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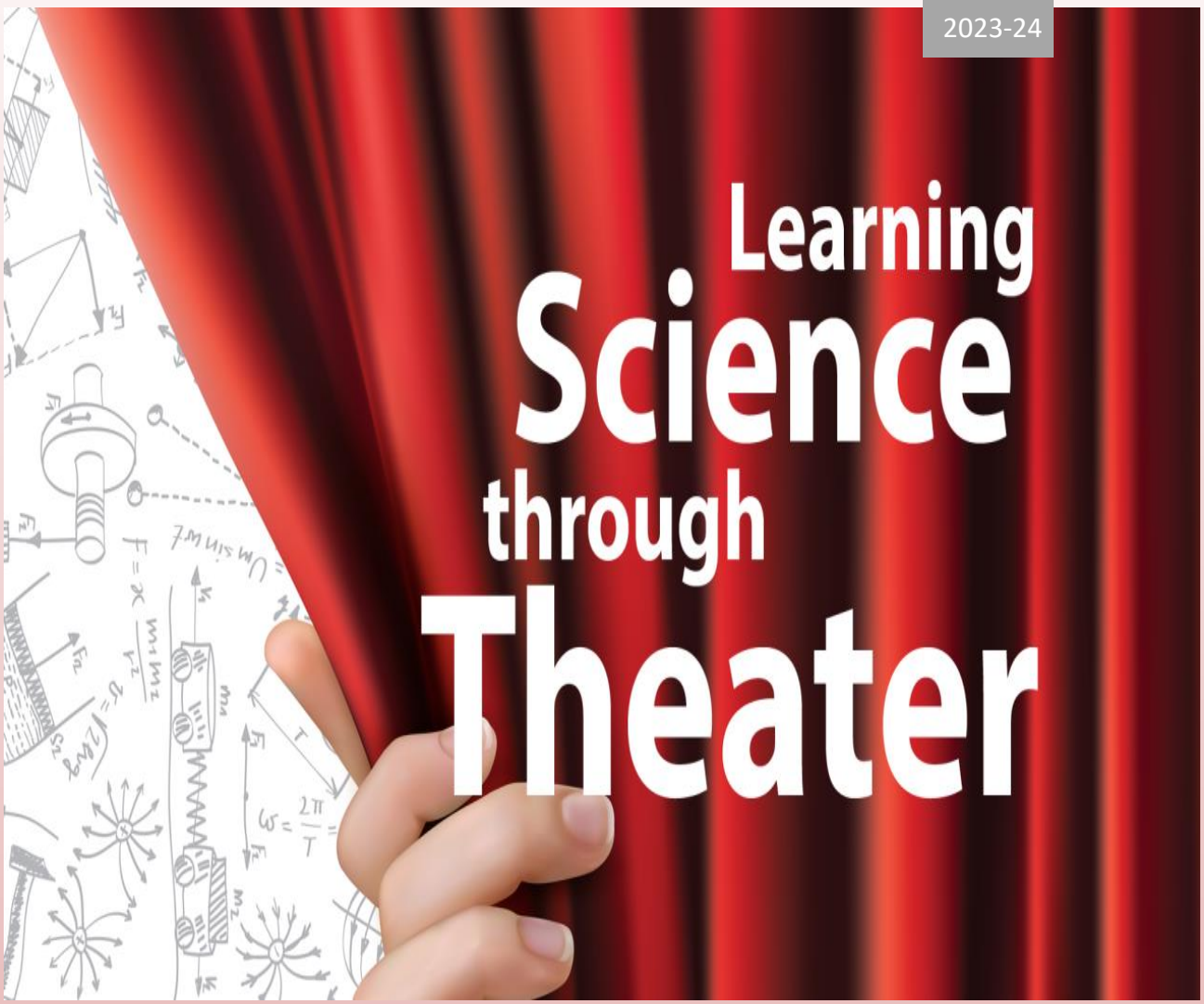


IMPLEMENTATION GUIDE

SCIENCE VIEW

www.lstt.eu

www.facebook.com/learningsciencethroughtheater/

https://community.road-steamer.eu/assemblies/lstt

www.youtube.com/user/scienceview

CONTENTS

1. Inquiry based science education

Inquiry Based Science Education (IBSE) is a method of teaching and learning that focuses mainly on the use of questions, problems, and educational scenarios that can be used to get students involved in the concepts of science and acquire scientific knowledge and skills. During IBSE, students gradually build up scientific knowledge and develop a scientific way of thinking as they engage in a process of exploring answers to scientific questions and problems. This is achieved through their active participation in activities that make sense to themselves. As a result, students understand in-depth the scientific concepts through their own visual perception of the world that surrounds them and through their own experiences and reflective processes.

However, different approaches have been developed with regard to the ways in which IBSE is applied. In this case, a core cycle of query, evidence collection, analysis, explanation, connection, communication and reflection (see Figure 1) is adopted in the implementation of the "Learning Science through Theater" activity.

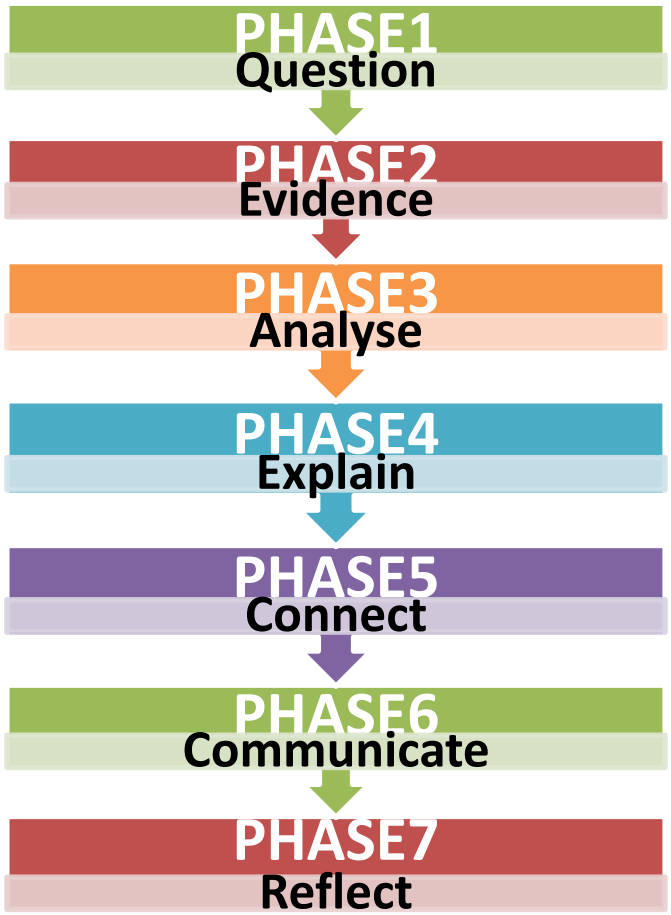


Figure1. Phases of IBSE

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, the actions that students perform in each phase of IBSE are shown in brief.

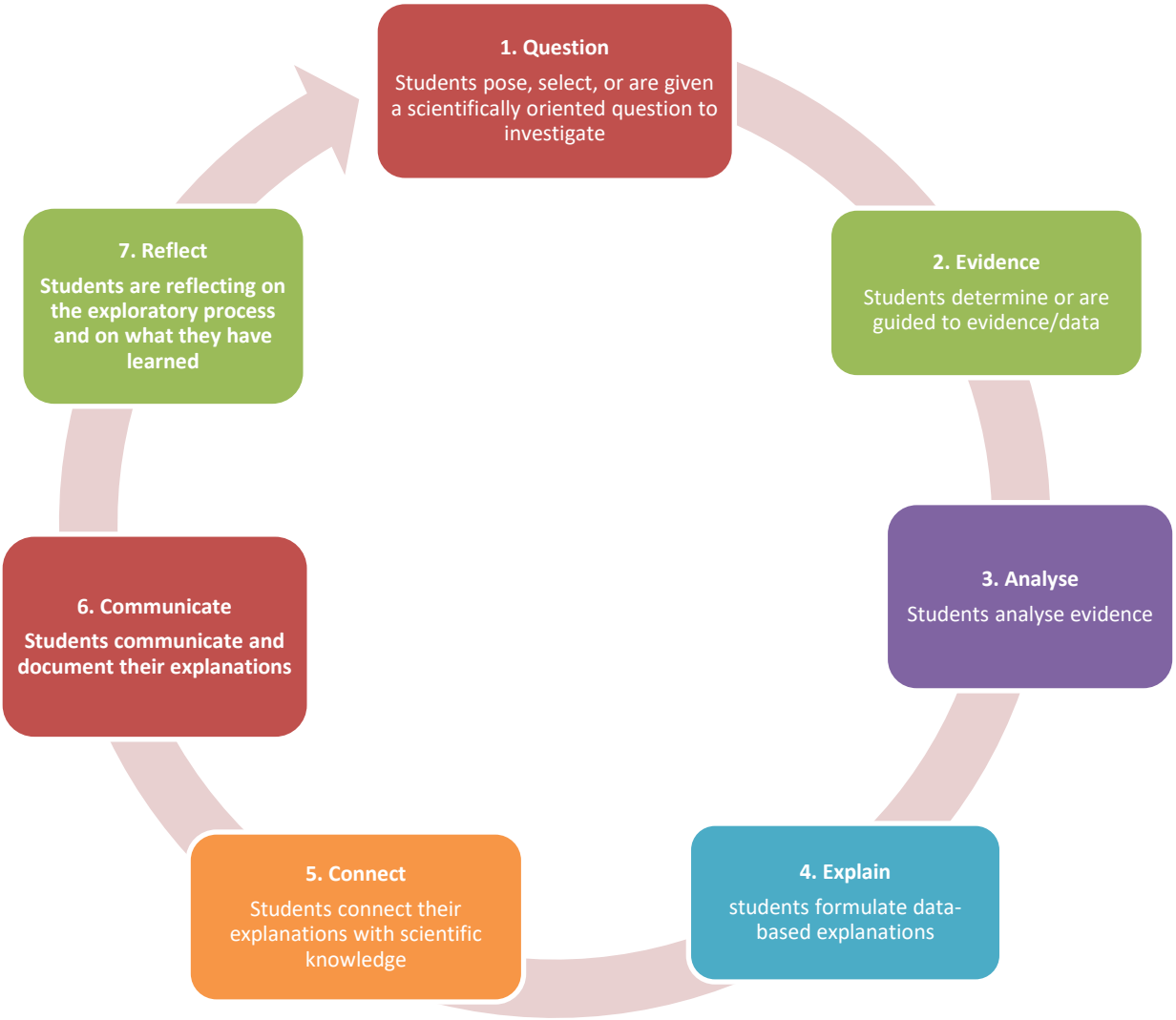


Figure2. Student actions at each stage of IBSE

2. The activity "Learning Science Through Theater"

2.1 Few words for the activity

In the context of the activity, students will implement a theatrical performance related to scientific concepts and will learn science in a creative way. The specific objectives of the activity, which have as a central axis the interdisciplinary interconnection of science with aspects of art, aiming at the enhancement of students' interest in science, involve both students and teachers. More specifically, through this activity, students will comprehend scientific concepts and phenomena, develop a spirit of cooperation and teamwork, will actively participate in the negotiation of scientific concepts and they will develop creative and critical thinking skills. Also by participating in dissemination activities and entrepreneurial actions for the promotion and support of their theatrical performance, they will contribute in further bridging school with society and at personal level developing their social and entrepreneurial skills. Teachers will be engaged in professional development procedures through their cooperation and the exchange of opinions, ideas and teaching material (either in person or through online learning communities). Finally, one of the main aims of the activity is to motivate more and more teachers and students and create an educational community that will cooperate, exchange opinions, material and best practices for science teaching and learning, that will continue after the implementation of the action.

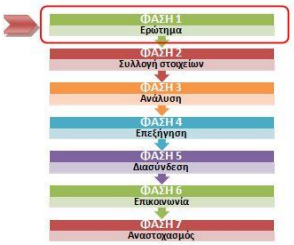
Find more information about the activity:

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

2.2. Implementation phases

Below you can find an analysis of the implementation phases of the activity LSTT.

PHASE1. QUESTION



KEY CHARACTERISTICS

Students pose, select, or are given a scientifically oriented question to investigate. Balance and navigation through dialogue aids teachers and students in creatively navigating educational tensions, including between open and structured approaches to IBSE.

EDUCATORS ACTIONS

The teacher chooses a chapter / module from the curriculum in which the students will be involved following the LSTT activity framework. Then, possibly on the occasion of a modern scientific subject related to this chapter, he begins a dialogue with his students, asking them questions. These questions will trigger a new round of questions from the students' side this time. At this point, the teacher should use these students' questions and come up with the subject that will eventually be explored and dramatized.
Once the subject has been identified, the teacher can use and implement experiential warm up exercises both for the students to get acquainted with their body and with the rest members of the group, as well as basic theatrical techniques. Some examples of such activities can be found in the Theatrical Team Exercise Guide (Link 1i).

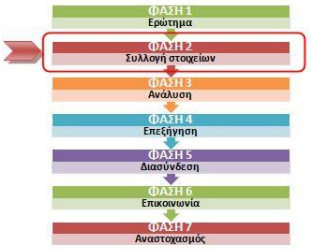
STUDENTS ACTIONS

At this stage pupils decide and put a basic and scientifically oriented question to explore. They discuss and elaborate questions together with the teacher, about this subject, while they are involved in open-ended investigations that are related to their experiences. In addition, they are actively involved in the theatrical group's experiential exercises.

LINKS

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

PHASE2. EVIDENCE



KEY CHARACTERISTICS

At this stage, individual and teamwork plays an important role, aiming at finding and gathering the necessary information about the main inquiry question that has been asked. It is also important to strengthen and empower students to produce individual queries and discuss the evidence they found in the various sources they sought to look for.

EDUCATORS ACTIONS

The teacher in this phase ensures that all students have access to information on the exploratory question, whether via the internet (eg YouTube videos, information from scientifically valid websites, etc.) or through printed material books (e.g. from the school library). The main concern is to coordinate the group of students in terms of searching and collecting the necessary information, as well as aiding the search for information within the chosen topic. The information search process can be facilitated by the teacher by providing basic search guidelines (eg suggested links to students, suggested subqueries to explore, providing search keywords for search engines, etc.)

STUDENTS ACTIONS

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

PHASE3. ANALYSIS

KEY CHARACTERISTICS

The main characteristic of this phase is the organization and analysis of the data collected during the previous phase of the exploratory process as well as the dialogue between the students to categorize the data.

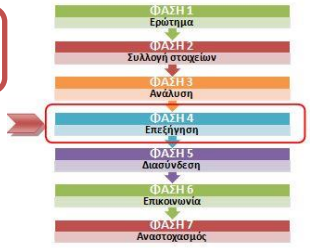
EDUCATORS ACTIONS

The teacher functions more as a facilitator of the process, and coordinates discussions among students about the data collected. Also, encourages the creation of organized information models, and search rules / standards pursuant under which the data will be organized. To achieve this, the teacher can provide students with a template according to which they will categorize their data. He then encourages and coordinates the group of 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. Essential role in this phase plays the improvisation of students as they attempt to set up a basic skeleton of their performance in a spontaneous way.

PHASE4. EXPLAIN



KEY CHARACTERISTICS

A key feature of this phase is the dialogue between students in order to extract and decide on the possible explanations and answers for the exploratory question that have been raised and which make sense to the pupils themselves.

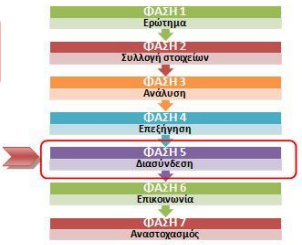
EDUCATORS ACTIONS

At this stage, the teacher acts as facilitator and process coordinator while identifying and correcting possible misconceptions of students about the interpretation of the data collected in the previous phase.

STUDENTS ACTIONS

At this stage, students collaborate and talk about making decisions about the basic explanations they will adopt to answer the question they have asked and then proceed with the creation of their theatrical performance.

PHASE5. CONNECT



KEY CHARACTERISTICS

A key feature of this phase is interdisciplinarity, as students conquer scientific concepts and knowledge interconnecting scientific knowledge with various forms of art.

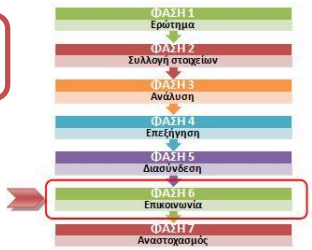
ECUCATORS ACTIONS

At this stage 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 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 in this phase 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 question / theme originally set. Thus, pupils are divided into groups of directing, music production, scenography and costumes, choreography, video production, sound and lighting, promotional activities. They use all their imagination and creativity to achieve the best possible result and produce the final products in each category. Collaboration exists both in between students belonging to the same group and pupils belonging to different groups, so that the results produced are consistent.

PHASE6. COMMUNICATION



KEY CHARACTERISTICS

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

ECUCATORS ACTIONS

At this stage the teacher encourages students to communicate with scientists and artists so that students 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 (director, musician, etc.) at the school for students to address their questions. Finally, the teacher, in conjunction with the organizers of the action, takes care to ensure a specific day for a rehearsal of the group of students. Finally, the teacher is responsible for coordinating the final performance of the pupils.

STUDENTS ACTIONS

Students in this phase communicate with artists (directors, musicians etc.) and the scientist who may even visit the school to be consulted. They ask them questions about various ways of improving the theatrical performance. In addition, both during their rehearsal and during their final theatrical performance, students communicate through their bodies and through various gestures scientific concepts and issues that they have explored throughout the exploratory process.

PHASE7. REFLECT

KEY CHARACTERISTICS

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

EDUCATORS ACTIONS

The teacher at this stage of the exploratory process, which is the last one, discusses with the students' group what went well and what not when the students' theatrical performance was implemented. 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, which helps in describing and assessing by the teacher both the course of student exploratory learning and the successful or non-elaboration of scientific meanings by students, through embodied learning, always in the context of the curriculum of the classroom in which students are studying.

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 play.

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