

First lesson with FizziQ Junior

FizziQ Junior has been developed by the start-up Trapeze.digital in partnership with the Fondation La main à la pâte. It has been designed for use on tablets by K4-K8 pupils and facilitates the implementation of experimental activities in science and mathematics, based on the Inquiry Based Science Education pedagogy. The app allows students to access the tablet's sensors to carry out experimental measurements and to document their work in an experiment notebook. It is free and without any requirement to register.

This document was originally created in French by la Fondation La main à la pâte as a user guide for FizziQ Junior. It has been translated and amended by Trapeze.digital. Thank you to Pauline Bacle for creating the original document and Ikya Kondapolu for subsequent amendments. The present document is published under the following Creative Commons license: Attribution + Non-commercial + Share Alike



Warning: as the application is under constant development, some features and/or the appearance of some pages may change. This guide corresponds to version 1.0.108.

Introduction

Themes Covered	Notebook of experiments, observations, measurements
Summary and Objectives	In this activity, the students will discover a digital tool (FizziQ Junior, a tablet application) that allows them to keep an experiment notebook. In this notebook, they will be able to document and organize their observations and measurements. They will be provided with step-by-step instructions to use the app by the teacher and the user guide. At the end of the session, the students would have created and personalized their first experiment book on FizziQ Junior, and would be familiar with the different measurement tools on the app.
Disciplines Involved	Science and Technology
Duration	1h

Getting Started with the Activity

This resource serves as an introduction to FizziQ Junior, a free application developed by Trapèze.digital in partnership with Fondation La main à la pâte, available on tablets. FizziQ Junior enables students to access their tablet's sensors to perform experimental measurements and document their work in an experiment notebook, organized into different stages through photos, text, and drawings. For more information, visit <https://www.fizziq.org/fizziqjuniormain>.

To facilitate the use of this new tool, we recommend that teachers plan a 45-minute to one-hour session dedicated to exploring the application and its features on a tablet, before any investigation activity involving the use of FizziQ Junior. This session, detailed in this resource, focuses on acquiring technical skills in handling the tablet and the application, rather than understanding scientific phenomena. This approach aims to leverage the excitement of using tablets as a medium to enhance student engagement.

To assist you in preparing your classroom sessions with this tool, we provide you with several resources:

- <https://tinyurl.com/guide-fizziq-jr>: a user guide, intended for teachers, to become familiar with the different features of the application.
- <https://tinyurl.com/diapos-fizziq-jr>: a slideshow that the teacher can use to guide students during the introduction session in class, and whose content is detailed in the rest of this document.

Activity: Creating and filling out an experiment notebook in FizziQ Junior

General objectives:

- To become proficient in using the main functionalities of FizziQ Junior to create and fill out an experiment notebook
- To understand the importance of being rigorous in documenting the investigation process in an experiment notebook.

Summary	
Disciplines	Science and Technology
Course and Modalities	The teacher introduces students to the FizziQ Junior application, which will enable them to maintain an experiment notebook during the session (Phase 1). The students personalize their notebooks with a title, date, and authors' names and discuss with the teacher the purpose of the book and its contents (Phase 2). Next, students learn about the different tools available for adding elements to the FizziQ Junior notebook (Phase 3). To further familiarize themselves with the measuring instruments available in the application, the teacher can challenge the students to add a measurement of the lowest possible sound volume to their notebooks (Phase 4). Finally, the teacher reviews the various functions discovered and emphasizes the importance of documenting observations accurately in the experiment notebook.
Duration	1 h
Material	<ul style="list-style-type: none">• A tablet with the FizziQ Junior application for each group of three to four students.• A video projector and computer to display the slideshow.
Comments	
<ul style="list-style-type: none">- Accurately document the various steps of reasoning and observations when conducting experiments.- In FizziQ Junior, students can create an experiment notebook and add pictures and measurements, along with comments, to provide an account of their approach.	

Before the Session

Material Preparation

- Each tablet is fully charged and has the FizziQ Junior application installed.
- The application has permission to access the camera. On Android devices, go to the "Applications" tab, select "FizziQ Junior," and check that the camera is listed under "Authorized." If not, select "Camera" from the "Not allowed" list and choose "Allow only if the app is in use."
- The tablet is set to sleep after a relatively long period (several minutes) to prevent it from sleeping too quickly when giving instructions. However, there is a trade-off between a longer sleep time (which extends battery life) and the fact that the "fading" screen may be distracting or frustrating for students. On Android devices, you can change this by going to "Settings" > "Screen" > "Screen Sleep."

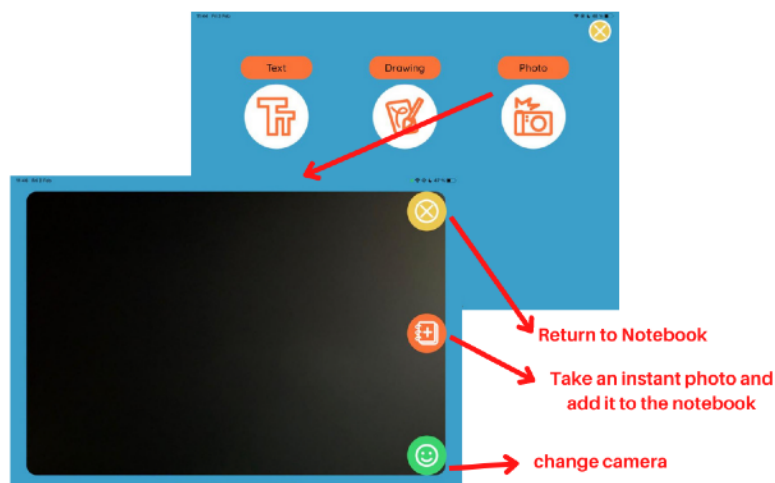
Using the Slideshow

To assist students with following the various steps, we recommend using a slideshow during the session. The teacher should explore the FizziQ Junior application beforehand by utilizing the guide available on the Foundation's website (<https://tinyurl.com/guide-fizziq-jr>). The teacher should then customize the proposed slide show to suit the available time and degree of detail they wish to cover with the students (see below).

The slide show is available in a folder accessible at the following address: <https://tinyurl.com/diapos-fizziq-jr>. This folder contains the following items:

- A PDF file named "Complete slide show (base)" provides the recommended progression and includes in a single slide show the essential features of FizziQ Junior. Additional PDF files are available for those who want to go further.
- The "Full slide show" folder contains all the slides that make up the above slide show as PNG images, numbered in the order of distribution.
- The "Different features" folder includes multiple subfolders, each corresponding to a specific feature and containing all the related slides in PNG format, numbered in the order of distribution.

The teacher can present the slideshow by either displaying the images of their choice sequentially (for an adaptable version) or by using the PDF file directly. Each slide of the slideshow contains multiple elements, such as a screenshot of the application, an instruction or explanation, and possibly, an action to be taken, symbolized by a right hand.



*Example slide: The student clicks to switch the camera from the rear-facing camera (displaying the classroom) to the front-facing camera which would allow them to take a selfie, for example.
Illustration created from an image by Brgfx for freepik.com.*

Lesson plan

Phase 1 : Presentation of the session and instructions (10 min)

The teacher begins the session by introducing FizziQ Junior to the students and explaining that they will be using this tool to conduct scientific experiments in class. The teacher should also explain that they will be using tablets to access the FizziQ Junior application and follow the instructions projected on the screen or displayed on the teacher's tablet.

Educational Note :

To facilitate the teacher's mobility in the classroom while managing the slideshow projection, they can project the screen of a tablet they keep with them via a computer using an application like Screen Mirroring App (free version with advertisement). This application uses WiFi connection to display the screen of the tablet on a web page, which can be projected on the screen.

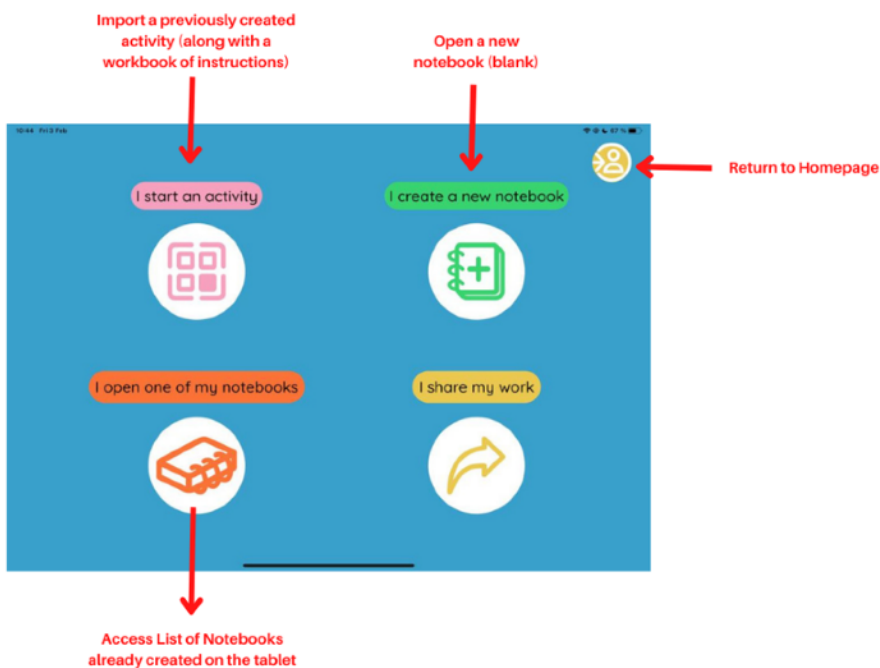
The teacher then divides the students into groups of three to four and distributes a tablet to each group.

Educational Note:

To ensure the smooth running of the session and avoid equipment damage, it may be useful to remind students of the rules they should follow when handling the tablets. These rules can be displayed on the board throughout the session. Examples of rules include: waiting for the teacher's approval to use the tablets, having only one person use the tablet at a time, placing the tablet flat on the table when not in use, following the instructions on the slideshow, calling the teacher if the screen does not match the slide show, etc.

It may also be helpful for each group to agree on a rotation system for handling the tablet, allowing each student to manipulate the application for at least one feature.

The teacher can then launch the slide show and display slides 1-5 to guide students in opening the FizziQ Junior application and accessing the main menu, followed by the "Student" menu.



Slides presenting the home page of the application (first image on the top), and then the "Student" menu (second image at the bottom)

Phase 2 : Discovery and Customization of the Notebook (15 min)

During this phase, students will first create a new blank notebook (slides 6 and 7) and then explore how it is organized (slides 8-14). They will then personalize it by adding a title, the authors' names, and the date (slides 15-22).

With each slide, the teacher will read aloud the instructions or explanations. Depending on the students' familiarity with digital tools like the tablet, some groups may be faster than others. It is important for the teacher to ensure that all groups have successfully completed each step before moving on to the next slide.

If a new type of action is used (such as click, double-click, drag, etc.), the teacher can describe the action to make it easier for students to learn. The different actions used in the slide show are listed below:

(a) Make a single click



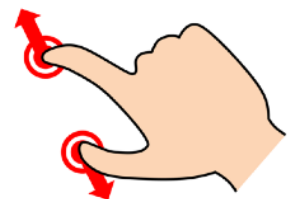
(b) Double Click



(c) Hold your finger on the screen and drag in the direction indicated by the arrow



(c) Keep your fingers pressed on the screen and move them away from each other



Legends of the different actions will appear on the slides.

Before proceeding with the personalization of the notebook, it is interesting to pause the slide show and stop on slide 12. The teacher can then invite the students to discuss the interest of the experiment notebook and its content. He can ask them questions such as "What do you think it can be used for?", "What does the FizziQ Junior experiment book already contain?", and "What do you think will be added to this book to enrich it?"

Suggested student responses may include:

- "The notebook is for writing down what you think."
- "It is used to make drawings to show."
- "We can write down things that are wrong and then we can correct them when we've looked. On the notebook, we write hypotheses, we work in groups, we search in the documents and then, we write on the notebook."
- "It's the opposite of the devaluation notebook. In the evaluation notebook, you write what you've learned; in the researcher's notebook, you mark what you haven't learned yet."
- "You put what you think and then you see with the others if it is true or not."
- "The notebook is used to make discoveries, to look for hypotheses and to answer them."
- "It's like a memory aid."
- "We can re-read our findings."
- "It helps to answer questions."
- "It helps me ask questions."
- "It helps me make assumptions."

- ...

The teacher will then make sure to tell the students that the notebook is organized into five steps that will guide them in how to keep it and complete it. These sections are similar to how a scientist would approach a problem. Depending on the students' familiarity with this investigative process, the teacher may decide to further explain this process, what each section is, and what each will contain.

Pedagogical Note:

Depending on the students' familiarity with this investigative process, the teacher may decide to explain this process further, what each section corresponds to, and what each will contain.

- **QUESTION:** we ask a big question that we will try to answer.
- **HYPOTHESES:** we make and write down hypotheses, which are ideas we have to answer the question, but we are not sure if they are true or false.
- **EXPERIMENTS:** an experiment is proposed to try to confirm or refute the hypotheses. You document your approach with explanations, drawings, diagrams, or photos.
- **RESULTS:** a record is kept of the measurements and results obtained.
- **CONCLUSIONS:** the results are analyzed, and conclusions are drawn in writing, in relation to the initial question.

During this exchange phase, the teacher will need to make sure that students have put the tablet aside so they are not distracted.

The teacher then invites them to personalize the notebook by adding three pieces of information that will make it easy to find later, among the list of all the notebooks registered:

- The title: it summarizes the objective of the session, and should be short and concise. For a given session, we advise you to propose a common title to the whole class, but it will be interesting to propose to the students to decide on the title together, as a whole class, at the beginning of the session.
- The first names of the authors of the workbook, which will also be indicated next to the title, in the list of saved workbooks.
- Today's date.

Pedagogical Note :

It is important to follow these customization steps early enough in the session: the students' notebooks will thus be saved in the tablets and easy to find, in case the application is unexpectedly closed.

Phase 3 : Filling in the notebook with observations and measurements (20 min)

Next, the teacher encourages the students to continue learning about the application by adding various elements to their notebooks (slides 23 to 51). The students are introduced to the FizziQ Junior toolbox, which allows them to insert text, drawings, photos, or measurements (slide 25).

The students learn about these tools through small, concrete tasks, such as adding a comment, drawing a star, or taking a photo. These tasks also allow them to learn about different features that help organize the notebook, including:

- Editing a photo to add a caption
- Deleting unnecessary elements
- Moving elements

Pedagogical Note :

The step of adding a caption to a photo (slides 39 to 46) provides an opportunity to ask students about the criteria for an accurate and thorough notebook, such as "Why is it important to caption a photo?", "What does it mean to have a well-kept notebook?", and "How do you make a well-kept notebook?"

The teacher can emphasize the need to comment on each measurement to keep track of what was done and the details of the experiments, so that students can refer back to their notebooks later and remember what they did.

This phase ends with the presentation of all the measuring instruments that can be used directly with the application (slides 52 to 54). It is not necessary to go into detail about all these instruments or their usefulness in this introductory session. However, the teacher can also suggest a very short practice session with one of these tools, in order to avoid frustrating the students.

Phase 4: Quick challenge to discover a measuring instrument (10 min, optional)

Slides 55 to 57 offer a brief introduction to the "Sound volume" instrument in the form of a challenge to the students: try to obtain the smallest possible value!

Without going into detail about the measurement or underlying scientific concepts, the teacher explains that this instrument measures ambient noise: students will quickly realize that the more noise they make, the higher the value increases.

Scientific note:

The FizziQ Junior application uses the sensors present in the tablet to obtain measurements of physical quantities. Here, the application uses the microphone to "hear" the sound and deduce its characteristics, in particular its intensity level.

Sound intensity provides an indication of the level at which a sound is perceived by the human ear: the higher the sound intensity, the louder the sound is perceived. This level is expressed in decibels (dB).

For more information on this tool, you can consult the "What is noise?" project or the scientific insight of the "Phonograph" sequence (from the "Edison's 1,000 Turns"

In addition to allowing students to become familiar with a measuring instrument and understand that they can keep a record of their measurements in their notebook (slide 56), this little challenge can also help to bring calm to the classroom!

Variation: The example of measurement here is sound volume, but it can be adjusted according to the sessions the teacher plans to have later. The teacher can insert here, instead of this challenge, the handling of a specific measuring instrument that corresponds to the one he or she plans to use later with the class.

Conclusion (5 min)

Finally, the teacher shows the students how to close the notebook, which will be saved on the tablet (slides 58 to 60): this notebook can then be reopened and modified (slides 61 to 63). Depending on the available time, he or she may also suggest that they add a photo of their group in the header to further personalize their notebook (additional slideshow).

Once this introduction is complete, the teacher invites the students to put the tablet aside. He or she then goes over the elements they have discovered, particularly how to hold the FizziQ Junior experiment notebook and what they can add to it. The teacher can draw parallels with the work of a researcher and his or her laboratory notebook: every day, the researcher records the experiments he or she conducts and the results obtained in a precise manner, noting as much information as possible, in order to be able to reproduce these experiments and interpret the results later.

The teacher can then ask the students to list the criteria for having a properly filled experiment notebook. It will then be interesting to keep a list of the few rules for keeping a good experiment notebook that have been highlighted in this session as a poster in the classroom.

Further Steps

- To allow for a gradual introduction to all the features of the application, it is possible to plan, following this introductory session of the application, a first use of FizziQ Junior without using measuring instruments, that is, using the application only as an experiment notebook to allow students to document an investigative activity. This will allow them to both reinvest the skills acquired during the FizziQ Junior introduction session, but also to practice keeping a clean notebook, respecting the rules mentioned in the conclusion.
- The Foundation's website provides several ready-to-use activities on various topics that use FizziQ Junior by taking advantage of the available measuring instruments: <https://tinyurl.com/activites-fizziq-jr>. During these sessions, whose objectives are to understand various scientific phenomena and acquire scientific knowledge, it is also recommended to allocate some time at the beginning of each session for the students to re-appropriate the tool and its features. On a similar format to the introductory session, but on a shorter time frame (generally 15 to 30 minutes, depending on the activity and the class level), a short slideshow can, for example, remind students of the main principles of the application and/or introduce a new measuring instrument available in the application. Slides for each measuring instrument present in the application are provided in the "Different Features" > "Take a Measurement" folder.

Pedagogical note : Do not hesitate to adapt the slideshow !

It will be relevant for the teacher to prepare a specific and adapted slideshow for the session, which they will compose using the available slides in the form of PNG images in the directory: <https://tinyurl.com/diapos-fizziq-jr>.

They can notably include the sequence of images corresponding to the handling of the measurement instrument that will be used during the session, as well as the succession of slides presenting to the students how to open an activity ("Different features" > "Open an activity"), if one has been prepared for the session

Credits

Illustrations for this resource and the slideshow created by Pauline Bacle for the "La Main à la Pâte" Foundation, using images from Reshot (rights-free), an image created by Brgfx for freepik.com (https://www.freepik.com/free-vector/interior-classroom_4452325.htm), and screenshots from the FizziQ Junior app (Trapèze.digital).

Design and Writing

Pauline BACLE for the Fondation *La main à la pâte*

Contributors

Aline CHAILLOU, Christophe CHAZOT, Alexandra FERNANDES and Michelina NASCIMBENI

With the participation of :

Virginie CALMETTES, Louise HOLZEM and their classes of CE1/CM2 et CM2 of l'école élémentaire publique Malet-Isaac (Guyancourt, 78)

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