Dhabi's 21st Century Learners (2014)</i>.</li> </ul>
What resources or equipment are needed?	Copies of the <i>Framework Requirements &amp; Exemplifications</i> section of the <i>ADEC SCF for Private Schools (2014)</i> .



### 4.1.4 What is Problem-Solving?

#### Definition

*Problem-solving as a competence involves discovering and analysing simple or complex, defined or ill-defined problems or issues, identifying and overcoming obstacles and finding the solution that best resolves the issue.*

*(ADEC SCF for Private Schools Framework Requirements and Exemplification (2014) p.iii.16)*

#### Background

This summary of research is provided as a background to this competence and further information can be found in the references below.

Competent problem-solvers are able to coordinate skills across several different domains. They can study a problem in detail and think critically about it, determine what needs to be done, generate and evaluate strategies, and persist in seeking solutions for both straightforward and complex situations. Successful problem-solvers are able to recognise when an individual or collaborative approach will be the most productive and that both require persistence, focused attention, and creativity. Group problem solving also requires effective communication, peer-interaction skills, and the ability to consider and draw upon multiple points of view in order to generate successful solutions (Feliciano and Berkhout, 2013; OECD, 2014; Thornton, 1995; Wenger, 1995).



These researchers and theorists suggest that problem-solving competence is very significant. Thornton (1995) considers it to be the most significant indicator of intelligence and draws upon a number of theoretical positions for example the work of Vygotsky. In considering the problem-solving development and abilities of children, Thornton cites Vygotsky's contention that a child's ability is shaped by the support provided by their environment and that problem-solving ability is best supported in social contexts. The shared task of finding solution pathways is more achievable with others including more knowledgeable adult others. This idea of problem-solving being a shared endeavor is exemplified in communities of practice (Wenger, 1991) and is also a significant driver for forming interdisciplinary teams to help solve wicked problems, (Feliciano and Berkhout, 2013; OECD, 2014) the complex, and messy problems that are very problematic both to define and solve.

The development of student problem-solving competence requires teachers to provide many opportunities in contexts that are relevant to their learners and that allow the students to regard themselves as successful in seeking both individual and group solutions. Teachers need to provide opportunities for recognizing and tackling the "wicked" problems that beset mankind. Practice in solving complex problems involving populations, environmental, and financial and natural resources and that have untidy solution pathways will involve students in utilizing their skills and



knowledge within multidisciplinary teams working in communities of practice in an effort to generate solutions.

## Learning Progressions

*“The term ‘learning progression’ refers to the purposeful sequencing of teaching and learning expectations across multiple developmental stages, ages, or grade levels. The term is most commonly used in reference to learning standards—concise, clearly articulated descriptions of what students should know and be able to do at a specific stage in their education. In terms of the student competence framework, a learning progression is a road or pathway that students travel as they progress toward mastery of the skills needed for career and post compulsory education.”*  
(ADEC SCF for Private Schools Framework Requirements and Exemplification (2014) p.iii.7)

The ADEC SCF for Private Schools (2014) provides learning progressions from kindergarten / Grade 1<sup>1</sup> through to the end of Grade 12. These progressions provide clear descriptors of what should be expected within that competence at each grade level, for example:

At the end of Grade 2 learners who are effective problem solvers are developing the ability to:

- solve problems using a variety of methods and skills
- consider different ways to solve problems
- analyse solutions to problems
- identify obstacles

At the end of Grade 1 learners who are effective problem solvers are developing the ability to:

- solve problems
- consider other ways to solve problems
- communicate solutions
- analyse solutions to problems
- identify that there may be obstacles

(Grade 1 and 2 Learning progressions for Problem-Solving in the ADEC SCF for Private Schools (2014). p.iii.17-19)

While the performance indicators within these progressions do not change in essence, they do expand in breadth and depth. This expansion makes the progressions a useful tool for both teachers and students. Below are some tasks teachers can undertake to help them make best use of these learning progressions:

- Read the progressions carefully as this will help you further understand this competence and what skills and attitudes make up that competence.

<sup>1</sup> The ADEC SCF for Private Schools (2014) recognizes that not all schools are able to deliver all competences across all grades. Table 5: A Road Map for the Delivery of the Competences across the Stages (p.iii.9) provides schools with a ‘road-map’ to support them in making decisions on the delivery and development of the competences across the four stages of schooling.

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- Before reading the descriptors for the grade you teach, read the descriptors for the grades below. These descriptors are the building blocks of what students have experienced in this competence before they reached this grade level. Ask students to share their experiences of these descriptors (e.g. “Tell me about a time that you solved a problem.” and use their answers to help you plan your starting point.
- While reading the descriptors for each grade level and identify the ‘step up’ students need to make to move through the progressions. For example, at the end of Grade 1 in problem-solving students are developing the ability to “consider other ways to solve problems”, while in Grade 2 they “consider different ways to solve problems”(ADEC SCF for Private Schools (2014) p.iii.19). Therefore their step up is learning that problems can be solved in different ways. Ask yourself what this might look like. For example give students a range of strategies for solving problems (e.g. make a list, draw a picture, check and guess) and get them to talk about which strategy they chose and why.
- Use the progressions when planning lessons to ensure your focus on a competence is based on the appropriate stage of the competence framework. The progressions are useful to refer to when giving specific feedback to students on their next steps in developing that competence.
- Support student to use the progressions to set goals and self/peer assess their own and others learning.

### References

Abu Dhabi Education Council (2014) *Abu Dhabi Education Council Student Competence Framework (SCF) for Private Schools - Competences for Abu Dhabi's 21st Century Learners*. Pearson Education Limited

Feliciano, D. and F. Berkhout (2013), "Dealing with "wicked" environmental problems: Introduction to Part 6", in ISSC and UNESCO, *World Social Science Report 2013: Changing Global Environments*, OECD Publishing, Paris/Unesco Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264203419-74-en>

OECD (2014) PISA 2012 Results: Creative Problem Solving (Volume V) sourced <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-v.htm>

Thornton, S. (1995) *Children Solving Problems*. Harvard: Harvard University Press

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press