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How to create a science theatre show

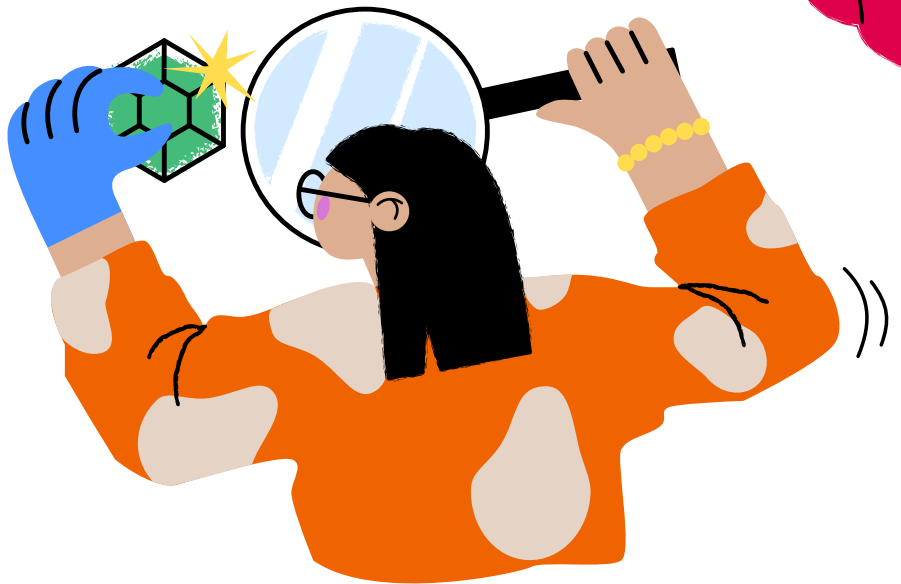
AUTHORS

Annika Vesselov, Daniel Fomochkin,
Uģis Rācenis

CO-WRITERS/EDITORS

Lennart Peep, Helen Järvpõld,
Kai Kaljumäe, Charlotte Tonheim

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What is a science theatre show?

The general understanding of what a science theatre show embodies varies greatly in different countries and among people who develop science theatre shows.

For example, it can be a lecture-like performance (where an actor conducts scientific experiments and explains the science behind these experiments); it can also be more like a play on a stage with costumed characters who, among other things, explain scientific phenomena.

Alternatively, it can be similar to a mime – a show with a series of experiments and without any words at all. What is common in most concepts and views on science theatre shows is that they usually have at least one performer or facilitator and a scientific topic around which the show is built and which is verbally or visually explained.

What are the benefits for the students?

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First steps towards a science theatre show



A science theatre show is an entertaining and engaging way to communicate scientific topics to people of any age or gender and spark interest in science. Organizing a science theatre show can be challenging if you have no experience or knowledge of it whatsoever, but with a little instructing and helpful tips this guide is set to give, it can be an enjoyable and rewarding process. Science theatre shows can be easily done as a part of a school assignment, local youth or community centre project, or even as an entertainment program at a family gathering. This guide focuses on organizing science theatre shows in a school context, but all the tips and instructions apply to other situations as well.

When starting with the science theatre show production, the first step is to choose your core team – the key ‘staff’ you are going to work with. In a school, it can be a whole class, a drama or science club or you can have an open call for all the students in the school and invite those that are interested in taking part. You need a reliable team with whom you can share the workload, so choose wisely. It would be a good idea to involve other teachers and parents as well. Depending on the scale of your science theatre show, the people you might need are:

- a director,
- a stage tech (sound and lights),
- a set designer (decorations, costumes, and props),
- a scriptwriter,
- a science experiment enthusiast,
- characters/actors.

If you have your team together, arrange a few meetings to brainstorm and discuss your ideas, your budget, timelines, roles of each person involved, and other aspects of the overall organization. The easiest way is to start with defining the theme and the main goal of the show (what do you want to say to the audience) and then go through the general aspects you need to work through.

The main things to consider are:

- the theme of the show and the scientific topic or topics it involves or explains;
- the purpose of the show (e.g. to entertain or to educate the audience, to provoke interest in science, etc.);
- the audience whom the show is meant for and the level of difficulty (kids, families, etc.);
- the format of the show (e.g. mime, 'classical' play, musical, comedy, forum theatre, dance, etc.);
- the length of the show;
- storyline or the description of what happens during the show (this is the cascade of 'causes and effects' where everything is connected and one thing leads to another);
- a set of experiments that help to better understand or demonstrate the topic of the show;

Theme:

Ideas on how to choose one and why it is a good idea to have a theme at all

Having a theme is important, as it creates a frame that connects all the experiments into a whole-some experience. You should pick the theme right at the beginning of the whole process. A theme will be the centre around which everything else (storyline, experiments, scenography, etc.) comes together. Having a theme helps you to create the storyline and choose the experiments.

Themes can be very different, such as physical or chemical phenomena like fire, water, electricity, acoustics, and optics. They can also revolve around certain situations – for example, a well-known story, crime scene, time travel, or whatever you can think of.

Pick something you and your team feel passionate about and inspired by as you will be working on this show for weeks. In school, always clear your choice with the administration before moving ahead.

How to choose a theme? Brainstorming is often a successful way for students to get ideas down on paper. One option is to have all students in your team write three themes that they feel connected to or that interest them on a sticky note. Then put all the notes on a wall and have everyone read them out and vote.

To whom and why?

Science theatre as a means to learn and to be entertained is suitable for all ages: when you choose the appropriate way to present the information, it is possible to make a show fun and interactive for every age group. The level of detail in explaining the scientific concepts is what dictates to whom (which age group) the show is most appropriate. However, for entertainment purposes, it doesn't even matter what the age or nationality of the audience is, experiments can be interesting and very enjoyable to watch even without understanding a word.

Depending on the demographic, it is possible to make the science theatre show into a fairy-tale-like kids show, a science class with easy explanations for middle school students, or a stand-up comedy for adults.

There are a variety of reasons why you would wish to put together a science theatre show. It can be created to entertain, to educate, to address some issues, to use it as a teaching method, to make scientific topics easier to grasp.

In a school context, science theatre shows are mostly used to educate and to make learning fun and engaging. Therefore, before starting to create a show, you should think about the purpose of the show and how you can achieve it.



Length of the show

A typical science theatre show lasts from 20 to 40 minutes. However, the attention span of a younger audience is shorter, hence you should not stretch the show for too long as to not lose your audience towards the end of the performance (see more on this in "Plot and script"). Also, longer shows might be challenging for students to perform as well. Of course, there are science theatre shows that can last more than an hour and still be exciting for the audience, but it is always a huge risk to plan such a long show, as it might get repetitive or fail to amuse the audience until the end of the performance.

Always think about ways for making your show dynamic - use contrasting ideas to enhance your show. For example, there can be funny and sad elements, loudness and silence, darkness, and light. A science show should be a rollercoaster for your audience where emotional and intellectual experiences are in balance.

Format of the show

As for the format or the way a science theatre show should be presented, there are many options. It can be experiment-based, meaning that the performers demonstrate experiments and connect them to situations or metaphors; a play with actors on stage performing a strictly scripted scenario that involves a scientific topic; a story told and shown through experiments; pantomime or even a dance or a musical. The choice can be made by discussing it with all the people involved in the process. So, consider brainstorming various ideas and then voting for the most appealing format.

It is also possible to create a science theatre show via online.

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Plot and script:

Why are they useful and how to create them

A plot or a storyline is the journey you prepare for your audience. It gives the whole performance structure and helps you to connect all the experiments and main events that take place during your show. But how can you come up with a good plot? Students can be very creative, so give them a chance to find their inner playwright.

But there is always the possibility to approach in a more structured way of writing a plot. Let's imagine that the theme you chose for your show is water. This topic is quite broad and you have loads of experiments to choose from. For example, you may

start the show by telling the audience about the origins of water on our planet. One way of showing it through an experiment would be to ignite a balloon filled with hydrogen to showcase the reaction between H_2 and oxygen in our air, chemically creating H_2O . From here, you can explore the chemical aspects of water and perform a couple of chemistry-based experiments. After that, move towards its physical aspects, like water's surface tension or heat capacity. That way, the audience knows what they got themselves into, will follow your story, and most likely will remember some of the explanations you gave.

Probably the easiest way out is to choose an existing play and integrate some science experiments into the storyline. For example, the fairy tale about the ugly duckling. You can take the plot of this children's story, develop it into a play and integrate the science experiments somewhere in between the events that take place in the story.

When you have decided upon your main storyline, it is best to write it down with all the necessary commentaries about the experiments (when do they happen), what does the stage look like (props, lighting), who says what (dialogues), so you would have something that helps you to document and memorize what and when will happen during the performance. In other words – write a script. A script is a document that outlines every aural, visual, behavioural, and lingual element of your story. This can be done as a col-

laboration with your theatre team, given as an assignment to one of the students in the team (after the main story and events of the show have been decided upon) or if students are younger, the teacher can be responsible for producing the script.

And after you have finished your script, be sure to give your show good and 'catchy' headline. The headline of the show should represent the theme or at least give some hints about what it is going to be about, and make your audience curious about the show.





Scenography

What it is and suggestions of creative ideas on how to do it

Scenography is the practice of crafting stage environments or atmospheres. As every science theatre show is unique in its way, it is important to create a unique atmosphere for your show. To distinguish a science presentation or a lecture from a science theatre show, you need to pay more attention to how the stage and performers look like. Here are some aspects that you should consider while preparing the science theatre show.

STAGE AND VENUE

Choose a place where there is enough room for you to perform and for the audience to see the show. There should also be a safe area for the experiments that require one. The stage does not necessarily have to be a 'classical' theatre stage; it can also be in the middle of the audience or on different "islands" for scenes in different places around the room.

LIGHTING

Make sure that the stage is well lit so that the show can be seen equally well from the first and last rows. In addition to front lights that light up the stage, it is good to use backlights too. This helps to erase the 'flatness' of the room and creates a more natural look on the set. Furthermore, if some of the experiments involve fire, be sure that you can turn off or dim the lights from the stage so that the audience can see the flames. If someone in your team is responsible for the lighting (e.g. the lighting tech), let them know about the order of the experiments before the show so that they know when to turn on the lights and when to dim them.

COSTUME DESIGN

Make sure that all the characters wear something that lets the audience know who they are. It can be a full costume, a prop or a small addition like a mask or a hat or maybe just the colour of the clothes (e.g. green for a caterpillar). As you are choosing the costumes for those characters who are going to perform some experiments, make sure to keep the costumes safe (easily removable, no loose and flammable details) and have the option to use safety equipment with the costume (e.g. gloves, goggles). So be sure that the costume does not limit the performer's movement on stage and adheres to safety precautions.

More on this can be found in "Safety – how to keep yourself and the audience safe"

STAGE DESIGN

Having a properly set stage adds a lot to the performance and makes it much more aesthetic. It is important that the stage is set accordingly to the safety measures and does not limit any movements or actions on stage. Decorations and props on stage depend on the topic of your show but keep in mind that decorations support your story, help to engage the audience and make the whole experience more memorable (especially when the show is aimed at kids). The moment the curtains open or the lights are turned on, the stage is the first thing the audience will see, therefore the stage design plays an integral role. As it is well-known that the first impression is very important, keep it in mind when you prepare your stage for the show.

Scientific experiments and how to integrate them with your story

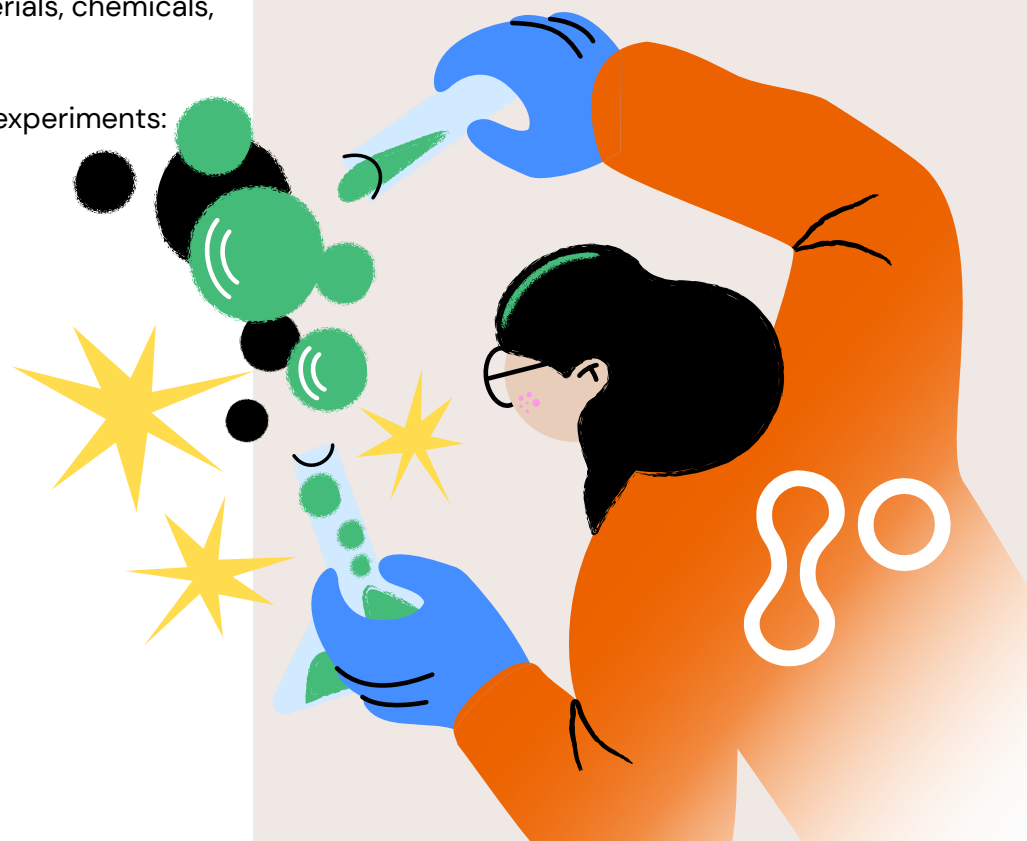
Choosing the experiments for the performance should ideally happen after picking the theme and it should go hand in hand with writing the plot. Sometimes it is easier to list (with the help of Google and YouTube) various experiments related to your chosen theme and then try to organize them by finding “common ground”. So, let’s say your theme is psychology and you found experiments that trick your eyes and attention or test your memory or perception, then you can narrow down your theme and make it about the brain or try to find connecting points between all your experiments and put them into a suitable order and develop the storyline along the way.

Another option is to put together the story, pick the “scenes” where experiments should happen, and then try to find suitable experiments. For example, if you are staging the fairy tale of the Three Little Pigs, you can make a small experiment for each time the piglets build houses (using the materials piglets use to build their houses). For instance, you can demonstrate what happens if the Big Bad Wolf tries to blow them over and explain why it happened and what made the houses fall apart (or stay intact). Or when the Big Bad Wolf climbs down the chimney and catches on fire, you can carry out an experiment with fire and explain why it happened (what components we need to light a fire).

When it comes to choosing experiments for your show, there are no limits. Just make sure that they meet the safety requirements and do not exceed the budget you have for the materials, chemicals, etc.

Here are just some ideas for the experiments:

- [Newton’s disc](#)
- [Lava lamp](#)
- [Static electricity](#)
- [Dry ice bubbles](#)
- [Skewer through balloon](#)
- [Bending light in water](#)
- [Chemical traffic light](#)
- [Blue Bottle Experiment](#)
- [Elephant’s Toothpaste](#)
- [Hot ice](#)



Safety

How to keep yourself and the audience safe

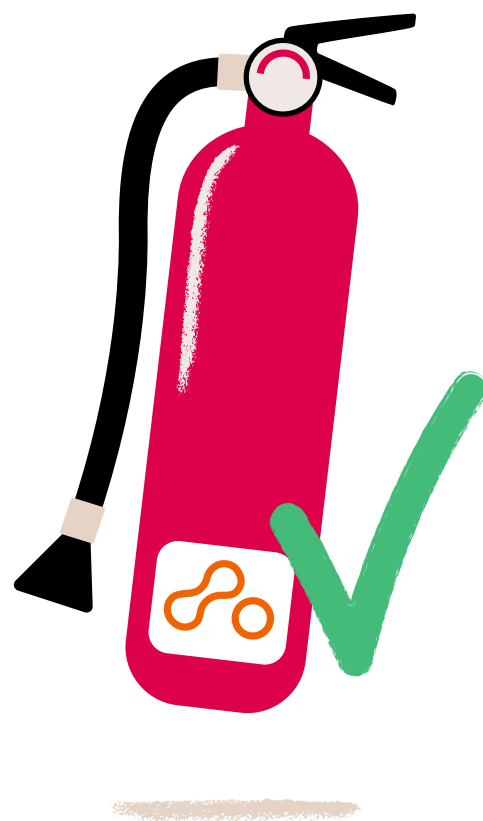
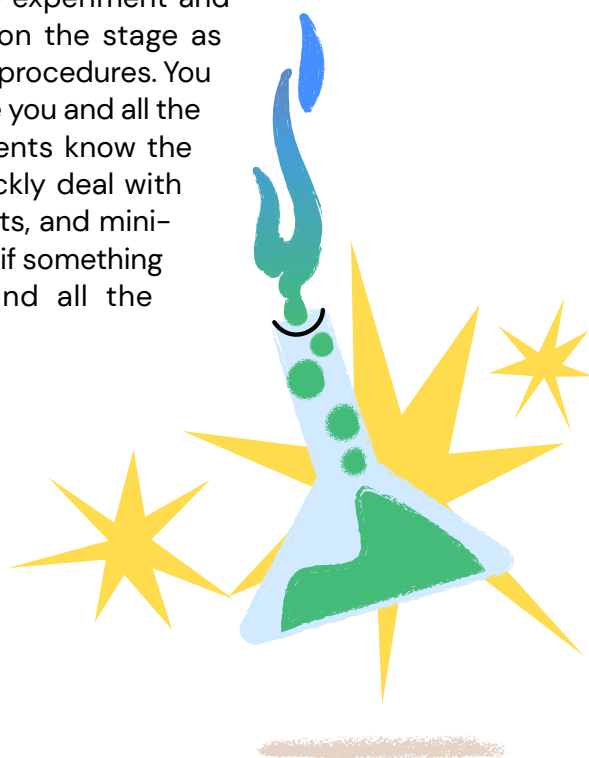
This is the most important part! Always perform the show in a safe area and make sure that the audience is far enough from the stage. How far? It depends on your experiments: if the show is about acoustics, then the audience can be closer to the stage, and if huge balloons filled with propane are going to be ignited on stage, the audience should be out of the “danger zone”.

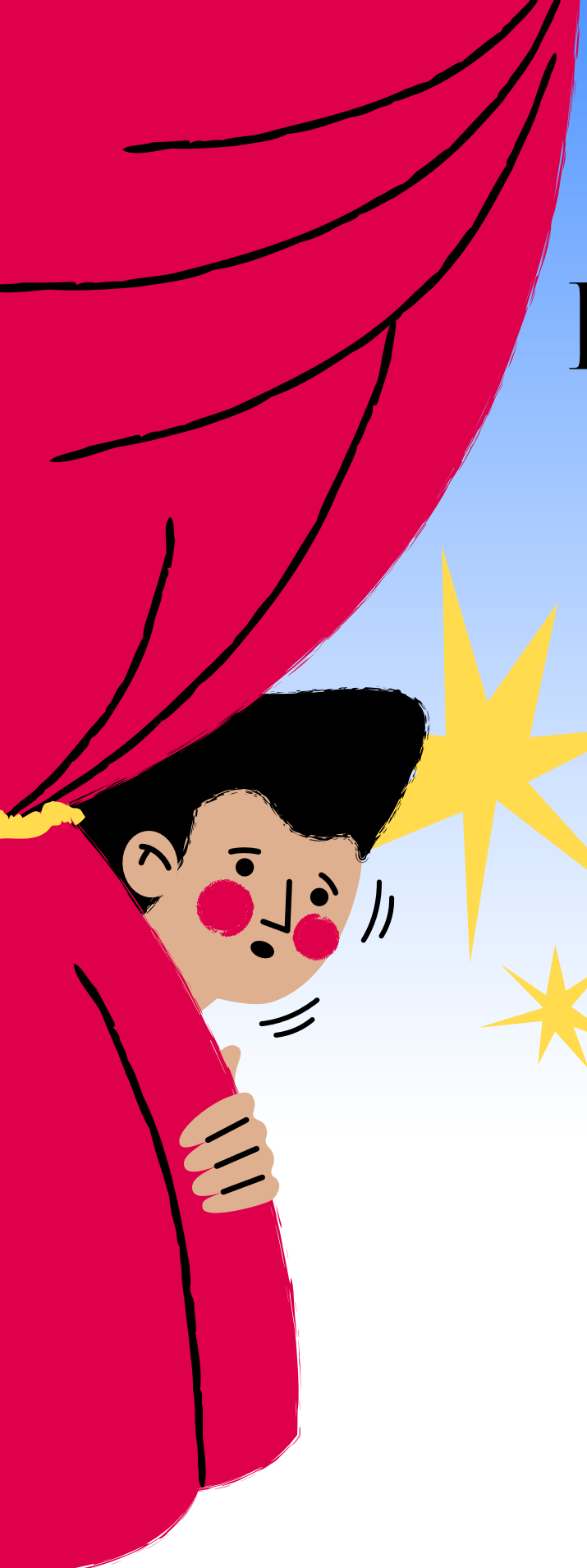
If you are performing in an unfamiliar place (e.g. a neighbouring school), examine the facilities before trying out the experiments. If there are going to be flames, watch out for any curtains, carpets and wooden objects, and get them out of the ‘danger zone’ before the show begins.

Before experimenting, research it as thoroughly as possible and make sure all students (those who perform the experiment and others who are on the stage as well) know all the procedures. You should make sure you and all the performing students know the risks, how to quickly deal with possible accidents, and minimize the damage if something happens. You and all the

performers must know every chemical you work with, every possible outcome of a reaction and the dangers that come with it. Note that when working with chemicals, you should wear a lab coat, safety gloves and goggles every time you step on the stage. If the performer looks safe, the audience feels safe as well. If the performer looks like they have no idea what they are doing, then the audience will be uncertain about the performers’ capabilities, their safety and therefore will not get the full enjoyment from the show.

See [here](#) for more information about safety in chemistry-based shows.



A cartoon illustration of a young boy with black hair and rosy cheeks peeking from behind a large, flowing red curtain. He is looking towards the right with a slightly nervous or excited expression. The background is a light blue sky with three yellow starburst shapes. The title 'Rehearsals and practising' is written in a large, black, serif font on the right side of the page.

Rehearsals and practising

Practice makes perfect! The more your students rehearse, the more confident they feel on stage. The more confident they feel on stage, the less stressful the show is going to be for them, and the more fun it will be for the spectators. In addition to rehearsing the individual lines and dialogues, theatre games are a very useful way for breaking barriers and causing students to become more comfortable around one another. Theatre games are also commonly used as warm-up exercises for actors before a rehearsal or performance.

One easy and fun drama game you can use to warm up your students is called the 'mirroring game'. Pair your students and have each pair choose the leader. The leader moves slowly in various motion while the follower imitates the motion simultaneously. This is an exercise that requires concentration because it should be difficult to know who is initiating the movement.

A more advanced theatre game you could try is called "Change the Channel". For this one, choose two to four students and give them a scene to start (such as lifeguards rescuing someone from drowning). When you call, "Action!" the students begin acting out the given scene. At any point, you call "Freeze!" and the whole scene must freeze. Then select one new volunteer, the volunteer can tap any of the people onstage to go sit down and assume that actor's position. Then call "Action!" again, the person who just tapped in must start a whole new scene based on the positions the remaining actors ended in. The other actors will

need to improvise and join in the new scene. The scene must be completely different from the one that was happening before. Every time you call "Freeze!" a new student replaces another student and creates a new scene.

When warm-up exercises are done, rehearsing lines, movement and experiments can begin. The bottom line here is – practice and prepare as much as you can. Make sure that students try every experiment several times before the show. If you have the option to practice the entire show in front of no audience, it is good to do so, as it makes the performers more confident.

One of the biggest challenges for the students is to memorize their lines (if it is not a mime) and when to do what. To help students memorize lines, you can have them write down their lines and read them out to each other. It is also a good

idea to give all students the scripts and have them highlight the parts they struggle with. One thing that students can do individually to practise is to record themselves saying their lines and then listening to it several times (and trying to recite the lines along with the video).

PROMOTION

One thing that should not be forgotten while working on your science show is publicity. If you have put a lot of hard work into developing a wonderful show, it would be a pity if no one came to see it. So make sure to get your team together to make some posters or flyers to advertise your show. You can hang these posters on schools noticeboards or all over the city. Just remember to make sure that you have permission to put up your posters (in certain places you need permission to do so). Using social media to spread the word is also a good option.



The premiere of the show

Before the show, double-check everything:

- Lighting
- Stage
- Sound (when using sound effects)
- Equipment for all of the experiments
- Safety precautions
- Seating for the audience

The first show can be stressful for the performers, so make sure everyone gets enough practice. Also, be ready to improvise during the show, as things may go wrong: an experiment may not go as planned. An experiment gone wrong can for example be turned into a joke or re-done. So, make sure you think about all these things while rehearsing. Also, remind your students that it is okay if things do not always work as they should and as long as they stay calm and confident in what they do, the audience will be on their side.

Some tips for the actors before and during the show:

- Always prepare for your show. Confidence on stage comes from being prepared.
- Know every second and phase of the show. The more you prepare, the freer you are.
- Relax but don't lose your energy.
- Avoid being all over the place. Do not overdo it.
- Leave no room for improvisation inside the plot. Let the only improvisation be the reactions to the unknown. Although you can prepare a bit for them, too.
- Do warm-up exercises for your voice before the show.
- Be sure you can be heard and seen while performing.
- The audience follows your eyes. What you see, they see.
- Don't be ironic or sarcastic. It's easy to lose the audience's sympathy towards you and almost impossible to win it back.
- Enjoy what you do!