GUIDEBOOK

FOR DESIGNING A TACTILE FAIRY TALESTORY

Stories4ALL

Project N: 2021-1-EL01-KA210-SCH-000031465

Index

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Stories4ALL in a nutshell

Stories4ALL aims to support the educational community (students, teachers, and families) to explore alternative learning pathways that focus on the development and flourishing of creativity and digital skills, as well as the social inclusion of students with visual impairments (VI).

The consortium consists of 3 organisations:

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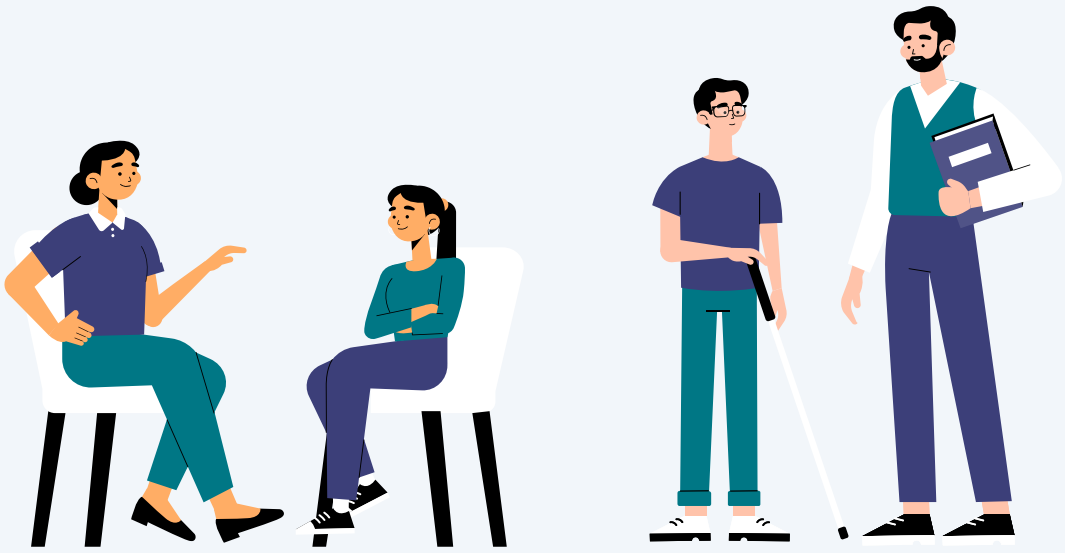
Target groups

- Trainers/teachers of participating partners
- Trainers/teachers of people with visual impairment
- Families of people with visual impairment



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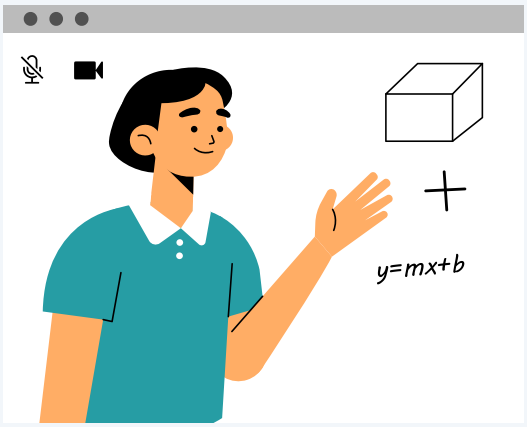
Necessary skills/knowledge for using this guidebook

- Basic knowledge of ICT skills
- Basic skills regarding 3D printing (optional)



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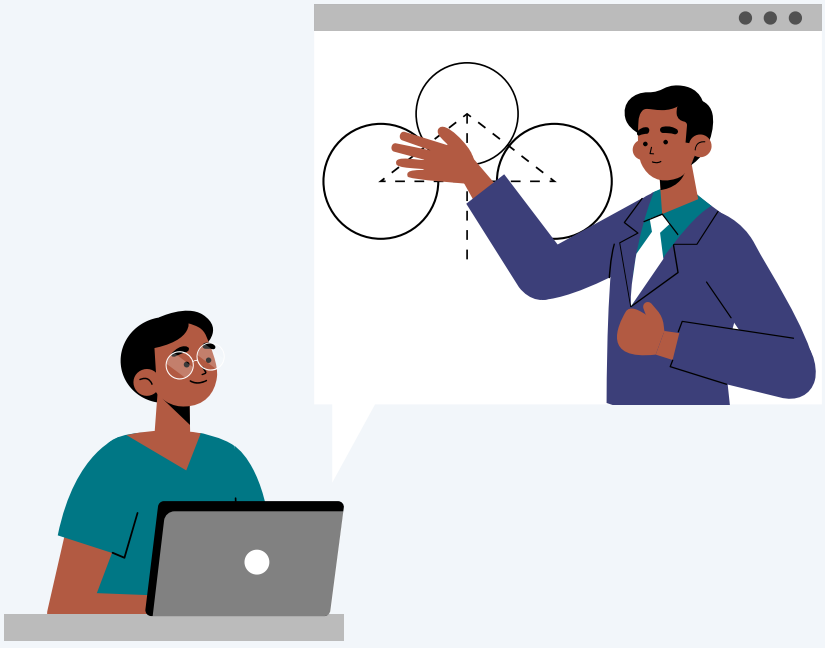
Necessary tools/software for using this guidebook

- PC
- Internet connection
- 3D printer (optional, as we can ask from a 3D printing expert to make the printing for us)



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Introduction (I)

Fairy tales and stories are important educational tools, as they contribute significantly to the emotional, cognitive and psychosocial development of the child. They entertain the child in a pleasant and attractive way and at the same time serve as an educational tool. Children identify with the heroes and at the same time discover the world. Fairy tales and stories stimulate children's imagination, nurture their spirit, and help them cope with difficult situations, feelings, and fears in a natural and effortless way.

Children with visual impairments benefit in many ways from their exposure to the magical world of fairy tales. Studies have shown that reading stories aloud to children from disadvantaged groups and/or with disabilities enhances their cognitive development and social awareness (Schneider & Goldstein, 2010). The lack of appropriate educational materials for visually impaired children acts as a deterrent to inclusion and leads to exclusion and discrimination. For children with visual impairments, exposure to fairy tales, stories, and educational materials is provided through three-dimensional tactile information so that the child can feel the shapes of objects.

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Introduction (II)

Therefore, systematic practice of the sense of touch is necessary and essential for children with visual impairment to cultivate their tactile perception as much as possible (Liodakis, 2000). Thus, it seems that the use of the sense of touch is of particular importance to compensate for the lack of vision in the best possible way.

Perceptions are tactile interactions with elements, and the information received is translated in the occipital lobe of the brain (tactile and visual areas) into visual images, which are activated when the subject tries to recognize a shape tactilely, for example. Images are generated by touch without the presence of vision (Reiner, 2008). Consequently, the use of touch functions as much as possible as a compensatory sense for the lack of vision and the way tactile information is encoded in children with visual impairments.

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Total Blindness

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- Choose an appropriate picture.

- The picture should have as simple and clear outlines as possible.

- The color of the background should be light.

- The outlines should be in dark colors.
This is preferable because in the final conversion the white - light colors do not gain height - volume, while the black - dark colors gain volume and a third dimension in height.

- The basic elements/heroes of the fairy tale should be shown enlarged on the first pages (always with embossing) so that the child can become familiar with the representation of each element and then understand the flow of the fairy tale.

- Each page turn should be accompanied by an audible signal in the narration.
- Numbering is placed on each page in both blind and spectator writing.

- The height of the embossed shape should be 2 to 2.5 m.

- Shapes should be simplified (clear outlines, no details on fills.

- Similar shapes should be similar in size.

- Different objects must have different sizes (e.g. eggs and sun cannot have the same size or almost identical shapes, as they cannot be easily distinguished).

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Low Vision

- The image should have good resolution (it is recommended that each side has more than 1000 pixels.

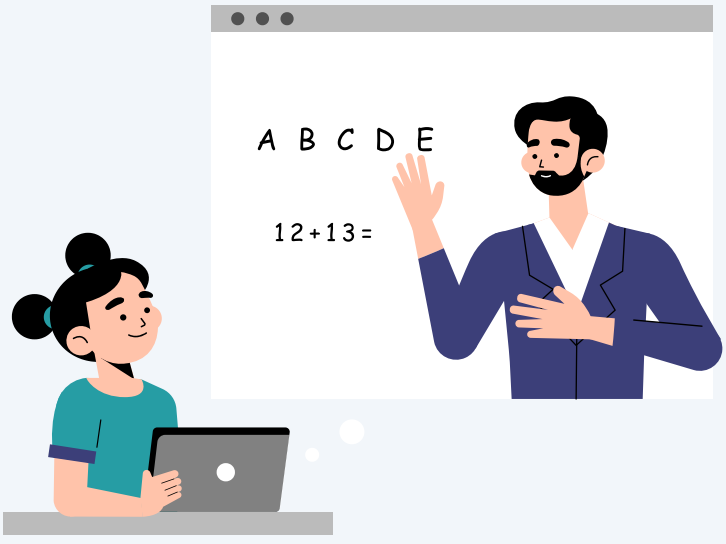
- The image should have clear and few shades of colors (images with too many different colors and abstract content cannot be easily understood as tactile images by visually impaired people).

- The numbering will also be in viewer font on each page.

- Shapes should be simplified (clear outlines, no details on fills).

- Similar shapes should be similar in size.

- Different objects must have different sizes (e.g. eggs and sun cannot be the same size or almost identical shapes as they are not easily distinguishable).



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STORYTELLING

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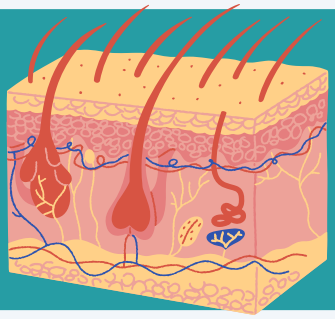
What is a Storytelling?

What is a Digital Storytelling?

The importance of Storytelling



Using a Multi-Sensory Approach

Digital Storymaking with Storybird

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What is a Storytelling?

Storytelling is the interactive art of using words and actions to reveal the elements and images of a story while encouraging the listener's imagination.

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What is a Digital Storytelling?

Digital Scrollytelling is a powerful technique for telling immersive stories on the web—using a combination of interactive content elements that elevate story arcs, improve readability, and sustain reader interest.

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The Importance of Storytelling

Story telling helps to develop the following skills:

- Language and oral comprehension
- Sequencing and memory
- Listening skills
- Focus and attention
- Creativity, imagination, and visualization

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How can we turn the visual into a non-visual experience?

Using a Multi-Sensory Approach

- Hearing: Music, sound effects
- Olfactory: Adding scents
- Seeing: Playing with lights and shadows
- Enhancing the story through tactile experiences
  - Animation
  - Temperature
  - Actions
  - Wind

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Tips & Procedures for Using this Approach (I)

Preparation

- Choose books that provide a multisensory experience
- Practice telling the story in advance
- Use a lively and appropriate narrative voice
- Try to use different voices for different characters (e.g., slow, low voice for the turtle, high, fast voice for the rabbit)
- Practice the tempo
- Plan strategic moments to pause and let the effects sink in
- Don't think you have to read the text verbatim and take the freedom of poetry

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Tips & Procedures for Using this Approach (II)

Before Telling the Story

- Take time to explore the topics ahead of time
- Pre-teach vocabulary using multiple items that represent the same thing, including realia, when possible
- Ask students to predict what will happen in the story
- Give students time to ask as many questions as possible about the items and their prediction
- Encourage students to refer to the objects they are telling about

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Tips & Procedures for Using this Approach (III)

During Storytelling

- Involve others, such as aides, to "work" the special effects (e.g., sounds, lights, smells); small groups are great!
- As you tell the story, be sure to include pauses
- Do not ask questions during the story and encourage students to listen to the whole story

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Tips & Procedures for Using this Approach (IV)

After telling the story

- Allow students to ask as many questions as necessary
- Allow students to act out parts of the story and animate the objects
- Allow time for students to "play" with the objects outside of the narrative
- Retell the story several times

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Tips & Procedures for Using this Approach (V)

Transfer the role of storyteller to the students

- Allow students to be a character in the story and animate it
- Work in small groups and have each child animate a character
- Allow students to act out the smell or sound machines
- Finally, have students retell the story

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Tips & Procedures for Using this Approach (VI)

Deepening Comprehension

Reaching higher order thinking skills

- Compare and contrast
    - Tell me about a similar character like _____.
    - Tell me about a similar experience as _____.
    - How are _____ and _____ the same?
    - How are _____ and _____ different?
    - How are you different than _____?

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Tips & Procedures for Using this Approach (VII)

- Make personal connections
  - Did you ever feel the same as _____?
  - Did you ever _____, like _____?
  - Have you ever _____?
  - How are you like _____?
- Identify the main idea
  - What do you think the main idea is about?
  - What do you think the author's message is?
- Practice making inferences
  - Why do you think _____ happened?
  - What do you think caused _____?

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Digital Storymaking with Storybird

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About Storybird

The Storybird is an online collaborative storytelling platform that provides a visual representation for a community of storytellers who want to turn their creative writing into engaging, beautiful, inspiring and creative stories in moments. Anyone can create these spectacular, artistically inspiring stories through illustrations by artists. Then you can publish them and share your stories on social networks.

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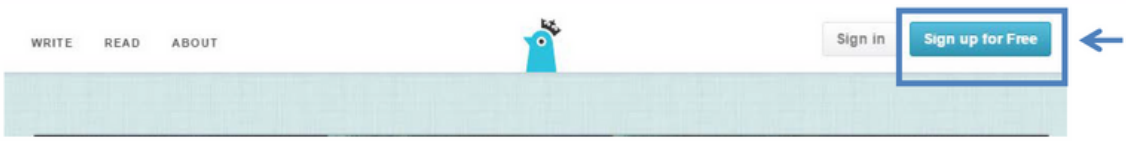
Storybird
in a nutshell

1. Visit the Storybird website. Log in if you already have an account, or click the “Sign up for Free” link to begin. For best results, use the most current version of your web browser.



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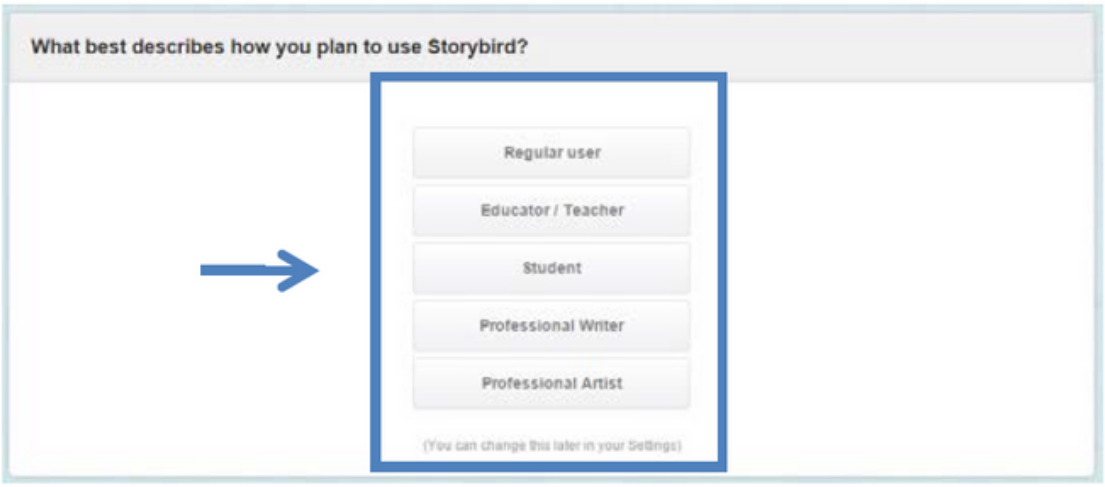
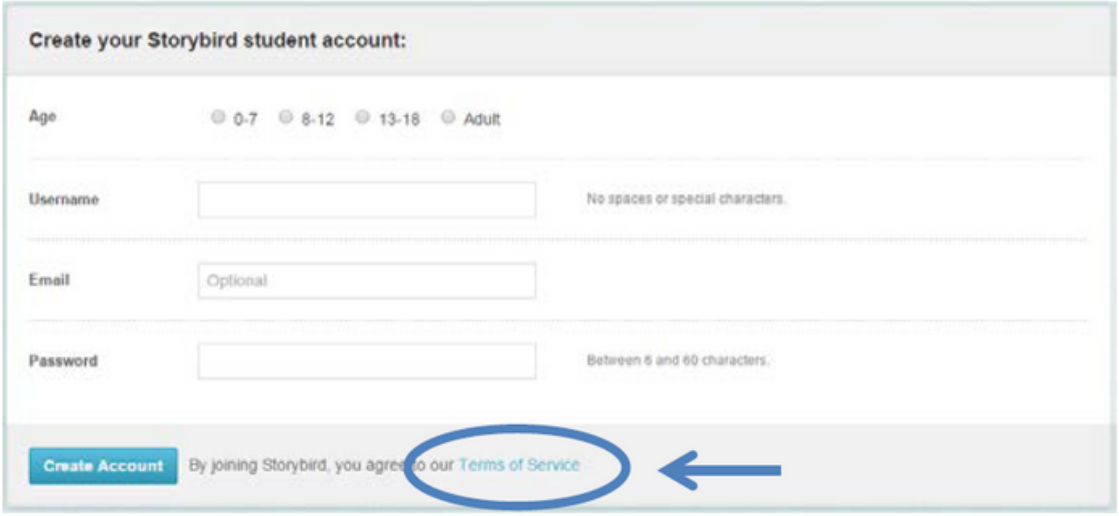
2. If registering, click the option that best matches your use of the site. You can always change this option later if necessary.



3. Enter your information to register for an account. Be sure to read the Terms of Service before clicking "Create Account."



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4. Once you have registered for an account, you will be prompted to upload an avatar picture. You may do so if you wish, or you may skip this step.

5. A confirmation email will be sent to the email address you provided. Go to your email and click on the link in the email to complete your registration

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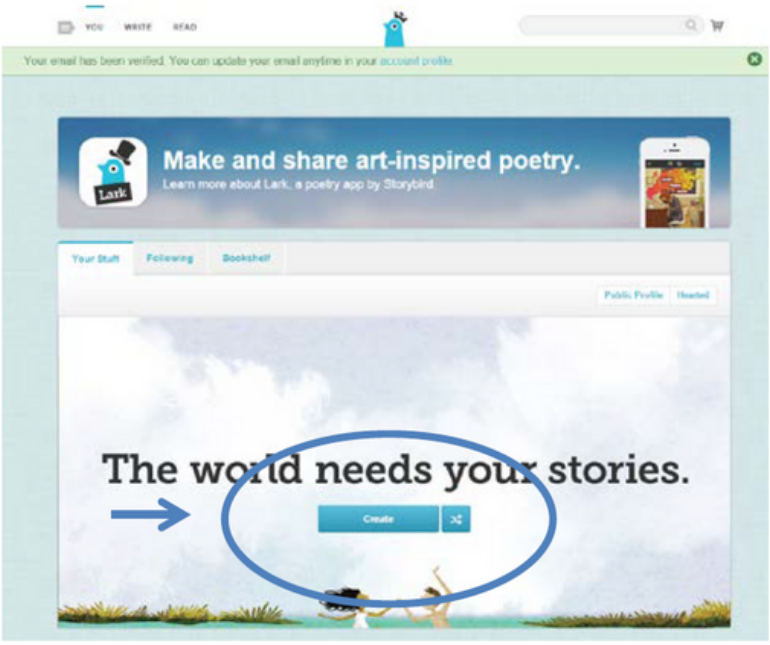
6. After confirming your registration, you are ready to begin creating your storybook. Click the “Create” button to get started..



7. You will be taken to a screen with potential artwork for your storybook. You may choose from the pictures shown or search art by tags.

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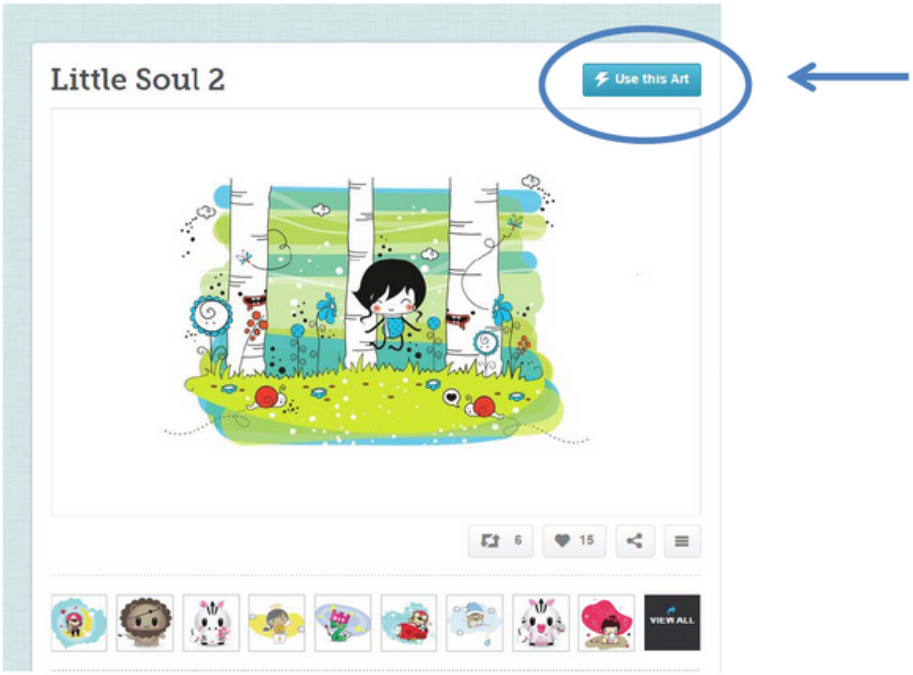
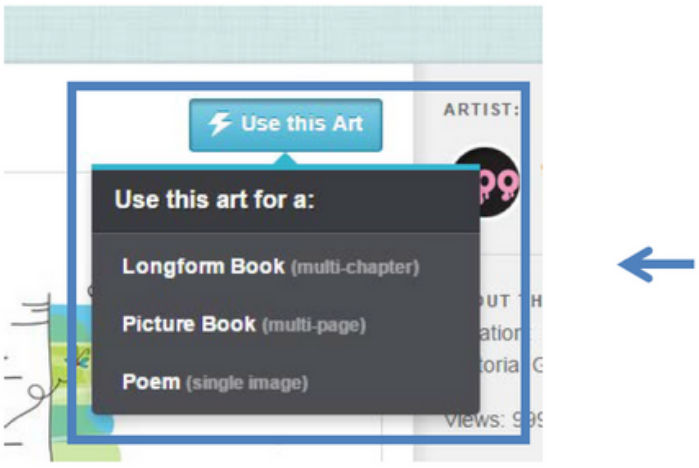
8. Once you have chosen your art work, you are ready to use it to create your storybook.



9. Once you click the “Use this Art” button, you will be prompted to select a final product for your project. Choose the option that best matches the assignment instructions.



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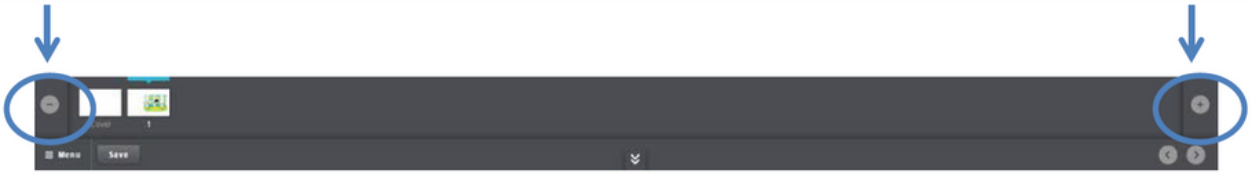
10. You will then be taken to the page in your project and shown the areas where you can drag your art or enter your text.

11. You can add pages by clicking the plus (+) button in the lower rght hand corner or remove pages by clicking the minus (-) button in the lower left.



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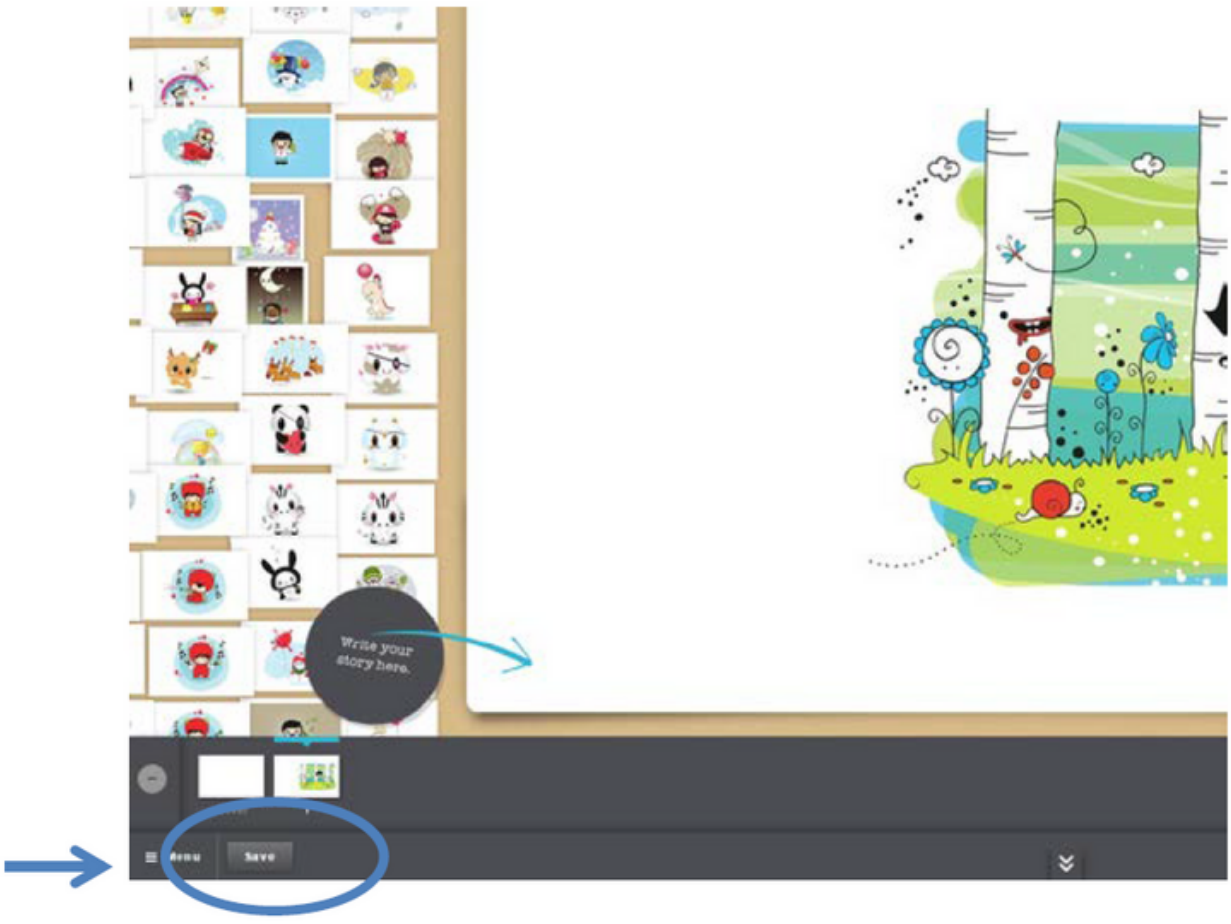
12. Continue building your project until it is complete, being certain to reference the assignment requirements. Be sure to save your changes as you go.



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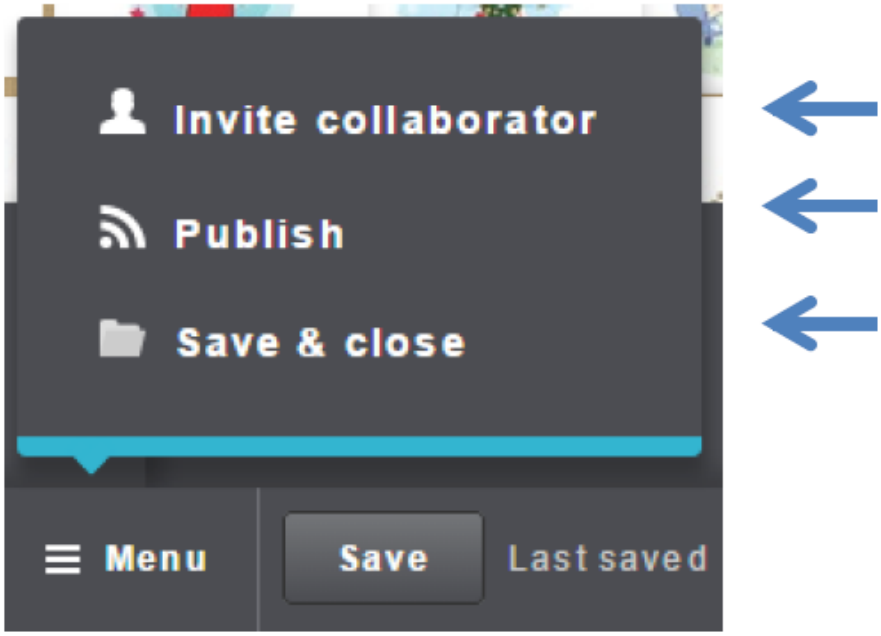
13. When you have completed your work for the day, choose the “Save & Close” option from the Menu. When you have completed all your work on your storybook and are ready to share it, choose the “Publish” option from the Menu. If your assignment requires you to work with another student, you can invite that person to collaborate on your project by clicking the “Invite collaborator” option from the menu.



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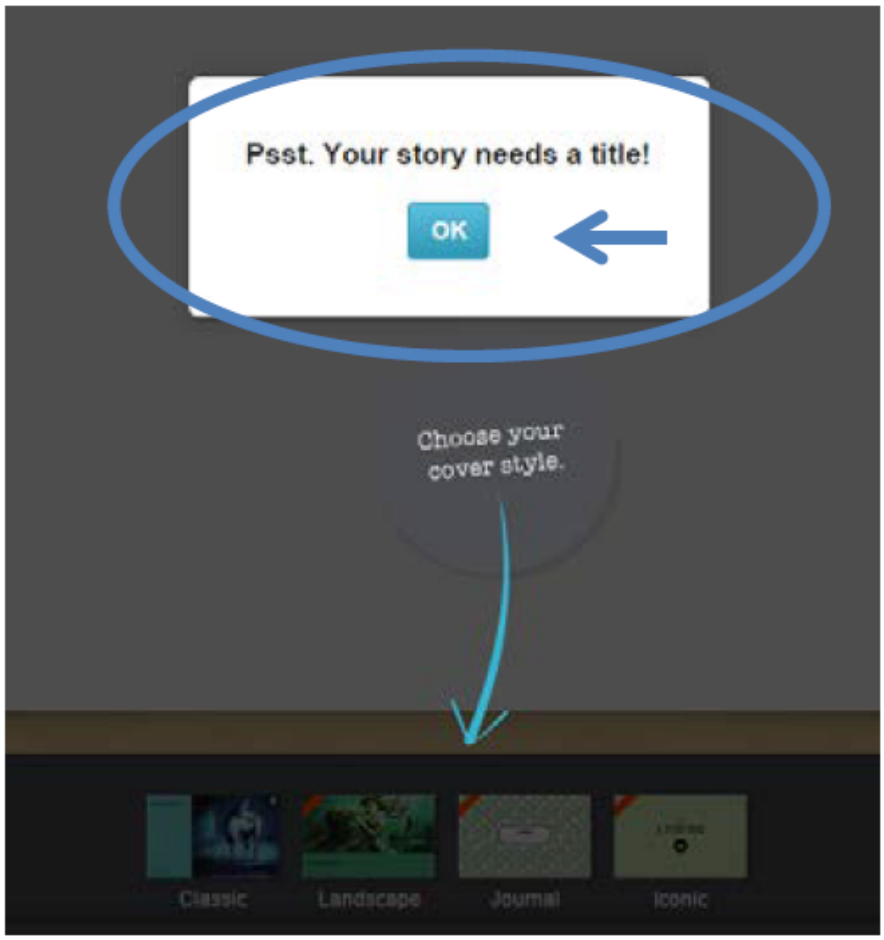
14. When you click the “Publish” option, you will be prompted to give your story a title and select cover art if you have not already done so. Click “OK” to do this and follow the steps to complete your project.



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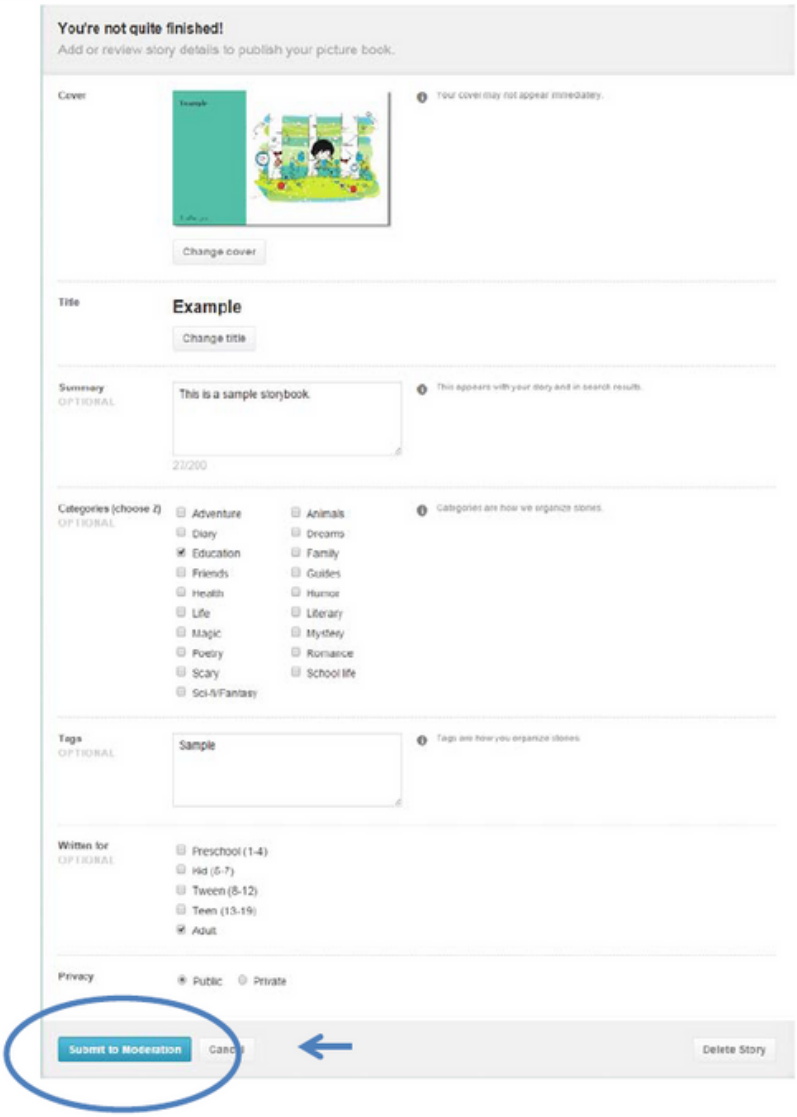
15. Before your work can be published, you will be prompted to add or review details. (Note that only complete stories can be published to the public library.) Once you have completed the sections on this page, you will be able to click the “Submit to Moderation” button.



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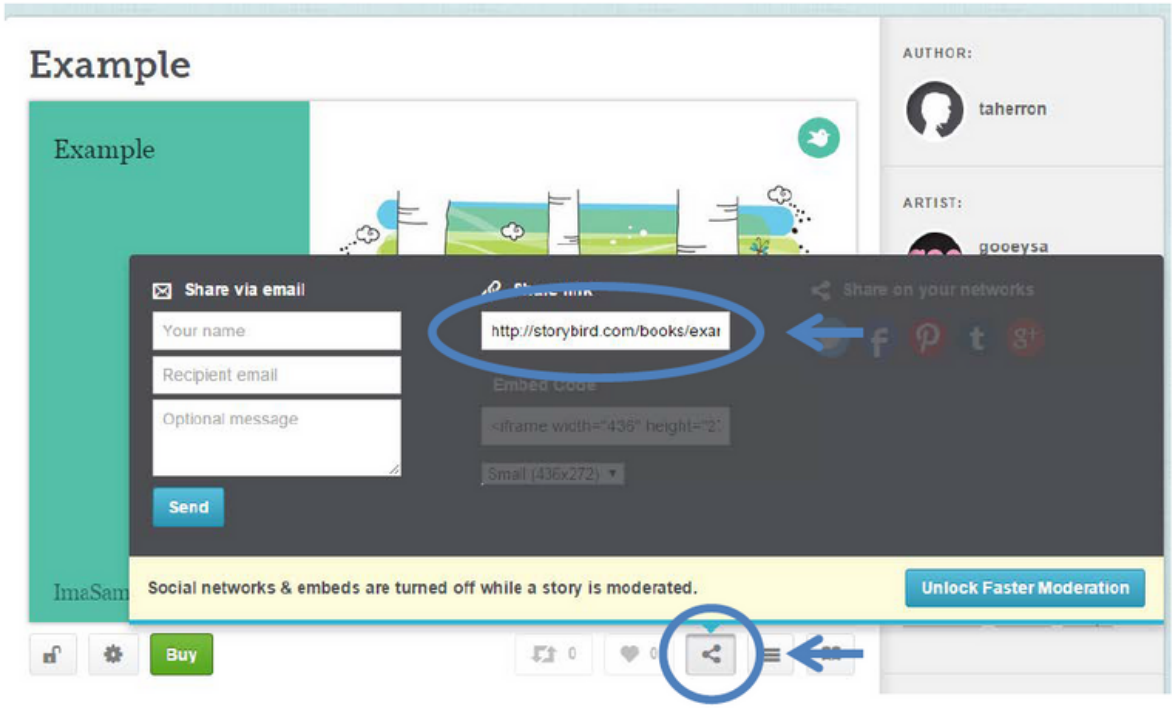
16. Your book will be submitted to the system to be reviewed before being uploaded as publicly available. You will be able to click on the share option and copy the URL to share your finished project.



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Helpful hints

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• Be sure to create your project to conform to the parameters laid out in the assignment.
• Be sure to share your project according to the parameters laid out in the assignment.
• You may edit your project until you feel comfortable with what you have completed for submission.
• You may delete your project at any time; however, once it has been deleted, the URL will no longer work. Wait until you have received the grade for your submission before deleting your project.
• If you run into any issues using Storybird, visit the Help page for assistance.
• Privacy issues for Storybird can be found on the What are public and private settings? page. (Note: All student account stories are automatically private. If you wish to publish public stories, you must create a regular account.)
• There is a collection of tutorial videos for Storybird located on the TechYouOut website.

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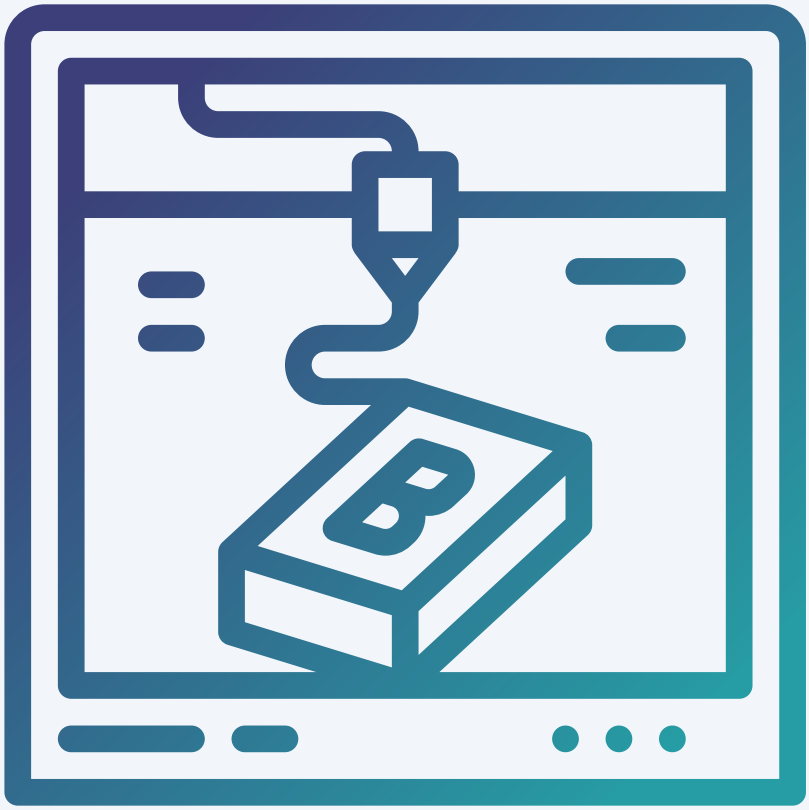
From Digital to Tactile



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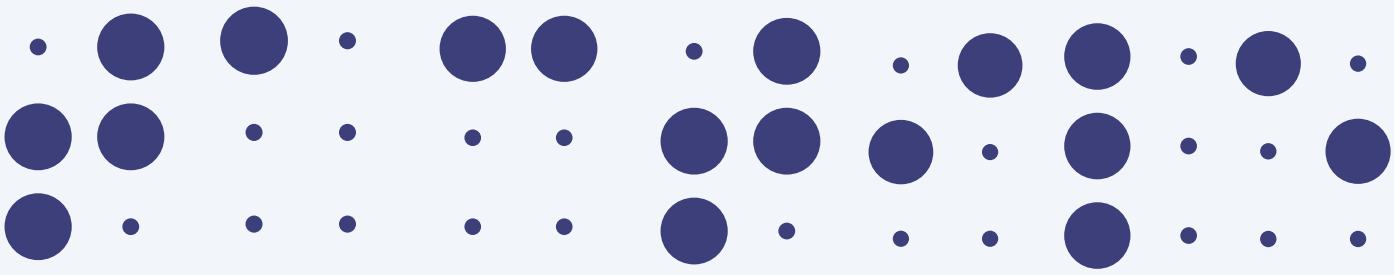
Stories4ALL

Converting digital images into tactile images

The image should be in good resolution (it is recommended that each side exceed 1000 pixels), have clear and few color shades (images with too many different colors and abstract content will not be understood as tactile images by people with visual impairment) and as simple outlines as possible.

Also the background should be light colored and the outlines in dark colors. This is preferred because during the final conversion, the white-light colors will not gain height-volume, while the black-dark colors will gain volume and a third dimension in height.



TACTILE

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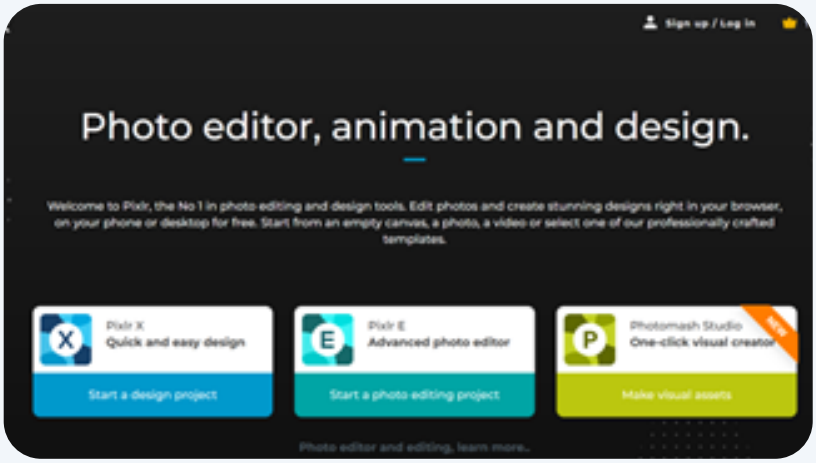
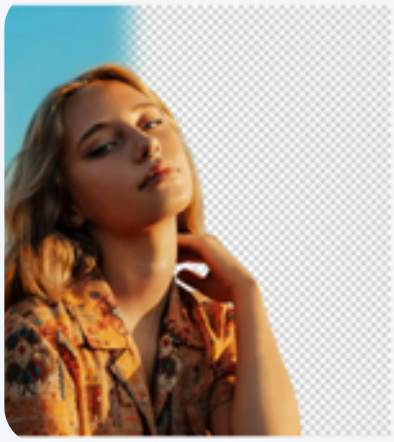
BASIC LEVEL

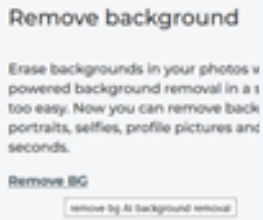
Stories4ALL

Picture editing with the online tool Pixlr

1. Enter to the website https://pixlr.com and select the option “Remove Background” https://pixlr.com/remove-background/ for quick removal of the background from your picture.







Select "Open Image" and select from your computer the image you want to edit. The program offers you the image and the central theme free from the background information. If for some reason an error occurs try again and almost certainly the second attempt will be successful.

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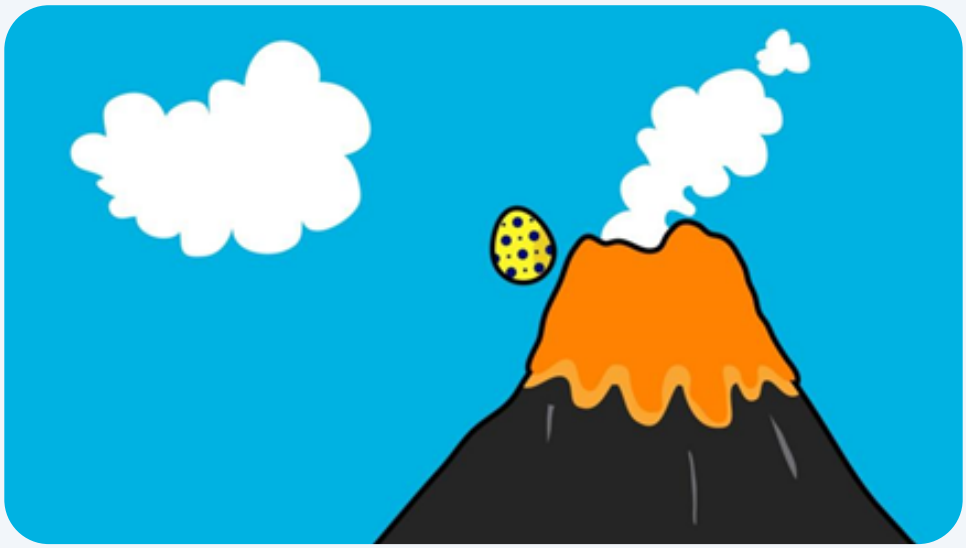
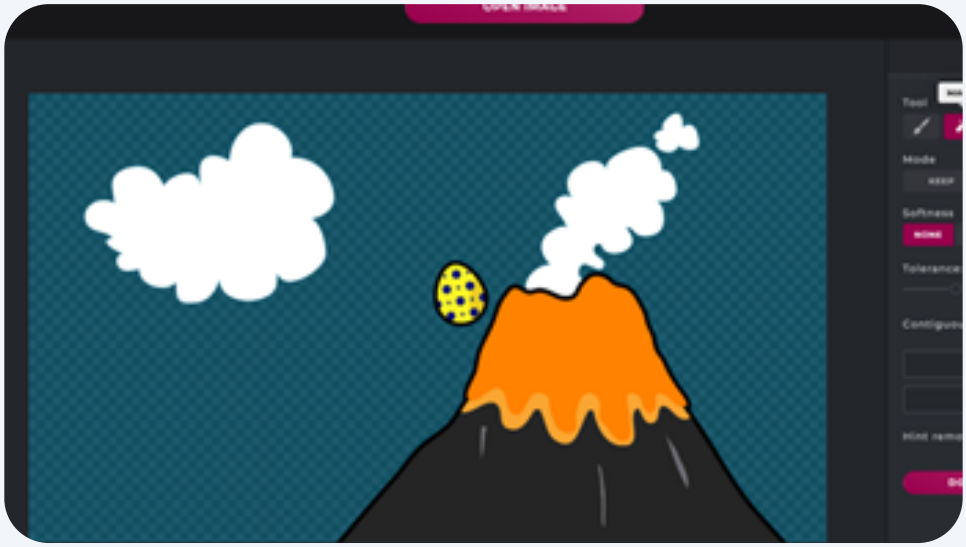
Stories4ALL





If you still can't remove elements from the background you can select "FINE TUNE". Using especially the tool Draw you can remove any elements that you don't need. You can always use the scroll middle button of your mouse in order to zoom in or zoom out.

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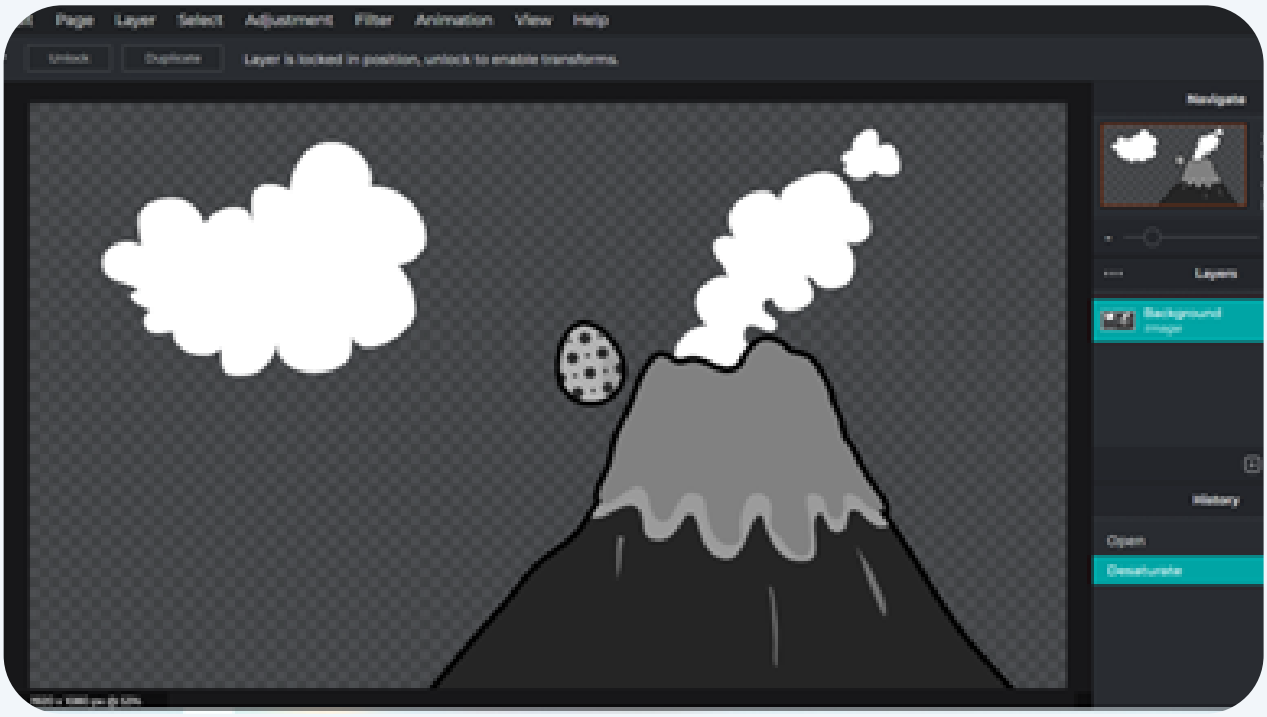
2. Once you have finished removing the background, DOWNLOAD and open the new image you created with PIXLR - E. Upon download, the original name of your image will change to "pixlr-bg-result" ending in .png.

3. Go to the menu "Adjustment" and select "Desaturate". You turn the picture in black and white.



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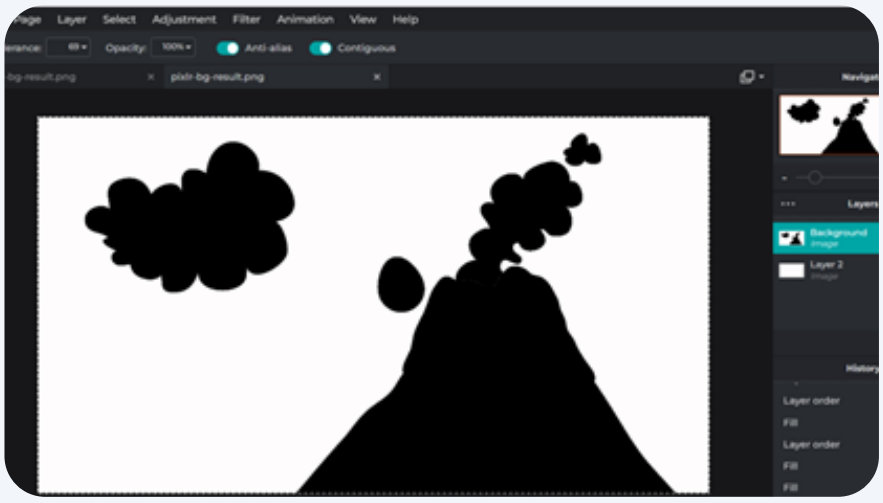
4. Once you have removed the entire background from the image you will need to add color to the background for a more successful print. It will be needed:

- Using the “Fill” button fill the elements of the picture with black color.
- Add a new ”Layer” to your project (Layer menu New Layer command).
- Use the "Marquee Select" tool to select the whole new Layer and use the "Fill" tool to color white.
- On the right, place the new layer below the level of your photo so that it appears behind the drawing.
- Notice that where you previously deleted some details from the background, imperfections appear. Use the eraser tool and delete them. Make sure the Layer of your image is selected on the right and not the white background you just created.



- At the menu Layers, select “Merge Visible”, in order to have a unique picture.

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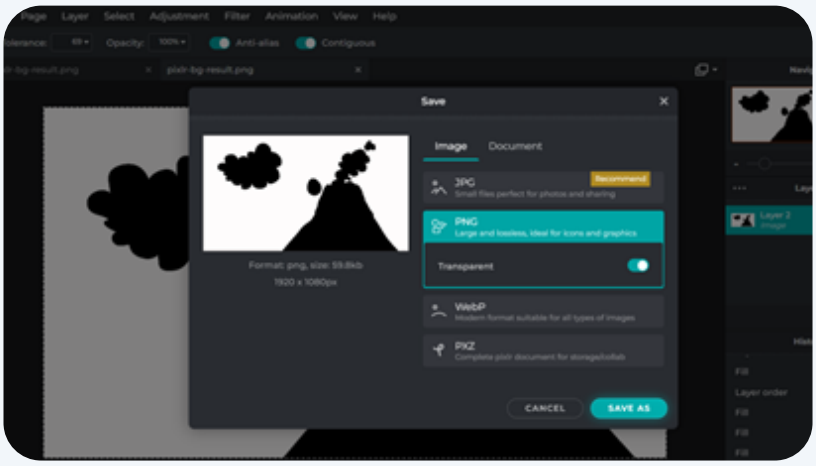
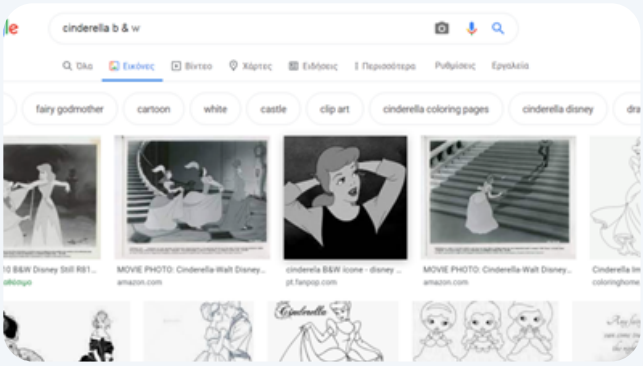
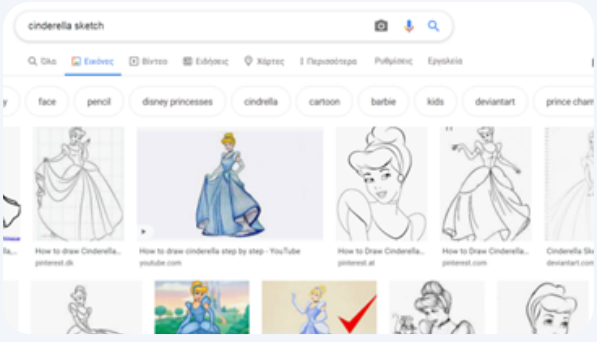
Stories4ALL

5. Save the final picture in PNG or JPG format, from the Menu “File”.



Note: If the images you choose to convert come from an Internet search and not from your own material, it is helpful to add keywords to your search that will make it easier for you to further process the image. Thus, you can search the file in black and white using the word B&W or as a ready-made design with only the basic details (which is the purpose of editing) using the word sketch.





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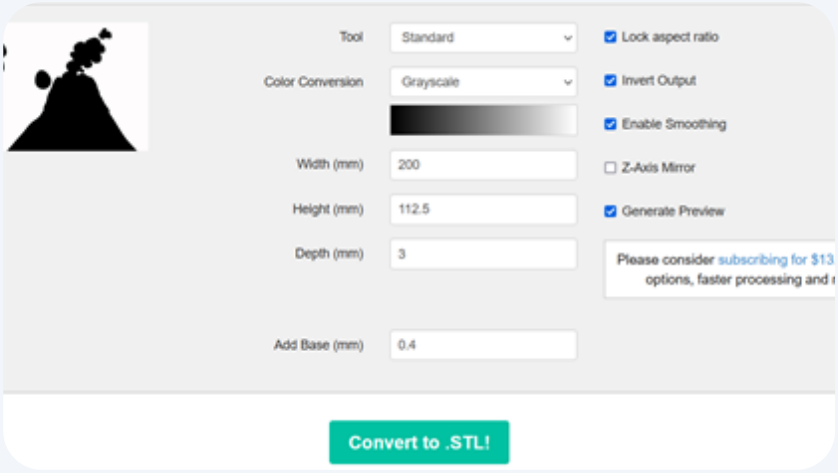
Converting the image into STL file

Using the web-based tool https://imagetostl.com/ Use the free web-based application https://imagetostl.com/ (without the requirement to install any software or application in your pc). This tool is really easy and it is suggested for basic users concerning IT skills. Moreover, is suitable for users that don't want to 3D print the final object by themselves, but they will send the file to a 3D printing expert. Use this free online tool in order to convert images (png, jpg) into 3D files (stl) suitable for 3D printing.

I. Press "Upload a File" and select your picture



II. In the settings we select "Depth" for the height of the figures, "Add Base" for the height of the base(add base - recommended 0.4-0.8 mm) and Width & Depth dimensions. If we have selected the "Lock Aspect Ratio" option, then any dimension change in one direction changes the other dimension (width or depth) accordingly.

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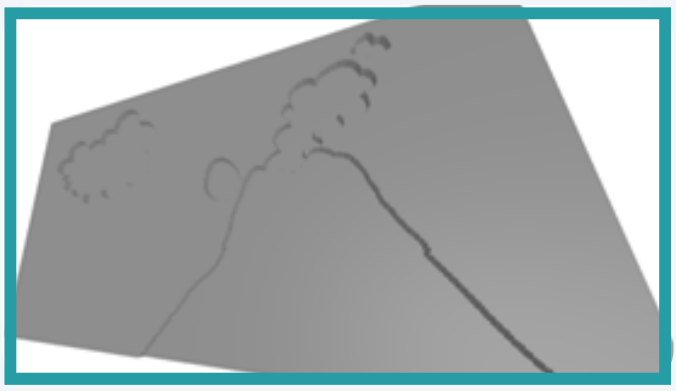
III.If we do not have the "Invert Output" option selected, then when building the 3D model, the inverter will apply the height we set in "Depth" (eg. 3 mm) to the geometry where it finds a white pixel and 0 mm to any black pixels. All intermediate shades will be represented proportionally in the final 3D model. Conversely if the "Invert Output" option is selected, then the black pixels will have a height of 3mm, the white pixels 0 mm and all intermediate shades will have a height of 0 to 3 mm, depending on their brightness.

IV.The "Enable Smoothing" option smoothes the edges. Recommended to use.

V.The "Z axis Mirror" option reproduces the object on both sides of the base.



In the pictures above it is presented how the different settings affect the final result in the same image. In the first (from the left) we have conversion with invert output and smoothing. In the second, conversion without invert output and without enable smoothing.

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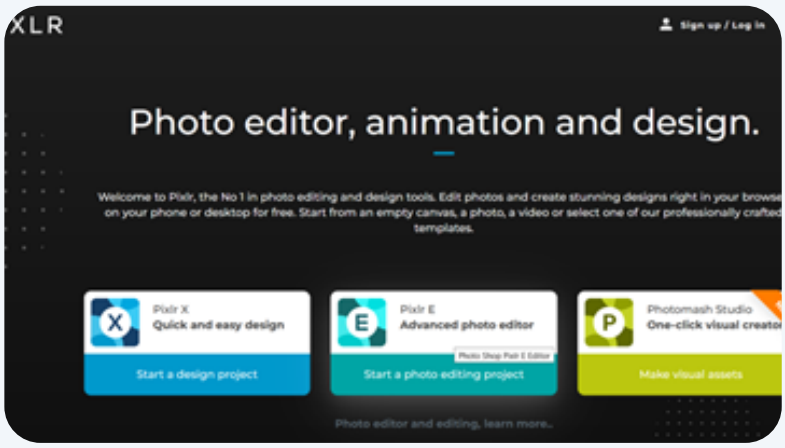
INTERMEDIATE LEVEL

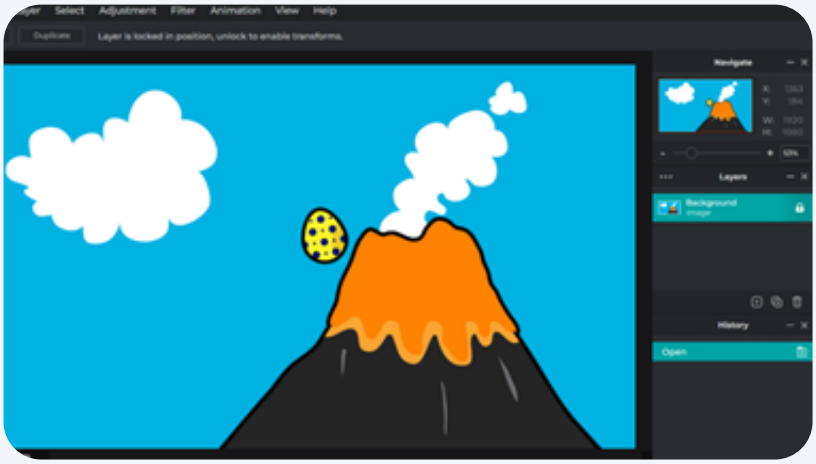
Stories4ALL

Editing the picture in Pixlr

1. Enter to the website https://pixlr.com and select the version PIXLR E for advanced users.



2. Select "Open image" and upload an image of your request in the tool



3.Go to the menu "Adjustment" and select "Desaturate". You turn the picture in black and white

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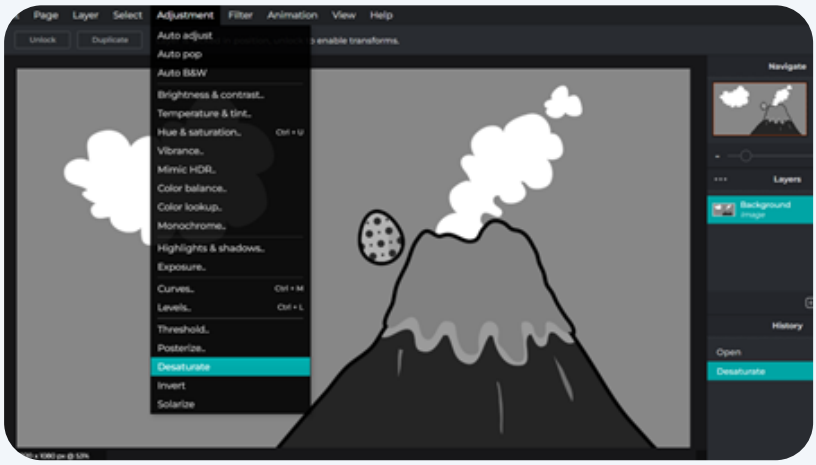
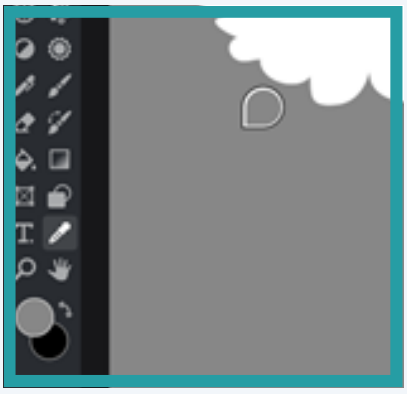
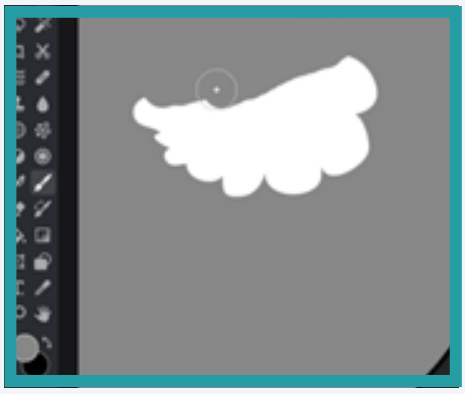


4.If you want to remove an element from the picture (for example the cloud) fill it with the color of the background with the tool "Picker", then select the "Draw" button, adjust the size/type of the Brush and finally use it to draw the cloud to the same color of the background.





5.Now remember that for the elements of the picture we want to give them a z height (during 3D printing), should be black and the areas with no z height should be white. Use the "Fill" tool to change the color of different areas according the z height you want. Adjust the "Tolerance" value in order to achieve the best result. For example we will make black the whole mountain, the smoke and the egg..:

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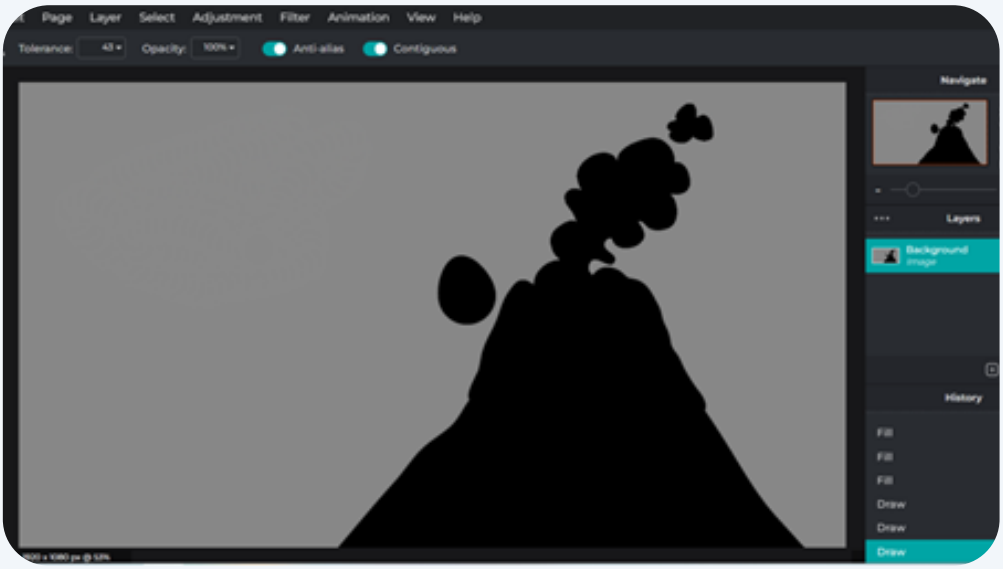
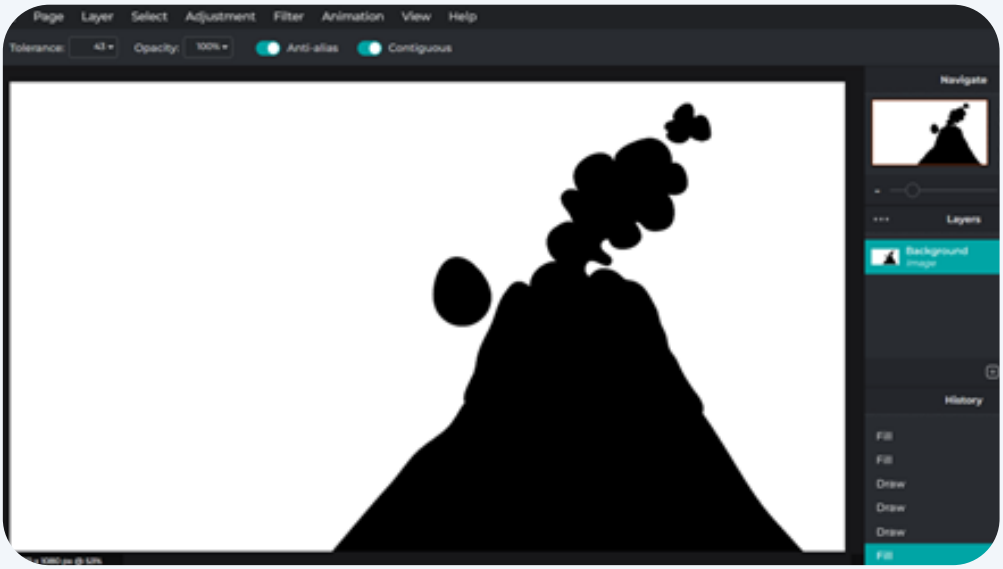


…and then we will turn into white the grey sky-background:



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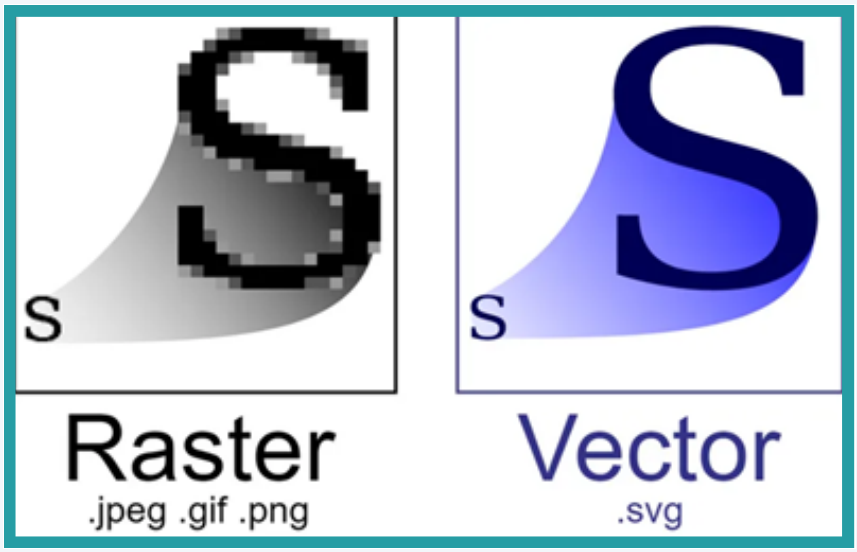
Stories4ALL

Convert picture in SVG format file

The best picture file format for converting an image into STL file for 3D printing is the SVG format.
SVG, or Scalable Vector Graphics, is incredibly practical. That's why designers are using it more frequently. Because SVG is a vector format, they look great at any size and work for pretty much any type of image other than a photo.
SVG is a lossless format - meaning it does not lose any data when compressed - renders an unlimited number of colors.



Use this online appliccation to convert any type of image into SVG file https://convertio.co/png-svg/. You can make 10 conversions/day with the free edition.
There also many others online software that make image conversions.

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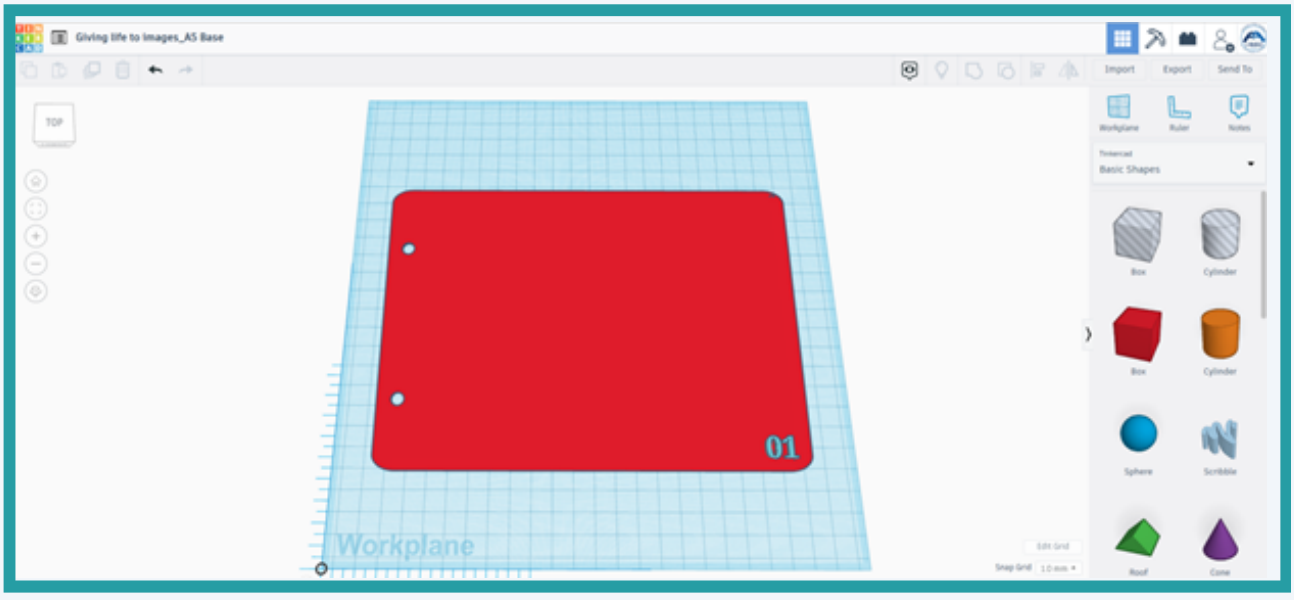
Stories4ALL

Use of Tinkercad online software

Use the Tinkercad software (https://www.tinkercad.com) to customize the image on a print basis and add additional components. This option is recommended for more experienced users, especially for those who have some basic design knowledge in the online design environment of Tinkercad. This way we can change the dimensions of the print area without changing the proportions of the image object. For example with the "Imagetostl" application, if we want to change the dimensions of the image or we have to change the dimensions proportionally or remove the proportion, but also affecting the subject of the image.

- Convert the image into SVG format as we described already. Save the svg image to your computer.
- Go to https://www.tinkercad.com create an account and log in. Then press the button "Dew Design".



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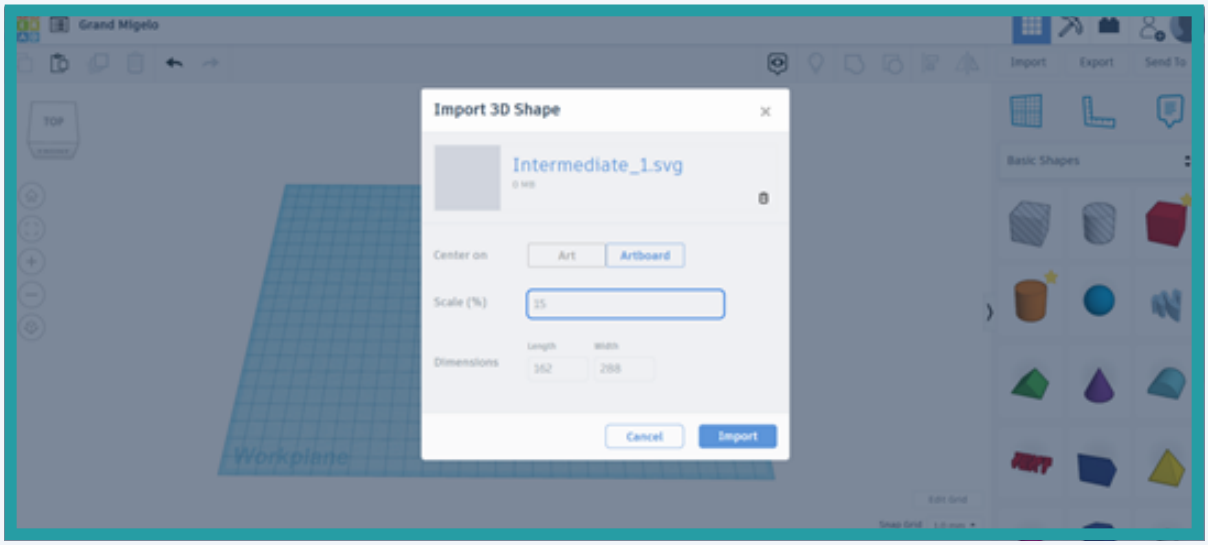
- Design a "base" for your image in the size you want. As part of the "Support Points 2020: Bringing Images to Life" program, we used a base that looks like an A5 page: it has A5 paper dimensions (210x148mm), 0.20 mm thick, holes on the side to be stored in the folder, and a large number of pages at the bottom left page to be detected by touch from a visually impaired person. You can download this file here: https://enabling.gr/en/2021/01/31/giving-life-to-images-points-of-support-2020/.
- Insert the SVG file with the command "Import" in the design environment. It is very likely that you will get a message that the image does not fit in the design environment, so you should do the corresponding "scaling".



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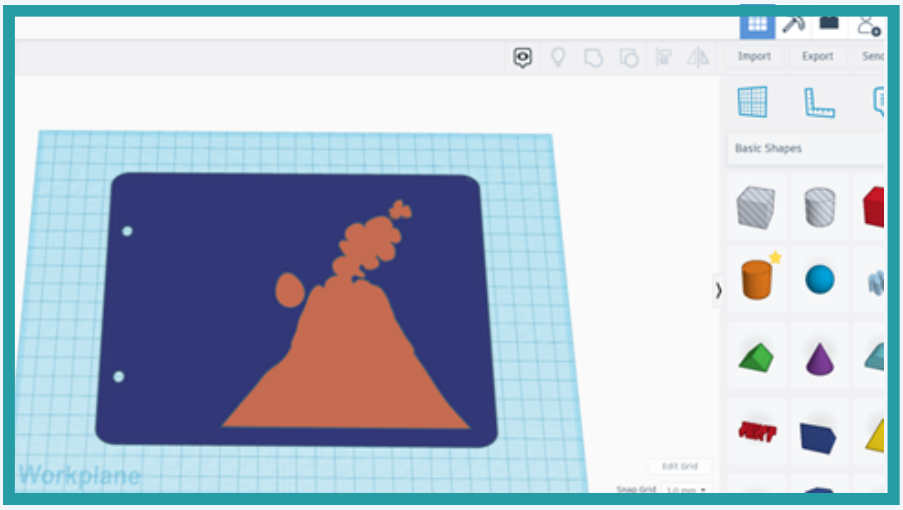
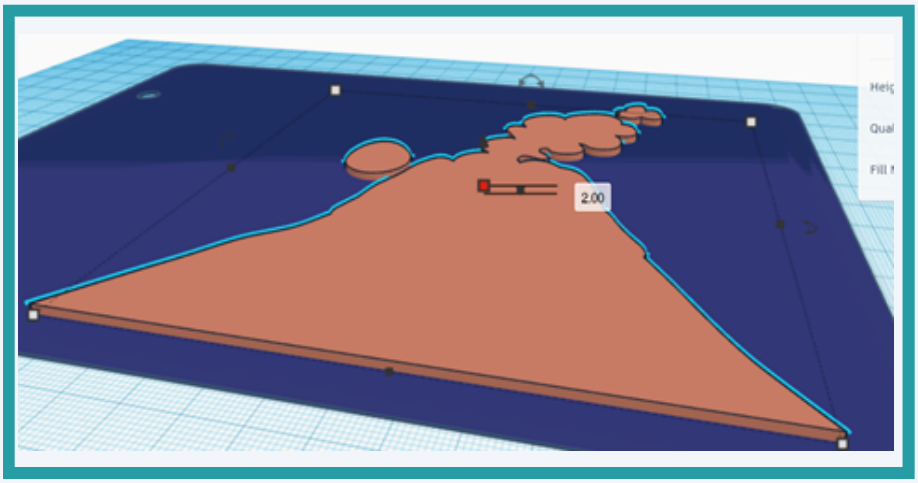
- Insert the image into the drawing environment, move it to the desired location. If you want to center it with the base you will use the Tinkercad (Align) alignment tool.



- Adjust the height in the Z axis of the inserted SVG. This height is crucial because this specific dimension will be identified by the people with visual impairment. It is suggested to adjust it between 2 and 3.5 mm.



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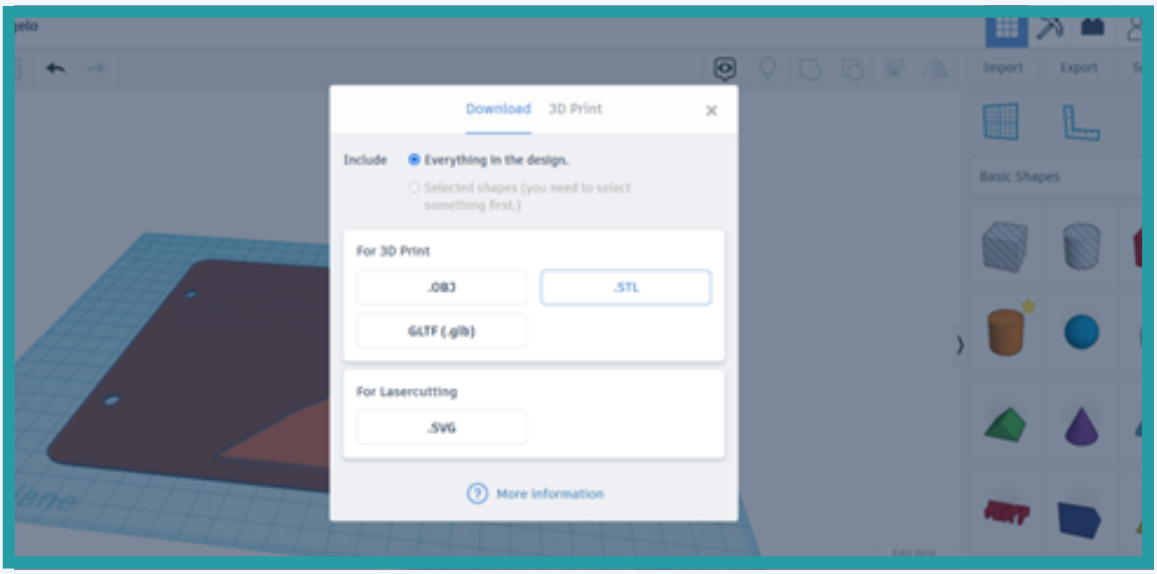
- After we are done with all the settings, the placement of the figure in the base and whatever else we may want to add design, then press the "Export" button in the upper right corner of the screen and in the window that appears select "STL". Here I pay attention to the following: if I want all the objects in the design area to be printed, then we must have grouped them beforehand ("Group" option) and then select "everything in the design". Otherwise I select "The selected shape".



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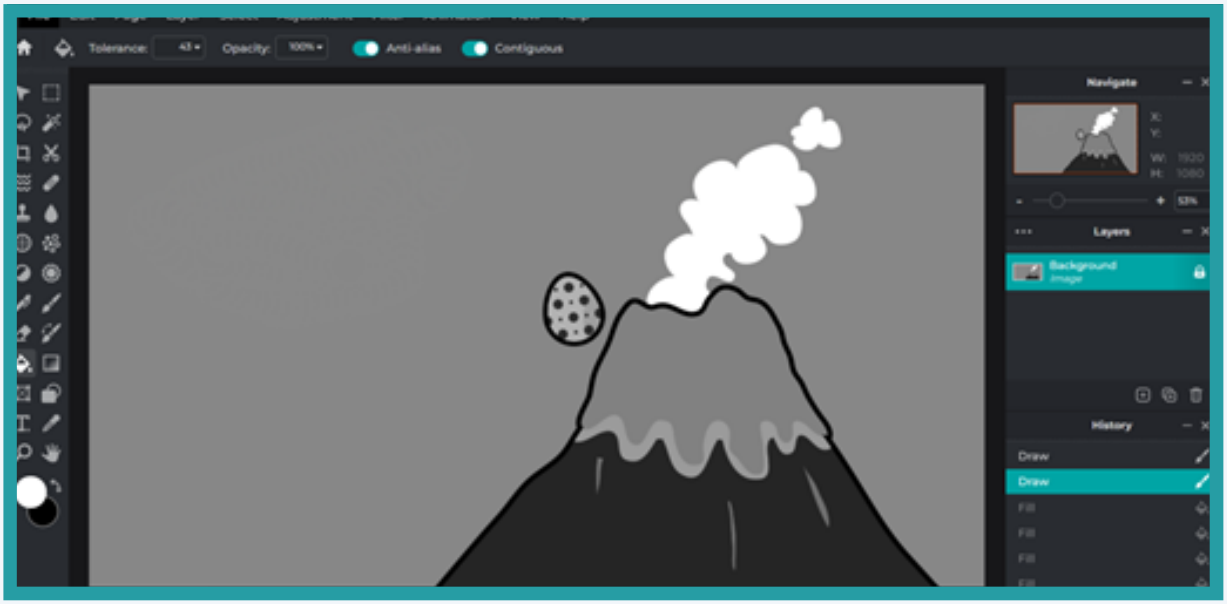
ADVANCED LEVEL

Editing the picture in Pixlr

In case you want to make distinctive features in the same picture for a Visual impaired person you can give a different z height for different figures/elements of the picture. The methodology that will follow for that is to isolate these figures/elements as different png files that we will convert them separately in svg files. Then we will insert these SVG files in Tinkercad and we will choose a different z height for each figure/element and finally we will group them.
Let's see the whole procedure step by step:

1. For example we are in this step of editing our picture:



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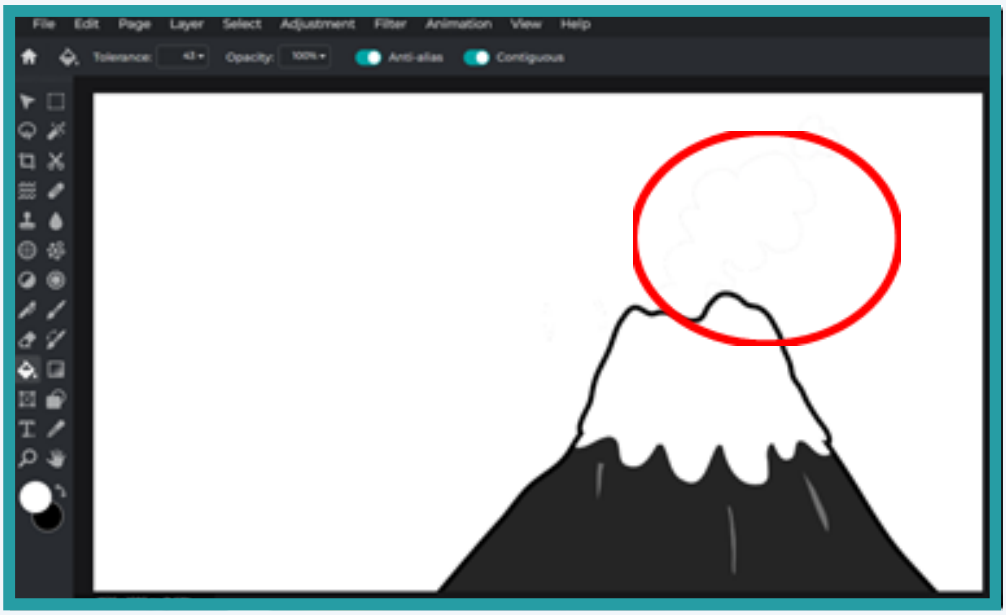
We have saved this picture for example as “Picture No1”. And we want these different z heights for different figures/elements:

- Base mountain z=2 mm
- Lava z=3mm
- Smoke z=1 mm
- Egg z=4 mm

2.We start with the base of the mountain. We make white all the other elements of our picture and save as “Picture No2” (Use “Fill” button and “Tolerance” Value)



Use “Draw” button, select white color and with the brush, draw above the black outline of the mountain.

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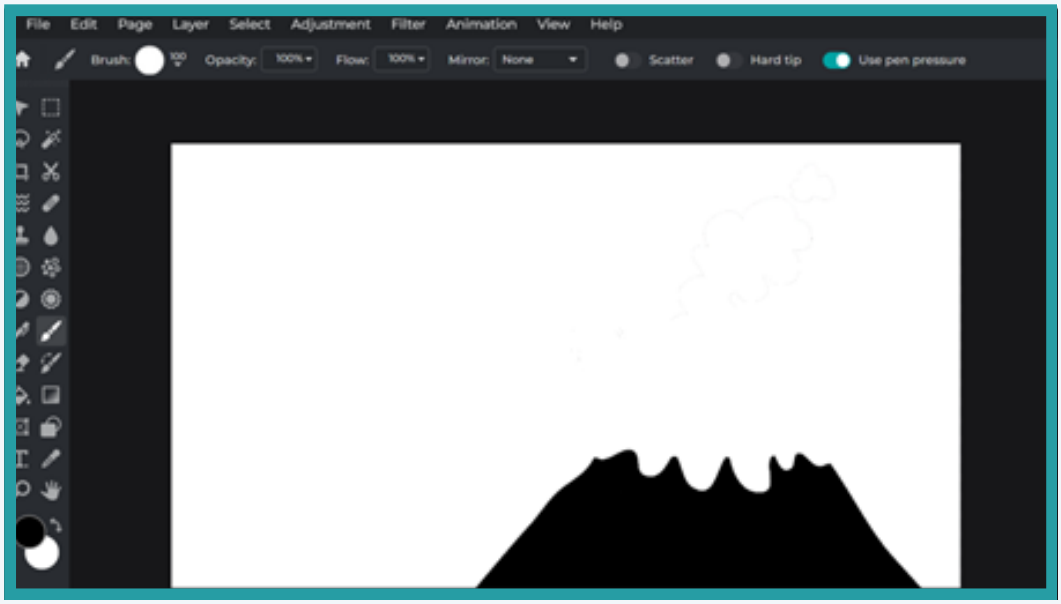
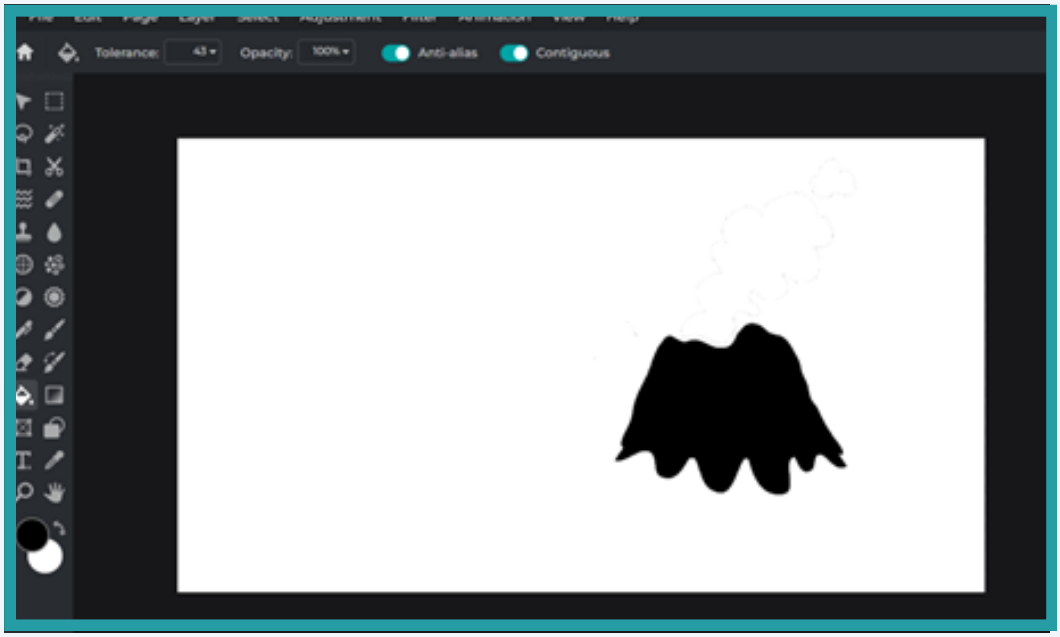
3.Finally you will have this result. Save the picture as Picture No2.



4.Open again the "Picture No1" and following the same methodology do the same in order to isolate Lava and save the picture as "Picture No3"



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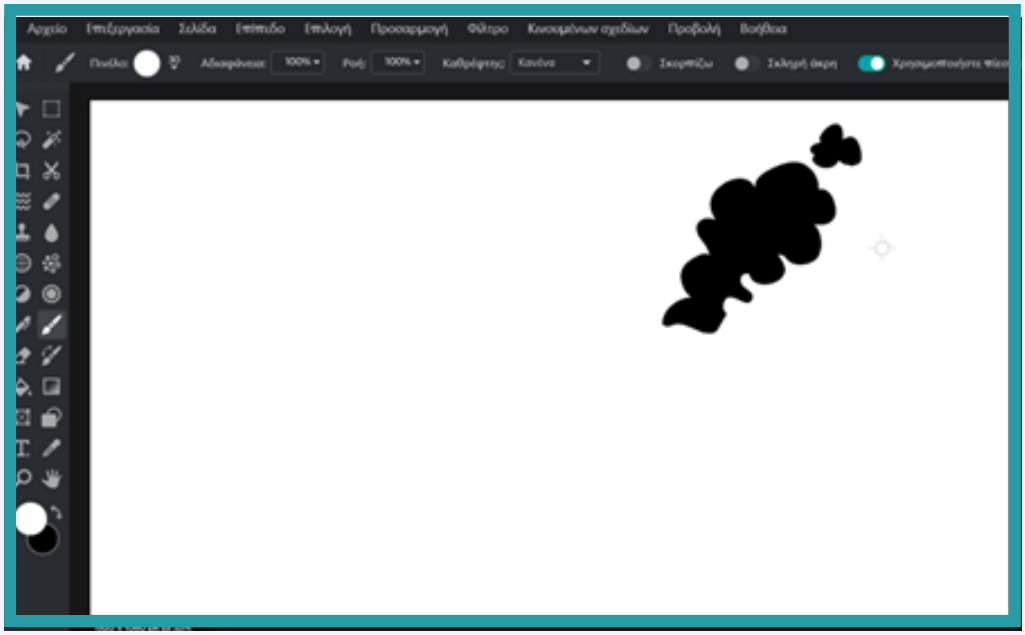
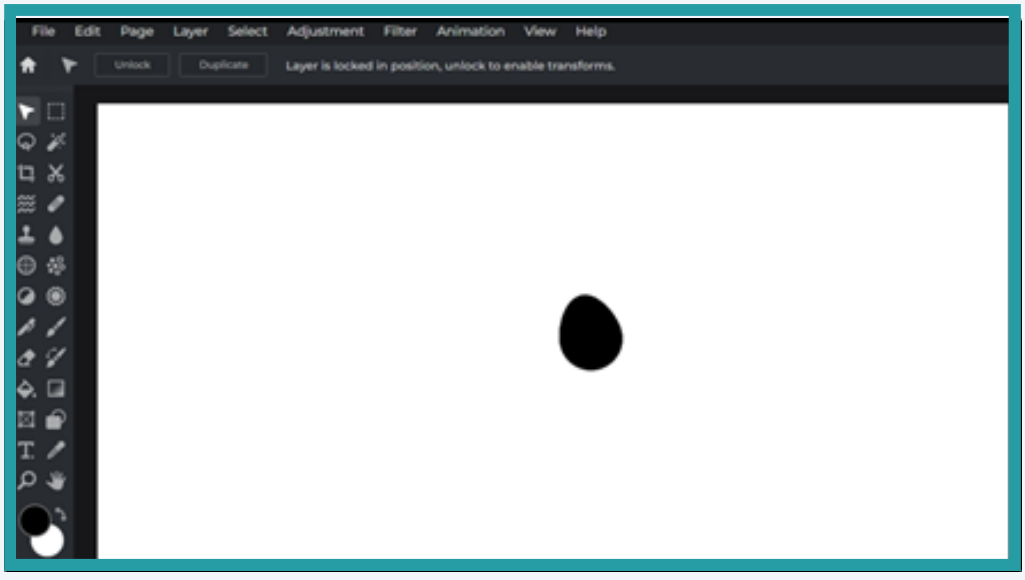
Stories4ALL

5.Open again the “Picture No1” and following the same methodology do the same in order to isolate Smoke and save the picture as “Picture No4”.



6.Open again the “Picture No1” and following the same methodology do the same in order to isolate Egg and save the picture as “Picture No5



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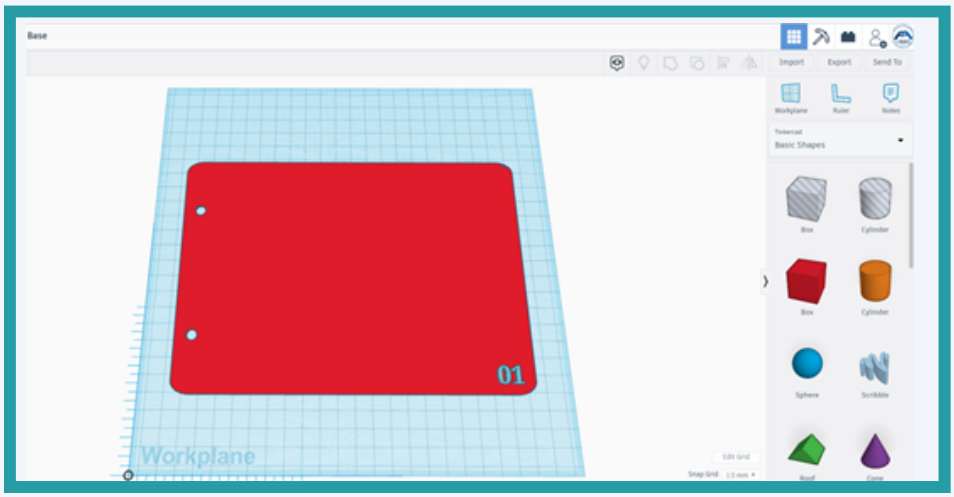
Convert picture in STL format file

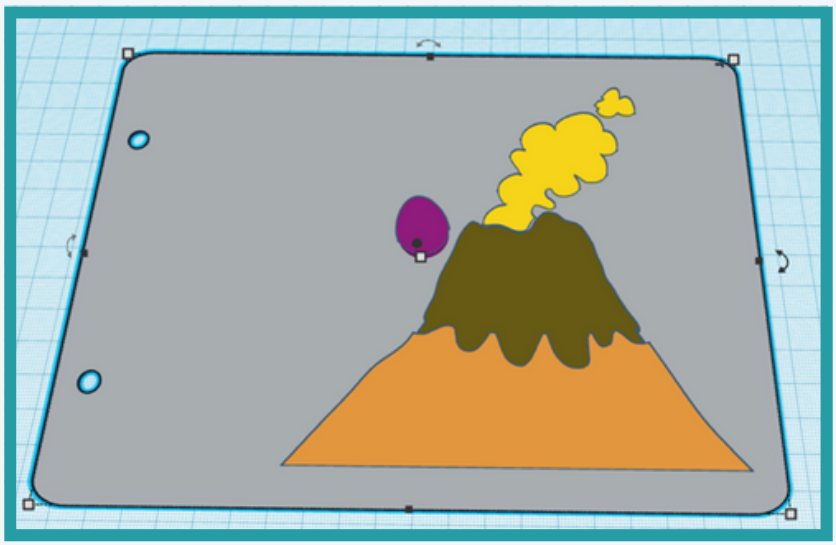
Use the online application https://convertio.co/png-svg/ to convert Pictures No2 to No5 into SVG files.

Use of Tinkercad online software

1. Insert the base as described in the Intermediate Level procedure.



2.Insert all SVG files from Picture No2 to No5, with the import function. Pay attention to select the same scale for all objects, in order to be placed in the exact position as they were in the original picture.



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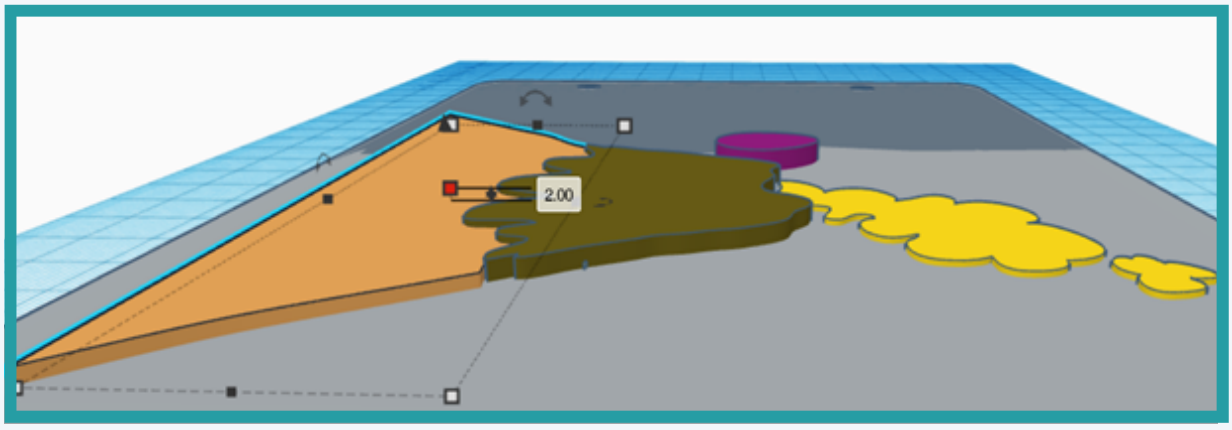
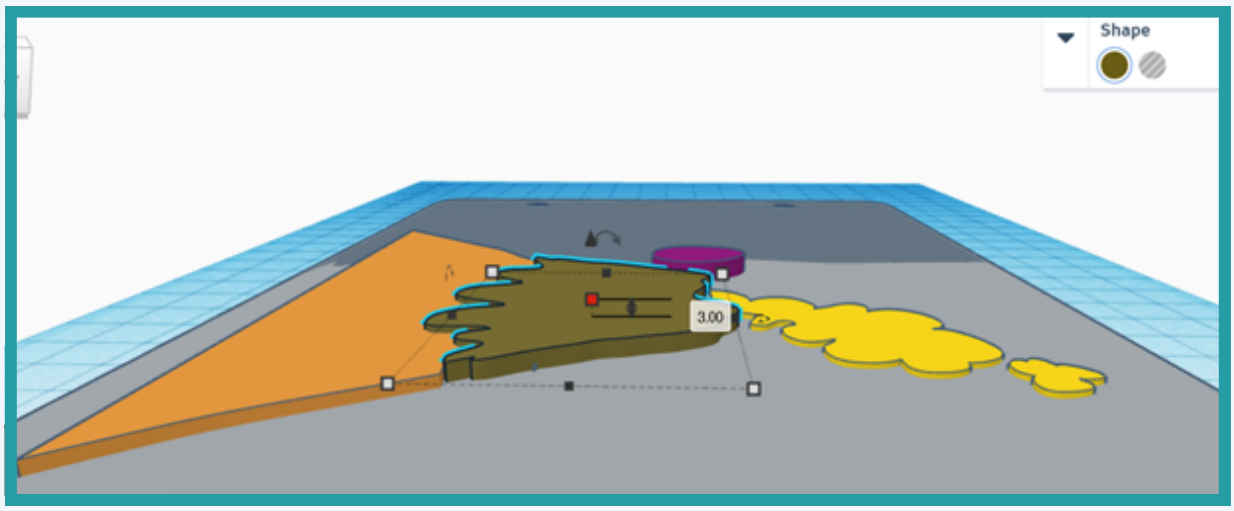
3. Adjust the different z height for each SVG, by simply clicking on it, then click again on the middle snap point (white little square in the middle) and write in the text below the value for each z height.





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Suggestions/recommendations for 3D printing settings and other specifications.

- We suggest to design and print the tactile images in A5 size (210 mm x 148 mm). A4 size construction is possible, but requires twice the printing time.
- You can adjust the thickness of the image base as much as you want. However, we recommend that it remain thin (eg 0.2-0.4 mm) so that it roughly resembles a sheet of paper. In this case (if you print such a "thin" base) a very good adjustment of the 3d printer's bed (bed leveling) is required in order to obtain a good surface quality. Also remember to set the layer height equal or multiplier of the base height (e.g. for base height 0.2mm, set layer height 0.2 mm or for base height 0.3mm, set layer height 0.15mm).
- For people with partial vision loss you can follow two techniques. A) printing with white material and coloring with a permanent color marker of the borders and B) printing using two materials (eg white background and blue borders). Of course this requires a printer with two extruders or a nozzle, or you must use advanced slicer settings in order to change filament during the printing in a one extruder 3d printer.

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- You may want to draw two different levels of outlines of the figures so that certain features of the drawings stand out.
- The elevation of the contours in tactile images is considered to be ideal between 2 to 3.5 mm.
- Using the base we made for this project, you can put all the tactile images in an A5 folder.
- Finally you can add as a STL into your 3d image the number of the page in Braille format. You can find in the link below, the stl files for numbers 0 - 9. https://drive.google.com/drive/folders/1qmh6vdAclLLIaHIme6lsHjVNKSmWv6S9?usp=sharing

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Notes

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Find out more at:

https://stories4all.eu

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