

## Levels of inquiry

Tafoya, Sunal, and Knecht (1980) suggested four kinds of inquiry-based learning based on different levels of student autonomy (Table 1). The first level is the confirmation inquiry in which students are provided with the question and procedure (method) as well as the results, which are known in advance. The second level is structured inquiry, where the learning goal is to introduce students to the experience of conducting investigations or practicing a specific inquiry skill, such as collecting and analysing data. The third level is the guided inquiry, where the question and procedure are still provided by the teacher. Students, however, generate an explanation supported by the evidence they have collected. The teacher provides students with only the research question, and students design the procedure (method) to test their question and the resulting explanations with guidance or mentoring support. The fourth and highest level of inquiry is open inquiry, where students have the opportunity to act like scientists, deriving questions, designing and carrying out investigations as well as communicating their results. This level requires experienced scientific reasoning and domain competences from students.

Table 1. Levels of inquiry according to (Tafoya et al., 1980)

Main responsibility for:			
	Open Inquiry		
	Guided Inquiry		
	Structured Inquiry		
	Confirmation Inquiry		
Level of inquiry	Problem	Procedure	Solution
<b>Level 4 Open inquiry</b>	Student	Student	Student
<b>Level 3 Guided inquiry</b>	(teacher)	Student	Student
<b>Level 2 Structured inquiry</b>	(teacher)	(teacher)	Student
<b>Level 1 Confirmation/ verification</b>	(teacher)	(teacher)	(teacher)

The weSPOT IBL model is compatible with the above categorisation. In an open inquiry the student has to make all the decisions throughout the process, from selecting the field of research, embedding it to existing theories, to making predictions, collecting and analysing the data using the right methods and tools, to discussing and presenting the results.

In a guided inquiry, the teacher is in charge of the first phase by deciding on the topic and creating the hypotheses and the students are taking control of all the other phases. However, the teacher can offer his/hers guidance throughout the process when necessary by assisting the students either on a phase level or on a sub-phase level.

In a structured inquiry the teacher has a greater degree of control by supporting and directing the students during the phases of the inquiry. These phases are: Question/hypotheses, Operationalisation, and partly on Data collection. The students then need to perform the rest of the phases, data collection, interpretation and communication. However, in the structured inquiry teachers guidance can be spread in most of the other phases by assisting students in certain sub-tasks. For example, students will perform the data analysis but the teacher might explain to them the appropriate method and tools.

In confirmation inquiry the teacher has the absolute control over every phase, making all the decisions and the students execute. For example, the teacher decides on the topic, creates the hypotheses, makes predictions, decides upon the research and analysis method and tools, guides the discussion and decides on the presentation strategy, audience, format and so on. The students perform the activities.

The following sections will explain the different types of inquiry in weSPOT with the use of the microclimate scenario.