Creativity, Arts and Science in Primary Education


# Training Material

## Learning Science Through Theatre

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*Science View*

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## Content



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# The CASE Project and Inquiry based science education

## In CASE, primary teachers are agents of change.

CASE aims to empower teachers' profession with skills and competencies which will enable them to widen their teaching capabilities by strengthening creativity in the classroom. Our approach to creativity lies at the intersection of science and art in education.

Inquiry Based Science Education (IBSE) is a method of teaching and learning that focuses on use of questions, problems, and educational scenarios used to engage students in concepts of science and support their acquisition of scientific knowledge and skills. This is achieved through their **active participation** in activities that make sense to the students, chiefly due to the fact that they are largely initiated by those students. Students understand in-depth the scientific concepts through their own perception of the world that surrounds them and through their own experiences and reflective processes.

**In CASE, science and the arts are intertwined**. The interaction between these fields within IBSE requires creative solutions on the part of both students and teachers, and enables new ways of thinking about the science curriculum, as shown below.

Various approaches have been developed for IBSE implementation. In CASE, a core cycle of query, evidence collection, analysis, explanation, connection, communication and reflection (see Figure 1) is adopted, based on previous initiatives in the field (e.g. the CREATIONS project[1]).

[1] www.creations-project.eu / H2020-EU Project reference: 665917

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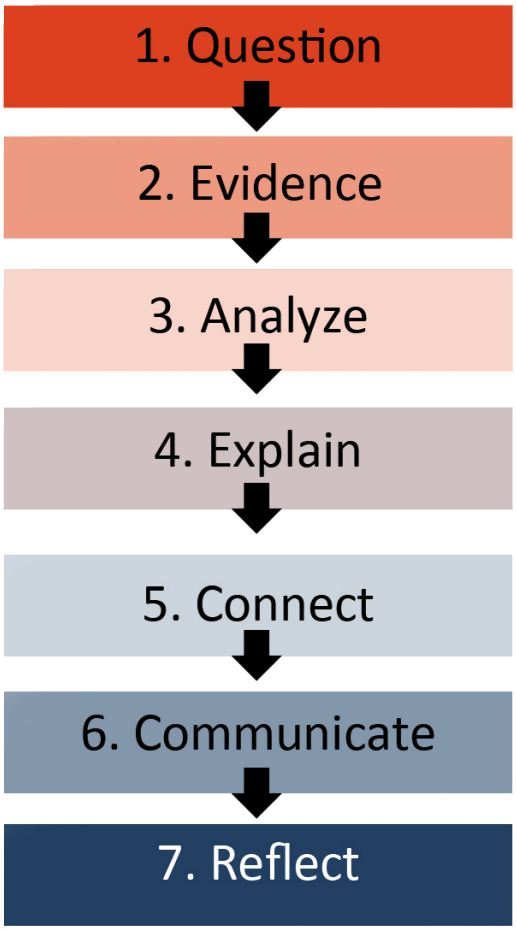


*Figure 1: Phases of IBSE*

This cycle emphasizes the need for students to engage in creative processes, through which they will act as young scientists and communicate science.
In Figure 2, actions that students perform in each IBSE phase are briefly shown.

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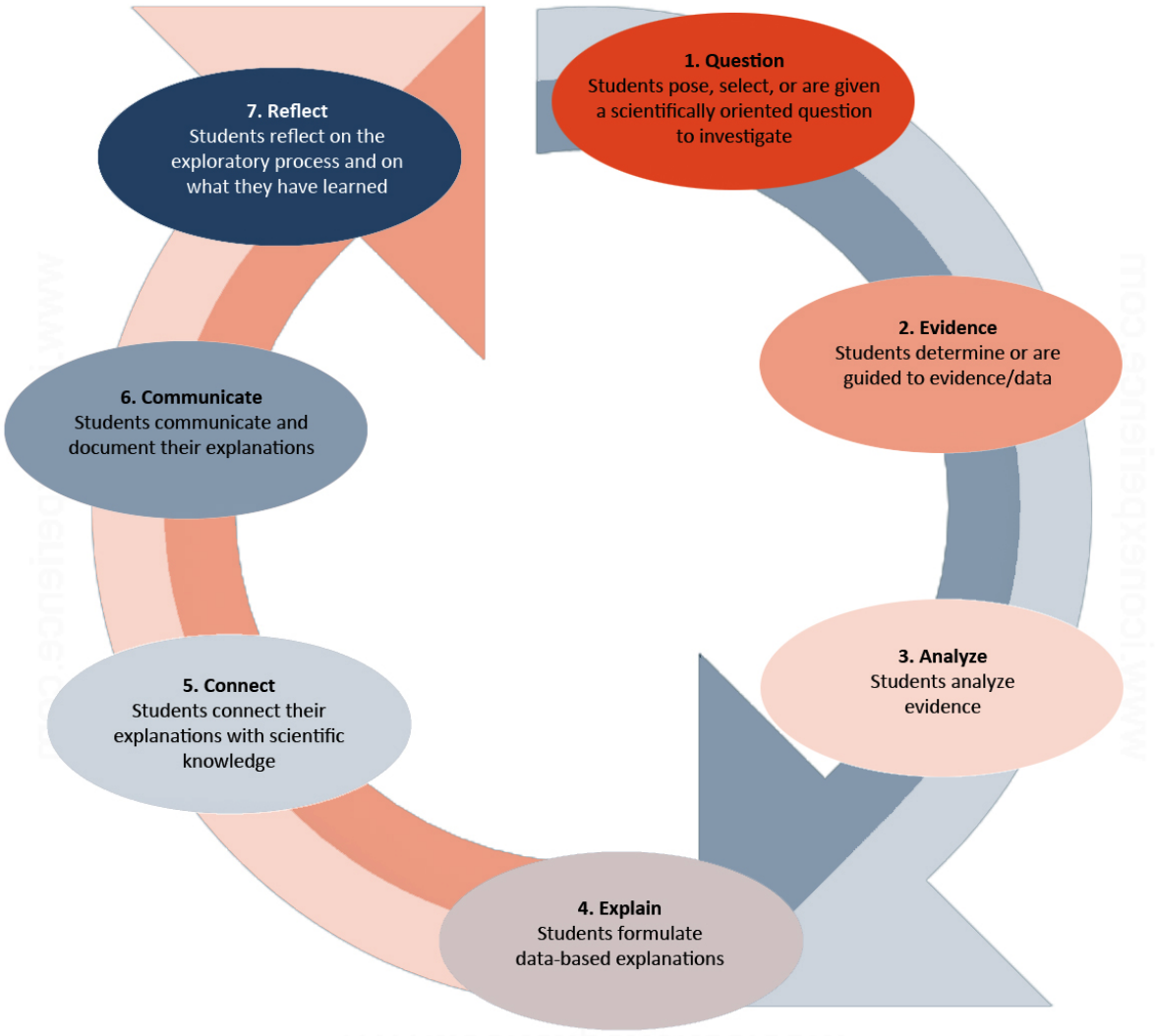


*Figure 2: Student actions at each stage of IBSE*

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# “Learning Science Through Theatre” (LSTT)

## Some words about the activity

LSTT brings together science and art inquiry. Students learn science in a creative way while implementing a theatrical performance related to scientific concepts.

In LSTT, students comprehend scientific concepts and phenomena, develop a spirit of cooperation and teamwork, actively participate in the negotiation of scientific concepts and develop creative and critical thinking skills. Furthermore, by participating in dissemination activities and entrepreneurial actions for the promotion and support of their theatrical performance, they contribute to further bridging school with society and develop their own social and entrepreneurial skills.

Finally, one of the main aims of the activity is to motivate an increasing number of teachers and students to join an educational community that cooperates through exchanges of opinions, materials and best practices for science teaching and learning during and following the action’s implementation.

Find more information about the activity:

- ☞ About the activity
- ☞ Regulations
- ☞ Awards - excellences

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## Implementation phases

Below you may find a description of the implementation phases of the LSTT activity.

## PHASE 1. QUESTION


### KEY CHARACTERISTICS

Students pose, select, or are given a scientifically oriented question to investigate.

### EDUCATORS' ACTIONS

The teacher chooses a chapter / module from the curriculum. S/he then begins a dialogue with the students, asking them questions. These questions will trigger a new round of questions, this time from the students themselves. The teacher should use these students' questions and come up with the subject that will eventually be explored and **dramatized**.

At this stage, the teacher can introduce physical warm-up exercises. These are great ice-breakers! They also help students get acquainted with the importance of the embodiment aspects of learning, while introducing basic theatrical techniques. Examples can be found in the Theatrical Team Exercise Guide (Link 1i).

### STUDENTS ACTIONS

At this stage pupils decide upon a basic, scientifically oriented question which they wish to explore through the LSTT activity. This happens in dialogue with the teacher.

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**LINKS**

Link 1i: **Experiential Exercises**
**( http://www.scienceview.gr/wordpress/wp-content/uploads/2017/10/WARM_UPS_BOOKLET_V3-Copy.pdf )**

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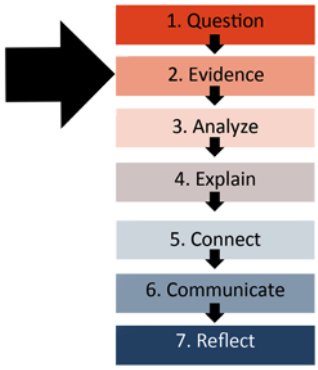
## PHASE 2. EVIDENCE




### KEY CHARACTERISTICS

At this stage, individual work ***and*** teamwork play important roles in finding and gathering necessary information about the main inquiry question that has been asked.

### EDUCATORS' ACTIONS

The teacher ensures that all students have access to information on the exploratory question, whether via the internet or through printed material books. The teacher helps students search and collect the necessary information. For example, the teacher may provide basic search guidelines (e.g. suggested sub-queries to explore, providing keywords for search engines, etc.)

### STUDENTS' ACTIONS

Students search the web for information on the chosen question / topic. They sometimes work individually and sometimes collectively, exchanging key findings and information they have collected.

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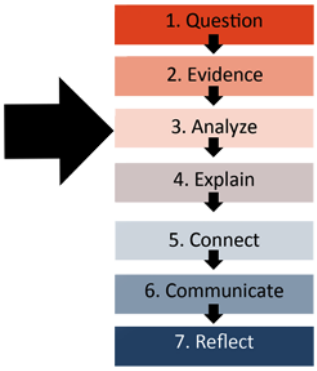
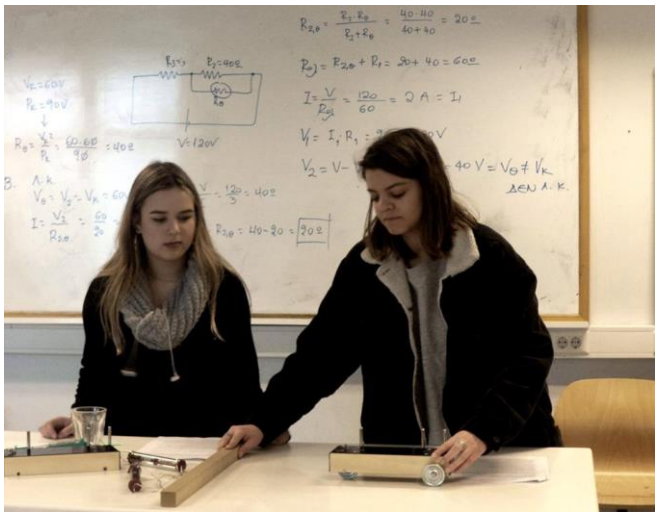
## PHASE 3. ANALYSIS



### KEY CHARACTERISTICS

This phase includes the organization and analysis of data collected during the previous phase, as well as student dialogue aimed at categorizing that data.

### EDUCATORS' ACTIONS

The teacher functions more as a facilitator, and coordinates discussions among students about the data collected. Also, s/he encourages the creation of organized information models, and search rules / standards for data organization (for example by providing students with a template according to which they may categorize their data). S/he then encourages and coordinates the students to improvise and create a first version of the theatrical performance.

### STUDENTS' ACTIONS

At this stage, students analyze and categorize the data they have collected while identifying different models of organizing information. Then they make a first attempt to capture the idea and create the scenario on which their theatrical performance will be based. Improvisation plays an essential role as students attempt to set up a basic skeleton of their performance spontaneously.

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## PHASE 4. EXPLAIN


### KEY CHARACTERISTICS

A key feature of this phase is the dialogue between students. That dialogue is needed in order to decide upon possible explanations and answers for the exploratory question raised earlier by the students.

### EDUCATORS' ACTIONS

**T**he teacher acts as facilitator and process coordinator while identifying and correcting possible misconceptions of students about the interpretation of data.

### STUDENTS' ACTIONS

**S**tudents collaborate and discuss decisions about the basic explanations they will adopt to answer the scientific question(s). They then proceed with the creation of their theatrical performance.

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## PHASE 5. CONNECT


### KEY CHARACTERISTICS

A key feature of this phase is inter-disciplinarity, as students study scientific concepts and knowledge while interconnecting scientific knowledge with various art forms.

### EDUCATORS' ACTIONS

The teacher takes full advantage of the possibilities offered by the interdisciplinary approach of teaching, as it promotes the interconnection of various scientific themes with various forms of art (theater, music, painting). To achieve this, a communication and consultation with specialists in the field is pursued (specialist scientist in science education, specialized stage director, musician, etc.). In addition, the teacher coordinates the corresponding groups of students who have undertaken to create the script, music, costumes, etc.

### STUDENTS' ACTIONS

Students explore the subject spherically and find interconnections with other fields, such as the arts (theater, music, painting, etc.). They are divided into groups according to their interests, in order to design and implement a complete theatrical performance with scientific content related to the exploratory chosen question / theme. Thus, pupils are divided into groups of directing, music production, scenography and costumes, choreography, video production, sound and lighting, and promotional activities. Collaboration exists both between students belonging to the same group and pupils belonging to different groups, so that the results produced are consistent.

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## PHASE 6. COMMUNICATION


### KEY CHARACTERISTICS

The main feature of this phase is the dimension of students' communication, both with their classmates and with specialized scientists and artists. In addition, communication also involves the expression of scientific concepts and findings by students through their theatrical performance.

### EDUCATORS' ACTIONS

The teacher encourages students to communicate with scientists and artists so that they can express and communicate the findings of their exploratory process in the best possible way to the public through their theatrical performance. The teacher has previously taken care to arrange a special scientist's visit to the science and / or artistic session (stage director, musician, etc.) at the school in order to allow students to address their questions in each discipline. The teacher ensures a specific day for student rehearsals. Finally, the teacher is responsible for coordinating the final performance.

### STUDENTS' ACTIONS

Students in this phase communicate with both artists and scientists. They ask them questions about various ways of improving the theatrical performance. Both during the rehearsal and the final theatrical performance, students use their bodies and voices to communicate scientific concepts through a variety of art forms, all of which may be included in the theatrical performance.

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## PHASE 7. REFLECT

### KEY CHARACTERISTICS

The main feature of this phase is student reflection and assessment of the exploratory process and learning.

### EDUCATORS' ACTIONS

**During this** last stage, the teacher discusses with students about their reflections regarding the theatrical performance, and what may be improved in the future. The teacher evaluates whether all students have been involved in the creative exploratory process, and completes an observation form provided by the organizers of the action. This helps the description and assessment of the course of student exploratory learning and the extent to which scientific meanings were elaborated by students through embodied learning. This always relates to the school's curriculum.

### STUDENTS' ACTIONS

At this stage, students are evaluated both by the judges (scientists and artists) of the final theatrical performance, as well as by the audience of theatrical performance. Then, after receiving their awards and distinctions, they discuss both with each other and with the teacher about the characteristics of the performance and the factors that contributed to the success (or not) of their final performance.

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