



# Tonie-Boxes:

An innovative way to inspire kids for science

iGEM Team TU Darmstadt 2021

## Introduction

Tonie-Boxes are the new generation of playback devices. They are small cube-shaped boxes that can be easily and independently handled by children. Therefore, it has great potential to be used for science communication with self-created audio plays. Children simply need to place a small figure on top of the box to start the audio plays. The figure, called "Tonie", contains the audio files to be played. The playing of the audio files works via a magnet in the box as well as in the figure. In addition to the figures with fixed content, there is also the option to purchase so-called "Creative-Tonies". These can be recorded with any content, including self-recorded audios.

We decided to use these "Creative-Tonies" to produce a radio play for children aged 3 to 6. In this way, we can introduce the children to science in a playful way and at the same time encourage their independence through the easy handling of the boxes. Here, we present a step-by-step guide on producing radio plays for Tonie-Boxes to make it easier for other iGEM teams using this new and innovative approach to communicate with kids about science.

## Step-by-Step guide

### 1. Brainstorming

If you have decided to produce a radio play for children, the most important step is thinking about the content of the stories.

- *Who are the protagonists of your story?*  
Our stories are about the protagonists of our project. The most important parts of our project are a *Bacillus subtilis* biofilm as well as phages. Therefore, we created our characters **Bacillus Becky** and **Phage Phips**.
- *What should the characters learn on their journey and what should the children learn while listening?*  
The stories should present scientific topics in a simple way. In addition, it was important to us integrating aspects of **friendship and diversity**. In this way, we indirectly convey positive social values to children as well.

In our first story, **Bacillus Becky in search for friends**, Becky is looking for a new home. On her journey, she meets many bacteria that are different from her. Each group of bacteria teaches Becky and the children something about them. Thereby, Becky and the children learn something about bacterial properties. In the end, she finds her new home in a *Bacillus* biofilm.

In our second story **Phage Phips on adventure**, Phips is on a journey through the human body, meeting many bacterial friends. Thereby, he explores different places in the body while learning a lot about them. Finally, there is a little conflict when Phips is encountering bad bacteria. Greatly, Phage Phips proves courage and saves his friends.

- *What stations do the protagonists pass through?*  
**Becky** gets to know many different bacteria such as *Streptococci* that like to form chains, *Pseudomonas* that are pathogens or a *Bacillus* biofilm she would like to stay in.  
**Phips** passes through various stations in the body such as the intestine, the heart or the lungs.

## 2. Writing the story

The greatest challenge in writing a children's story is conveying the scientific aspects in a simple way. Here are some advices that will help you with this.

- **Keep it short.** Children often have a short attention span. Our stories are 1500 to 2000 words long. This gives an audio play length of about 15 min.
- **Connect difficult technical terms with simple terms that children can remember.** One example is associating difficult bacteria-related terms with names, such as Bacillus Becky, Streptococcus Sebastian or Thermococcus Theo.
- **Connect difficult processes with things children already know.** For example, bacteria digest food in the intestine. In our story, the bacteria have a big party in the intestine with a huge buffet of popular child dishes. Metaphors can also lead to a better understanding of content (e.g., representation of lung as a balloon).
- **Remember that you are creating a radio play.** Integrate verbatim speech of the characters into the story. Also, consider in which parts you could insert sound effects.

## 3. Record the radio play

When your story is ready, you can finally record it. There are a few things to keep in mind when doing this.

- **Use different speakers for different characters.** Even if children cannot remember names, they associate the characters with different voices.
- **Use a microphone to record.** With a microphone, the sound quality is much better than with just a cell phone or similar.  
*Pro Tip: Put a sock over the micro. This minimizes the reverberation.*
- **Use the right program for recording.** We used the free program "**Audacity**" to record our stories.

## 4. Writing & recording a theme song

If you want to add a nice feature to your radio play, write a theme song. This can build an extra bond between the children and the story.

- **Again, keep it short and simple.** Our theme song is 15 seconds long and is about the two protagonists who take the children with them on their journey.
- **Try to write song lyrics with rhymes.** Children can remember songs better if they rhyme.

## 5. Cut and edit the radio play

Now comes the most tedious part: editing the files. Here, you will listen to the stories very often until you cannot hear them anymore. But hang in there and you'll end up with a wonderful radio play as a product!

- For editing the files, we used the program "**Audacity**" again, with which we also recorded the audio plays.
- If you want to add sound effects, make sure that you use **royalty free music**. We have used sound effects of the platform **Epidemic Sound**.

## 6. Get Tonie-Boxes

If you want to distribute your audio plays to different kindergartens as we did, now is the time to get Tonie-Boxes. Since the boxes are not the cheapest, you will definitely need sponsors.

## 7. Distribute Tonie-Boxes to kindergartens

Now that you have received the boxes, it is time to distribute them. You will make many children very happy with the boxes and your stories.

If you have difficulties finding kindergartens, ask kindergartens you know, e.g., from your childhood.

## 8. Prepare a reading session

Once you have distributed the boxes, it is a good time to present your stories in person. You can do this simply with a reading session in the kindergartens. This way you will not only get in touch with the children and see how the stories are received, but you will also give the children a special day with your visit. Keep this in mind when preparing for the reading session.

- **Choose the right story.**

If you have several stories to read aloud, you should choose only one. One story is enough to keep the kids entertained. After that, their attention span drops again. Thus, it is clever to choose the shortest one!

- **Different characters.**

To make it easier and more fun for the children to follow the story, the different characters should look different. Of course, you can use different people. In addition, you can also use accessories for the characters. For example, Phips wore a green bow around his neck during our reading session.

- **Prepare coloring pictures with your protagonists.**

Children love coloring pictures. Coloring pictures that match the story the children have just heard are not only a nice activity for them. At the same time, you give the children the opportunity to process the story better after listening.

Our coloring pictures show Becky along with a new friend and Phips on his rocket.

## 9. Have the reading session

- **Interact with the kids.**

It is best to include small breaks in the stories to make sure you do not lose the children's attention. In these breaks, you can talk with the kids about the stations the protagonists passed through. Examples are the different bacteria in Becky's story or the different organs in Phips' story.

- **Activities after the reading session.**

The perfect activity after the reading session is the coloring of the pictures you prepared. In addition, the Tonie-Boxes are perfect for playing "stop dance". This works especially well with the boxes, because the music stops as soon as you take the figure off the box.

*Providing balloons also gives you huge bonus points!*

- **Have fun** and make it an unforgettable day for them because kids are real gold pieces!