

## ANNEX 2 - DEVELOPMENT AND ADAPTATION OF PRE-PRIMARY EDUCATION MATERIAL FOR STUDENTS WITH VISUAL IMPAIRMENT.

One of the tasks of support teachers regarding the integrated education of students with visual disabilities and blindness is to anticipate and respond to the needs for the development and adaptation of the materials they require. To do this, teachers will need to know these needs in advance, to adapt or elaborate the materials with enough time, so the students have them available in time, as their classmates.

The teacher must provide the support teacher with the texts to be transcribed into braille with enough time in advance for the transcription process. He/she does not only have to adapt or develop various materials that can be perceived by touch, but they will also provide advice and training to the teacher in this regard. The ultimate goal is for the student's own teachers to generate the materials they need based on our guidelines and basic adaptation criteria.

Let's look at some of these material adaptation criteria.

**MATERIAL ADAPTATION CRITERIA (FOR LOW VISION)**

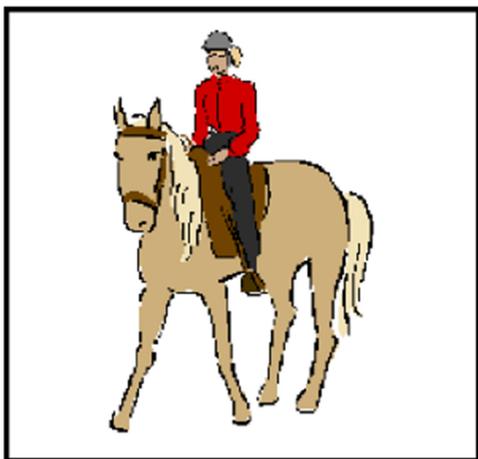
María del Mar Díez Álvarez and Esteve Bellini y Cortés, specialists in the adaptation of materials in relief from Barcelona Bibliographic Production Center, point out that the adaptations required by students with functional remaining vision are those that:

- Facilitate their access to printed materials.
- Are based on sight.
- Allow them to make the most of their remaining vision.

ADAPTATION OF ILLUSTRATIONS, DRAWINGS AND PICTURES

Following the indications of Elena Gastón from ACCEDO group (Accessibility to ONCE Educational Content), the following criteria will be considered to adapt illustrations, drawings, and pictures:

1. They show clear shapes based on the child's experience, interests and needs.



Of the two drawings, the right one is more suitable, since the contour lines are clearer, there is a good contrast of colors with the background and between the figures (the horse and the rider). The position of the horse and rider from the side is very clear.

In the drawing on the left, contour lines are not continuous, all parts of the horse are not well shown (the tail is partially hidden and glued to the back of the horse), and the rider is not clearly distinguishable.

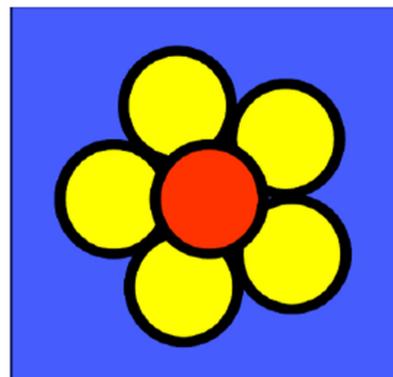
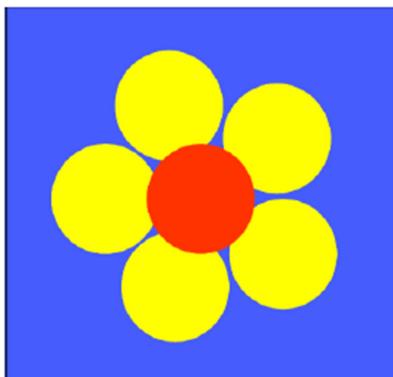
- They show isolated shapes, drawings, or pictures, avoiding overcrowding.



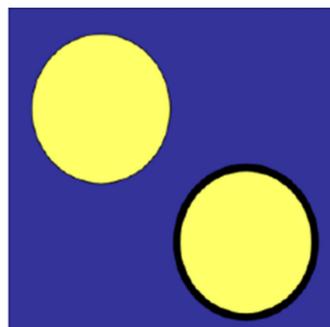
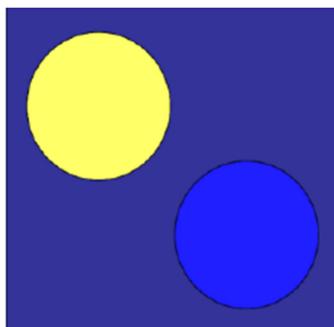
- They need to have a good shape-background contrast.



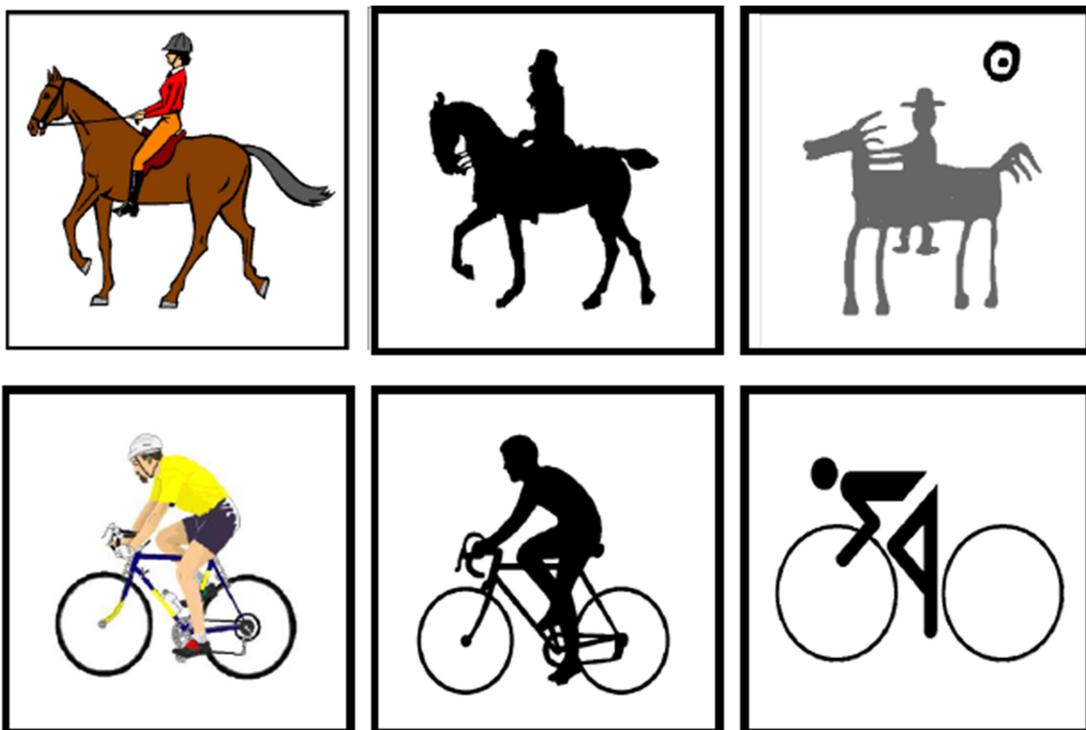
- They have to highlight the contour in a thick line to increase the differentiation of shapes.



5. They need to show contrasting colors.



6. They should follow an abstraction hierarchy.

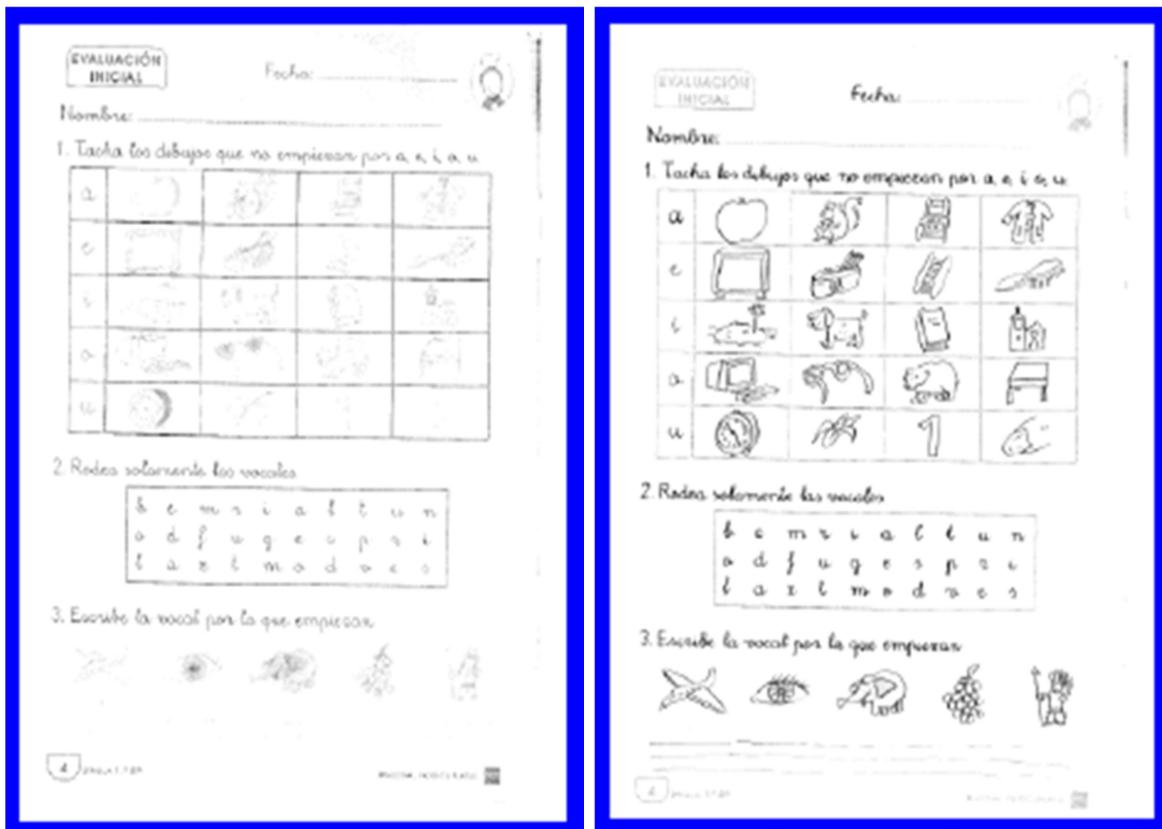


ADAPTATION OF TEXTS

In posters, signs, or text adaptations, the best contrast is provided by the combination of the following colors:

<b>BLACK ON WHITE</b>	<b>WHITE ON BLACK</b>
<b>YELLOW ON BLACK</b>	<b>WHITE ON BLUE</b>
<b>WHITE ON RED</b>	<b>BLUE ON WHITE</b>
<b>RED ON WHITE</b>	<b>YELLOW ON GREEN</b>

Another important adaptation is to highlight contours with markers to increase differentiation of the shapes. Teachers frequently photocopy tasks supplementary to the books for the students, usually made with a low ink level, so their contrast and differentiation between shapes is difficult to perceive by students with low vision. Highlighting contours facilitates the child's work and avoids visual fatigue, so the teacher must be given the appropriate guidelines for them to have this in mind.



In most projects of different publishers, the pre-written paths and/or the lines that the student has to follow to draw letters and numbers are usually printed a discontinuous line in a very light gray, barely perceptible for children with low vision. The teacher should highlight these lines with a fine-tip black marker or pen to make them more noticeable.

**MATERIAL ADAPTATION CRITERIA (LOW VISION AND BLINDNESS)**

PICTURES IN RELIEF

Educational books and projects most often feature a large volume of drawings, pictures, and graphics. Touch provides additional information to what the child with low vision can perceive with their eyes, so reinforcing the visual stimulus with the haptic stimulus provided by different materials and textures on the surfaces, streamlines and enriches the perception of children with visual remains. In this sense, it is essential to train the use of touch as early as possible, both for children with low vision whose literacy

code will possibly be Braille, and also for blind children, since this training will facilitate the process of accessing this system and the interpretation of maps, plans, and graphics in relief.

We will follow the instructions of the specialists in adaptation of materials in relief from Bibliographic Production Center of Barcelona, María del Mar Díez Álvarez and Esteve Bellini y Cortés for the design of relief illustrations:

PICTURE: in relief, texturized, and full-color.



SIZE: wide enough to be touched by both hands.



SHAPE: simple details, with one relevant characteristic to identify the shape or character.



OUTLINE OF THE FIGURES: clear, without overlapping objects. Must be clearly defined to allow easy identification and differentiation.



PERSPECTIVE: (depth) a concept to be avoided in materials in relief, due to its difficulty in representation and understanding.



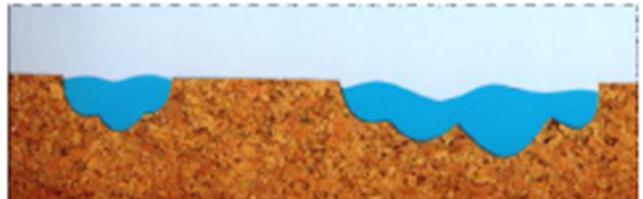
COLOR: try to use plain or basic colors, easily recognizable with tone contrast.



TEXTURE: fill the whole figure with the same texture to delimitate it and allow an easy identification.



TEXTURE: use textures that remind of the real sensation of what is represented (for example plastic, a cold, smooth sensation for water or metals).



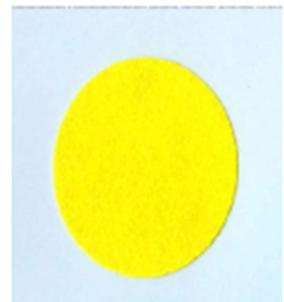
CORK: irregular, not very hard.

For earth, mountains, the earth's crust, etc.



SANDPAPER: a rough, unappealing sensation.

For fire, the sun, lightning, and very hot materials.



WOOD: for trees and wooden objects (furniture).



FABRIC OR CLOTH: smooth and delicate sensation. For clouds, smoke, and dreamed representations.



MOBILE PIECES: these can also be included.



**MATERIAL ADAPTATION CRITERIA (BLINDNESS)**

HAPTIC SHEETS OR CARDS

1. When making this adaptation, try to simplify the sheet, reproduce few elements, and always just those most relevant to achieve the objectives.



In the case of this card, only the basket in which the child had to put chestnuts has been reproduced.

The leaves adorning the background of the card do not provide information to blind children, and if reproduced they will only lead to confusion.

2. Simplicity in shapes, avoiding complex elements and visual details that do not provide tactile information.

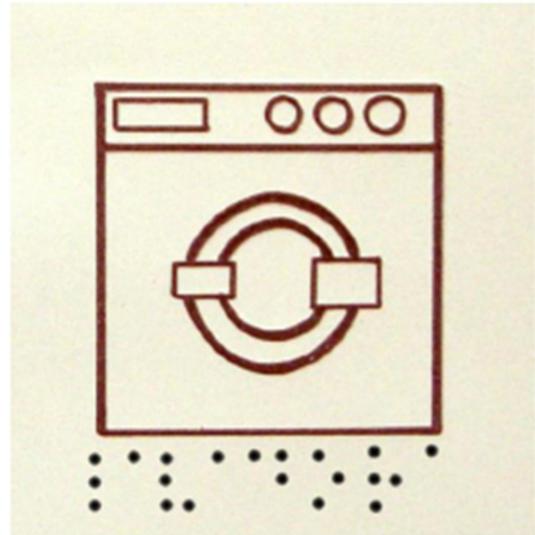
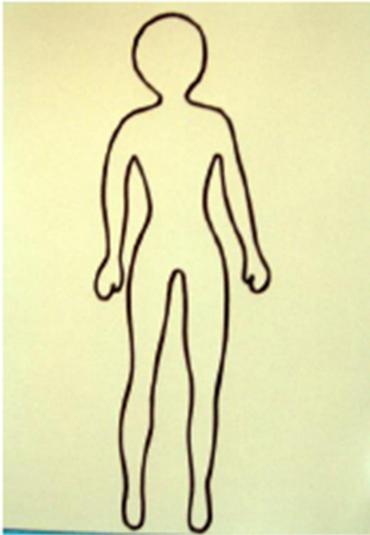


3. Use highly differentiated textures as long as tactile refinement is not specifically being worked on.

4. Make sure the reliefs are not too bulky.

5. Fuser film sheets: they are made of special materials with microcapsules which, when exposed to strong heat (fuser oven), raises the lines or patterns drawn in the sheet. The element to be represented in relief is drawn on a blank sheet of paper, marking the relevant lines of the object or drawing. The thicker the line, the higher its elevation will be.

Once the drawing is made, it is photocopied on the fuser sheet and passed through the oven. The elevation resulting from the marked lines can be explored by the child by touch.



Guidelines for fuser drawings:

- The background of the image must be white, since we want the outlines and filler of the image (frames, lines...) to be differentiated and stand out, so the child can explore them. With a dark background, there would be no difference between it and the outlines, since both elements would be raised in relief.
- Simplify the drawings and eliminate irrelevant elements that may create confusion.
- Do not overlap objects.
- The drawings should be an adequate size (not very big or very small), so the child can both cover it with their hands but also differentiate its details.
- Transcribe any texts into braille.
- Try not to draw two lines too close together.
- Put a name or title on the sheet so the student knows the position in which to explore it.
- Do not represent perspective or depth.
- Keep a constant and coherent scale for the objects represented.