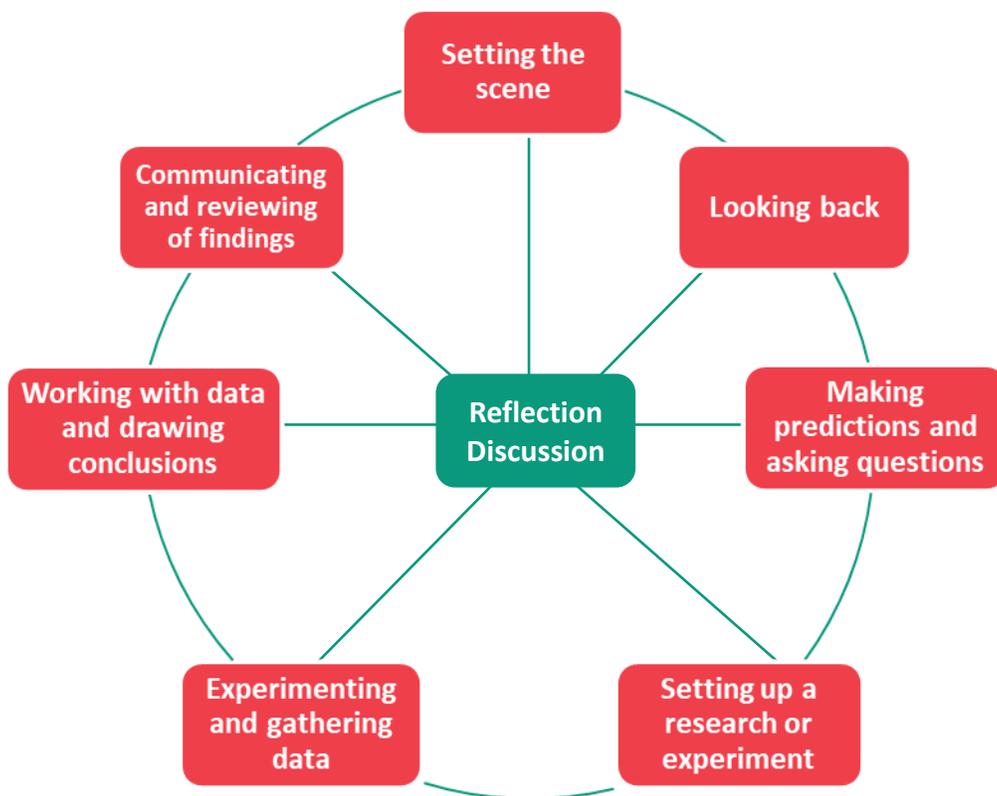


## PLATON: Promoting Learning Approaches for the Teaching of Natural Sciences

### The PLATON Inquiry Cycle

Inquiry is an approach you can follow when designing and enacting your lessons. Since it relates to the practices followed by scientists when trying to respond to questions about how the physical phenomena occur, it is a suggested approach and methodology you can engage your students with during your science lessons. By engaging them in the various inquiry practices, they are expected to develop scientific skills and knowledge about the natural phenomena they are studying.

**The PLATON's Inquiry Cycle is organized as a set of seven interconnected phases**, namely: **1.** Setting the scene, **2.** Looking back, **3.** Making predictions and asking questions, **4.** Setting up a research or experiment, **5.** Experimenting and gathering data, **6.** Working with data and drawing conclusions and **7.** Communicating and reviewing of findings. The PLATON's Inquiry Cycle is present below and a brief description of each phase is also provided in the next page:



**Setting the scene:** This phase is about stimulating students' interest and curiosity towards the problem, question or topic to be addressed. During this phase, the learning topic is introduced. Try to set your scene by connecting the topic you want to introduce to something that is already familiar to the students, something from their everyday life or something that is important to them. Try to make this introduction as interactive as possible.

**Looking back:** Encourage your students to identify all the concepts that they know of and are related to the problem under discussion and make the correct connections between them. Discuss what they already know or think about the ideas being brought up. Remind them about previous learning instances where relevant materials were studied. Ask them to connect the main concepts with different relevant domains.

**Making predictions and asking questions:** This phase is about students understanding the problem presented and getting an idea of how they are going to work on it in order to solve it. Invite your students to set the questions they are going to investigate and make some preliminary predictions. The questions set, should focus on how to investigate the problem at hand. Students' hypotheses and predictions should be around the questions they have set.

**Setting up a research or experiment:** During this phase, students set a plan to investigate the problem at hand. Students should design a plan that will help them answer their questions. Their plan could involve an experiment during which they will have to collect data or make observations (or both), or it could involve the collection of information through a research investigation process.

**Experimenting and gathering data:** During this phase, students investigate the problem at hand. Make sure students always have in mind what they are investigating and why they perform each step. They need to have a clear understanding of the connection between the investigation, the questions they have set and the hypotheses they have made.

**Working with data and drawing conclusions:** In this phase students go through their data, analyse them and make meaning out of them. Data could be experimental values, images from observations, input from online sources or handwritten observations. Data analysis could involve some extra calculations and graphs or simply observations of images. Once students are done with processing their data it is time to interpret them and draw conclusions. To do this, they always need to keep in mind where they started from; what is the question they are trying to answer.

**Communicating and reviewing of findings:** During this phase, students share their inquiry process and results with others (peers, school, community etc.). This phase involves the process of presenting and discussing the whole inquiry process or a specific step, as well as having peers critique and comment on the process and the results presented.

You can **engage your students in various inquiry learning pathways**. This can be done through making different combinations of the phases, and not all of them necessarily. For instance, if your students encounter substantial errors in their data analysis, they can go back to their experimental design to revise it, perform the experiment again, and collect new data. Or in case new questions are revealed during the drawing conclusions phase, you can ask them to formulate new hypotheses and start a new research/experiment design. It is important to keep in mind that when switching among phases, your students should engage in reflection and/or discussion about what is learnt, how it was learnt, what it remains unknown, and what to do next.

**Reflection and discussion** are also internal parts of every inquiry phase. For instance, students present and discuss their findings to support their conclusions and provide feedback to their peers. During the “Looking back” phase, students reflect on their prior knowledge and experience in order to express their ideas about a concept. During the “Setting up a research or experiment” phase, students can reflect and discuss in groups the design of their experiment and whether it is valid or not. Questions like “What are we going to study? How can we study it? How many variables do we need to vary for our experiment to be valid? How can we vary a variable? What other variables can affect our result and how can we keep them constant? What do we need to measure and how can we measure it?” will help you towards this direction.

You can access the complete set of inquiry components in the form of [flip cards](#), or choose to see the content of each one separately in our website by clicking [here](#).

You can also participate in individual **small online** tutorials for each of these components. These tutorials are designed as stand-alone tutorials and you are not necessarily meant to do them all together. You can start with anyone you like and move to the next one whenever you want.

## Your Roadmap to inquiry: Integrating the Inquiry Components in your Science Lessons

The integration of the inquiry components into your teaching should take the form of on-going and progressive small adaptations of your teaching practice in your science classroom. This gradual integration of inquiry into your everyday teaching will help you upgrade your teaching approach as a whole and to better understand and efficiently implement the inquiry approach, even when you have very limited time at your disposal.

**Tip 1:** Do not forget that the integration process is gradual and on-going! It will be a process of trial and error until you discover what works for you and your students.

**Tip 2:** Do not be disappointed if your first trials are not in line with what you anticipated! It will be an adjustment period for you and your students. The final result, the eagerness and active participation you will receive from your students will not disappoint you!

**STEP 1: Rethink the way you teach**

Before you start integrating the inquiry components into your everyday practice, reflect on your current way of teaching. For example, how would you characterize your teaching? Which of the practices you are implementing in your science classroom you consider to be inquiry related and which not? What do you need to change for making your teaching more inquiry-based?

**STEP 2: Gradually integrate the inquiry components into your teaching style**

The nine inquiry components are listed in order of priority so you can start by integrating them in that order (from IC1 to IC9). Of course, you can also start with the component you feel most comfortable with and think about how you can change your teaching style based on the related inquiry practices. Work at your own pace, pick the components in any order you prefer and try to integrate these recommendations in your everyday teaching!

For each inquiry component you will find the traditional and inquiry practices related to it, a small text about why there is a need to change from one type of practice to the other and some inquiry tips which will help you with the transition.

When you feel like you have mastered the inquiry practices embedded in a specific component, you can move to the next one. You can find below our suggestions which can help you make the decision of moving from one component to another:

**1. self-reflection and self-assessment** (see some ideas below)

**Reflect**

*“How are my students responding to the adaptations?”*

*“What practices concerning component # have I already implemented?”*

*“What practices am I not implementing so far and how can I integrate them in today’s lesson?”*

*“Am I ready to move to the next inquiry component? Why?”* etc.

**Keep a journal**

Intergrading IC1 in my teaching practice:

1st attempt:

Today I tried to start the lesson by showing a video to my students. They responded to it well and expressed their ideas. This particular classroom is responsible for the garden of our school, so I will try to connect our second lesson about photosynthesis with their experiences of maintaining the garden a little bit more.

**Idea!!** *If this idea is a hit with my students I believe I can continue with the next practice.*

**Create a checklist**

IC1 Inquiry Practices:	Not there yet!	Almost there!	Success!
Introduce topics based on students’ interests, daily lives and prior knowledge	✓		
Give the floor to students		✓	
Provide equal opportunities for students to participate		✓	

2. **Assessment of your teaching practice:** you can find a variety of formative and summative assessment tools that you can use [here](#).
3. **Asking for the feedback of a fellow teacher can help you make that decision.**

## Collaborate with other teachers

**Share ideas** on how to integrate the components.

**Get their opinion** on how the introduction of the inquiry approach in your classroom is going.

**Get advice** from experienced teachers.

**Work together** on developing materials and inquiry lesson plans.