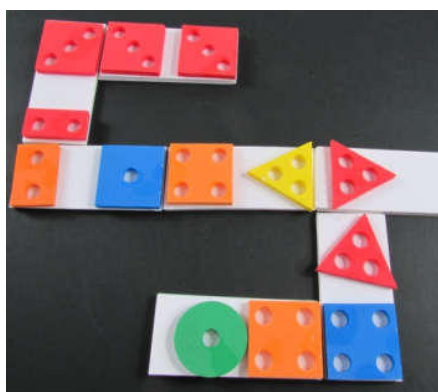# TEACH CVI MATERIALS
FOR TRAINING OF TEACHERS
CHAPTER II

- Material produced by the TEACH CVI project members

- This publication was supported by the Erasmus+ Programme of the European Commission

- Please note that information provided into this folder for teachers training is not exhaustive

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TEACH CVI MATERIALS FOR TRAINING OF TEACHERS

CHAPTER II. Resources and information to support assessment of the child´s vision.

Chapter II:

Resources and information to support assessment of the child's vision

Part 6: Communication, initiating communication, play and exploration tips

1. SHORT INTRODUCTION OF COMMUNICATION AND VISUAL STIMULATION

Building trust and initiating positive communication between you and the child you are about to work requires planning and forethought.

In this section are some suggested tips and strategies to help you prepare for working with the child. They may need further adjustment to meet the need of the individual child you are working with.

2. STEPING STONES FOR COMMUNICATION AND VISUAL STIMULATION
IDEAS OF STRATEGIES FOR COMMUNICATION AND VISUAL STIMULATION[1]

Five keys to successful intervention

- Try to understand and be sensitive to the child´s visual world

- Develop familiar routines and activities

- Offer visual stimuli at the child´s level

- Approach the child gently, with respect and humor

- There is no universal CVI-program – Each child is unique

1. Communication / Visual communication	2. Body position	3. Time
4. Adaptation of environment - Space	5. Adaptation of environment - Lightning	6. Adaptation of environment - Distance
7. Toys and materials	8. Colour and contrast	9. Shapes and size, technology and Apps
	10. Multisensory stimulation	

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[1] Resources and diagram shared by Roxana Cziker

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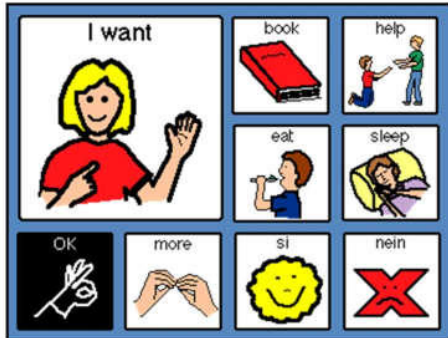
1. Communication[2]

- First step in assessment or intervention
- Find the best way of communication to attract the child´s attention
- Address on the child name when asking for achieving a task
- Try to establish eye contact with the child (if possible)
- Try to find out which is the way of communication chosen by the child: verbal, sign language, pictures, body language etc.
- Give the child time to react

2. Body position

- The quality of visual stimulation program depend on the body position
- Try different body position in order to get best visual reaction: laying down on the tommy, sitting in a special chair, using different type of mattresses for a comfortable position etc.

3. Time

- Time is one of the key aspects for successful reaction of children with CVI
- Use slow movement of stimuli
- Repeat sequences and routines to develop understanding

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[2] Resource shared by Roxana Cziker

4. Adaptation of environment – Space

o Keep, as much as possible, the space clear of objects and furniture

o Avoid having too many stimuli at the same time

o Reduce as much as possible the visual clutters (noise, people moving around etc.)

o Create landmarks (on environment, on the table)

5. Adaptation of environment – Lightening

o Use visual stimuli in different lightening conditions: normal lightening condition, artificial light, dim light, black / UV light

o Avoid strong sources of light if the child is sensitive

6. Adaptation of environment – Distance and visual field

o Try different distances in near vision tasks

o Use different devices and tool in order to make the distance more comfortable when working near visual tasks

o Check the visual sphere where the child respond better on visual stimuli: left, right, up, down

7. Toys and materials

- o Visual
- o Auditory
- o Tactile
- o Vibration
- o Balance

8. Colour and contrast

- o Black and white toys (puppets), pictures
- o Simple colours – red, yellow, green, blue
- o Use a good contrast
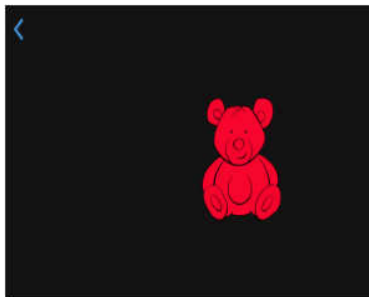
9. Shapes and size, technology and Apps

- o Use simple, real and common pictures
- o Present common real objects that have meaning to the child
- o Find out the appropriate size for objects and pictures
- o Use iPad Apps and animation for visual stimulation and visual attention

10. Multisensory stimulation

- o Provide opportunity to multisensory stimulation activities

3. STRATEGIES FOR ENGAGING CHILDREN/YOUNG PEOPLE WITH CVI COMMUNICATING AND BUILDING TRUST[3]

Communication:

- May be intentional or unintentional
- May involve conventional or unconventional signals
- May take linguistic or non-linguistic forms
- May occur through spoken or other modes (e.g. thoughts, messages, information, speech, visuals, body language, signals, writing or behaviour)

Communicating and building trust may involve changing your thinking and expectations by:

- Being very inventive and thinking creatively
- Having patience, allow the relationship to develop slowly, become gradually familiar to the child/young person before expecting a response
- Allowing time to observe and to collect information about what the child/young person can do, to find their preferred method of approach
- Allowing time to think and make or receive a response

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[3] Reference: Rita Thompson QTVI/MSI Nov 2011

Points to remember:

- Progress is only likely to be made when the child feels comfortable and relaxed

- Familiarity and acceptance helps to build a trusting relationship that will hopefully develop over time

- In the beginning we are finding a way to lay down a foundation of trust

- It is our role to create communication with the child/young person by offering an activity within their experiences

4. STRATEGIES FOR ENGAGING CHILDREN/YOUNG PEOPLE WITH CVI SUGGESTIONS TO INITIATE ONE TO ONE COMMUNICATION [4]

- Use different available devices to record child's own voice
- Use of favourite toy as stimulation
- Use of a hand puppet to engage with child
- Favourite song or rhyme, either play or sing it with actions if required
- Jelly bean switch to operate a mechanical toy
- Hand and foot massage
- iPad apps
- Black and white shapes on card
- Black and white face
- Black and white objects/toys
- Primary colours of above
- Dynamic light stimulation
- Photographs of family/pet or of something that is of particular interest to the child (if this is appropriate as 2D images are difficult to process)

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[4] Reference: R.Thompson. Nov 2011. QTVI/QTMSI

5. STRATEGIES FOR ENGAGING CHILDREN/YOUNG PEOPLE WITH CVI GENERAL TIPS AND CONSIDERATIONS FOR SUPPORTING PLAY AND EXPLORATION[5]

Children and young people with CVI may have limited experience of incidental learning that sighted children have access to. Their physical and visual condition prevents them from knowing of the naturally occurring opportunities available for exploration and learning. Children should be allowed to learn at a level that is appropriate to their developmental stage and not necessarily at age appropriate levels.

The child/young person requires a physical and social environment that supports and encourages their learning style. We need to create an environment that maximises their opportunities to interact with objects, people and peers as independently as possible to enable them to learn through their own experiences.

Play and exploration should be developed through exposure to a wide range of activities/objects/experiences that are motivating and rewarding and use sound, tactile and visual feedback. They should offer immediate feedback to enable exploration of both the familiar and the new experience.
If the learning environment lacks stimulation and motivation, the child is likely to 'switch off' which will limit opportunities for leaning and response still further.

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[5] Reference: Rita Thompson. QTVI/MSI. Nov 2011.

Tip 1: Understand child/young person

- Know your child/young person

- Look holistically as vision is only part of the whole child

- Be informed about the child/young person

- Observe the child/young person in different situations

- Talk to people who know the child (multidisciplinary team)

Tip 2: Observe to gain specific knowledge to plan and record

Observe:

- Eye movements

- Head control/movements

- Physical attainments (e.g. reaching, grasping, holding, rolling and sitting)

Tip 3: Know child/young person's communication preferences

- Likes and dislikes

- Familiar object or activity enjoyed

- Preferred approach

- Preferred environment

- Preferred lighting

- Preferred time of day

- Preferred sensory approach (e.g. visual, auditory or tactile, and how is this used?)

Tip 4: Approach

- Initially, approach the child/young person from the front using their name

- Say who you are and use an identifier to reinforce your presence

- Get down to the child/young person's level to connect with them and to encourage eye contact and visual exploration of your face
- Be calm and do not startle the child/young person
- Give reassurance through your actions and the tone of your voice

Tip 5: Start from baseline

- Establish baseline
- Build communication and trust
- Spend time understanding the child/young person and what they can do at their baseline point
- Begin by working with the familiar objects
- Lead slowly upwards in very small structured developmental steps to achieve progression
- Then gradually extend - offer challenges

Tip 6: Establish what the child/young person enjoys looking at

- Use a favourite toy/object for initial intervention
- Gradually adapt and change the toy/object

Remember: children often shut down initially and won't respond until the situation becomes more familiar and they can cope. Allow **time** for this to happen.

Tip 7: Visual Stimulation

- One of the biggest challenges is to interest the child/young person in using their vision. They often don't understand the visual information that they are receiving. It is easier to block visual images than to receive confusing information

- Visual stimulation is an important strategy
- Always consider what makes objects easier or possible to be seen: size, colour, distance, contrast, familiarity and preferred visual field

Tip 8: A**uditory support**

- Consider carefully the role of auditory input to help the child/young person to participate in a task
- Some must have absolute quiet
- A distraction free environment is more conducive to 1:1 working so that the child can focus and fatigue is reduced

Tip 9: **Sensory overload**

- Too much visual, tactile and auditory channels used together can cause sensory overload, causing the child/young person to 'shut down' and retreat into their own world
- Plan carefully the sensory actions expected of the child (e.g. either to look or to listen or to touch)
- Deliver short activities in exactly the same structured, sequential way each time, using the same language and the same props (repetition)
- Follow with rest periods to allow child/young person to regain energy to continue using their vision to process information

Tip 10: Repetition and consistent approach to support understanding

- Use same language/description/prompts when supporting an experience (There a many ways to say the same thing, but a child/young person with CVI will not recognise this and may perceive each description as different)

- Offer real experiences which are stimulating and fun, repeat these experiences many times in the same way. Routines provide and allow the child/young person to develop skills of anticipation and sequencing which allow events to be ordered and associations made - to make sense of the world

Tip 11: Final alert points

- The child/young person has to maintain a much higher level of concentration to participate and access requiring a high level of energy
- Concentration can only be maintained for very short periods of time and causes visual, physical and mental fatigue
- Recognise that when a child/young person is concentrating on holding up their head, they may find it impossible to 'look' at something as well. The more energy is being used to control posture the less can be used for seeing
- The child/young person may not be able to do two things at once as concentrating on one thing may cause fatigue, leaving little or no energy for the other (e.g. looking and listening)
- One area must be stable before we ask the child/young person to participate in another
- Not being able to transfer information may cause confusion and hinder the learning process – hence need for careful decisions and well planned visual/tactile/auditory interventions
- Because there appears to have been a visual reaction, it does not mean that what has been seen has been understood

Part 7: Supporting development of visual skills – Visual stimulation programmes for children with CVI

1. STRATEGIES FOR CHILDREN/YOUNG PEOPLE WITH CVI SETTING THE SCENE FOR POSITIVE WORKING[6]

Considerations before you work with a child/young person – Tips for setting up the environment

- Select a quiet distraction and interruption free environment
- Understand their particular likes and dislikes
- Position the child/young person comfortably in specialist equipment or relaxing on a beanbag etc.
- Address the child/young person by name at the beginning of your communication to attract their attention
- Adapt the level of verbal communication in line with the child´s understanding. Sometimes you may need to speak slowly or repeat the sentence several times
- Consider the child/young person's best field of vision and ensure they are positioned to enable you to present targets in this area
- Understand the child/young person's needs, conditions
- Be calm and not boisterous
- Do not feel that you have to fill in all of the gaps. Gaps are good
- Depending on need employ a careful multi-sensory approach using touch to support visual and auditory cues

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[6] Reference: Adapted after Rita Thompson (2011). *QTVI/QTMSI.*

- Work one to one if possible in order to increase the level of child's participation and observing more accurately their visual functioning feed-back

- Provide a creative environment in order to maximise the visual potential of the child

- Get to know them, become a familiar person

- Wear an identification signifier to aid child's recognition of you

- Adapt and individualise the educational strategies to meet the need of the child

- Allow **time** for the child/young person to process information and make a response. This requires great effort, give time, wait for the response and acknowledge it

- Do not overload the child/young person. Avoid asking them to listen and look at the same time

- Sometimes it is necessary to repeat sequences of events and routines to develop understanding

- Break tasks/activities down to the child's level of understanding and awareness

- Remove unnecessary clutter from the area to be used. Use black screens or good contrast background to reduce clutter

- Consider the lighting: position in a glare free location

- If necessary have a spot light available for focussed work

- Keep sessions short, followed by a rest period

- Be sensitive to changes in position, mood, facial expression or slight bodily movements such as finger or foot movements

- The child/young person may be passive, allow **time** and space for emerging reciprocation

2. STRATEGIES FOR CHILDREN/YOUNG PEOPLE WITH CVI. SUPPORTING A CHILD DURING VISION STIMULATION SESSION

Careful observations across different situations and settings enable the surroundings to be arranged to optimise the child's opportunities to utilise their functioning vision. Refer to and where appropriate use the strategies explained in point 1 – Tips for setting up the environment.

- Use a solid colour blanket or sheet when playing with the child
- Use a plain background shield
- Experiment with different lighting situations to assess optimal conditions for viewing e.g. locate a light source behind, and/or to the side of the child, use of spotlighting technique to focus on activity, bright light, dim light, day light, sun light etc.
- Place/use one object at a time presented on a plain background to support the child to see it more readily
- The child/young person may have difficulty with "figure/ground" discrimination. They may see low contrast objects on a plain background, but may not notice them when they are placed on complex or busy backgrounds. It may make the objects 'invisible'
- Present common real objects that have meaning to the child, use things that are 'liked' and known to begin with, to initiate the communication
- Use objects and toys that are simple in design with chunky features and with a clear contrast between colours or features
- Observe carefully to find out the smallest toys/objects that the child can see. Then play with toys/objects that are the same size or bigger

- Use simple primary coloured cause and effect toys/objects that have a light and sound for promoting visually directed reaching. Observe which is the colour the child give a better feed-back

- Vision is best stimulated when paired with another sensory system. Use simple cues, touch cues or object cues (e.g. consider offering a tactile cue when the child appears to be visually attentive, to reinforce visual discrimination of a common object)

- Watch carefully how the child responds to objects during the learning activity

- Observe whether the child only makes a consistent visual response to bright, high contrast or reflective objects, or whether they notice low contrast objects, or different colours

- Notice which size of objects is better for the child

- Notice the distance where the child reacts better to different stimuli

- Notice the visual angle where the child reacts better on different visual stimuli – right, left, up, down

- Notice the ability of child to focus and follow visual stimuli and keep looking at it while they reach or do they look away while reaching

- Notice if the child is reacting on object / toy in motion or steady

- Notice if the child reacts better in stimuli with sound

- When the child looks or reaches for an object, makes sounds with it or is active in other ways, noise from the surroundings may distract the child from utilising their ability to see. Refrain from saying anything and also reduce or eliminate other auditory effects from the surrounding

- Repetition is very helpful: use the same objects and same processes each time to provide familiarity and security for the child

- Allow lots of time for the child to process information and to make a response. Be careful not to take something away from a child before they have had the time to process, integrate, organise and respond
- Observe and record each child's subtle response cues (e.g. changes in breathing patterns, shift of gaze or body position)

3. STRATEGIES FOR CHILDREN AND YOUNG PEOPLE WITH CEREBRAL VISUAL IMPAIRMENT
SUPPORTING A CHILD DURING A VISION STIMULATION SESSION
USE OBJECTS THAT ARE SIMPLE IN DESIGN[7]

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[7] Photographs on this page are shared by Positive Eye Ltd

4. STRATEGIES FOR CHILDREN AND YOUNG PEOPLE WITH CEREBRAL VISUAL IMPAIRMENT
SUPPORTING A CHILD DURING A VISION STIMULATION SESSION
USE OBJECTS THAT HAVE SOUND/LIGHT/HIGH CONTRAST[8]

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[8] Photographs on this page are shared by Positive Eye Ltd

5. STRATEGIES FOR CHILDREN/YOUNG PEOPLE WITH CVI – GENERAL FACTORS TO OBSERVE AND RECORD DURING VISUAL SKILLS SESSION

Lighting

- Glare or reflection on a surface

- Sunlight

- Dim lighting

Contrast

- Discrimination of objects against a black/white/coloured background

Size

- Size of object required for child to see it

- Distance at which object can be seen at

Placement of materials

- Best position/location for the objects or materials to be presented to the child, based on their field of vision (e.g. right or left side, centre, upper or lower field)

Colour

- Discrimination of colours

- Colours which provide the best contrast

Background

- Low contrast backgrounds

- Well contrasting background

- Plain, patterned, complex background

Objects used

- Objects used – type, colour, size, shape, pattern, materials

Behaviour during the assessment

- Ease or difficulty with which the child appears to complete activity

- Time taken to finish the activity (e.g. 'immediate/quick', 'gradual response' 'needed a long time', 'slow to respond' or 'slow and random')

- Note the verbal, body and eye responses

6. EXAMPLE OF RESOURCE OF VISUAL STIMULATION FOR CHILDREN/YOUNG PEOPLE WITH CVI – SPOTLIGHTING TECHNIQUES[9]

The use of "**SpotLIGHTing Techniques"** should be considered for increasing visual attending behaviours for targets at near and intermediate ranges. This instructional strategy is simple and easy to use and may help to increase visual attending behaviour and the level of participation in activities for students who are disturbed frequently to light. This technique should not be used if your student is sensitive to light and/or has a seizure disorder (that may be triggered by light).

SpotLIGHTing involves the following:

- Use of a high powered flashlight; 250 lumens or greater or a 100 LED Flashlight works well (do NOT shine the light into student's eyes)
- When a toy, target or other interesting visual item is presented to the student, shine the light onto the object; reflective or mylar targets work well
- Shine the light onto the target from behind the student (over his/her shoulder), so that the student is not turning to look at the light source
- With smaller, high powered flashlights: try moving the flashlight to within inches of the object, illuminating only the object
- Avoid glare reflecting from the target

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[9] Reference: Sheline D. (n.d). *SpotLIGHTing Techniques.* Retrieved from https://strategytosee.com/toolbox/spotlighting-techniques/

- Remember to present the SpotLIGHTed target in the student's best field of view and within 36 inches of the child
- At first, encourage the student to attend briefly to the lighted target (this process may need to be repeated often, in an environment that encourages looking behaviour; reduce environmental complexity and as well as auditory and tactual interfering stimulation)
- Next, encourage the student to follow or track the movement of the lighted target
- Finally, encourage the student to become involved in some way with the lighted target. This might include, but not be limited to, reaching out to touch the target, reaching to grasp the target, shaking the target or using it for some functional purpose (grasping a SpotLIGHTed cup to take a drink)
- The end goal is that objects and tasks are presented without SpotLIGHTing the target, and the student visually attends equally well, and the same looking behaviours are encouraged

Alternate SpotLIGHTing Technique: It is also possible to use the spotlighting techniques with books and other materials on white paper. Try to use a high powered flashlight SpotLIGHTing and an individual letter or target from *behind* the paper. The flashlight illuminated the individual target of interest. Press the lighted end of the flashlight right onto the back of the page. The student looking at it from the other side sees the target of interest illuminated.

Part 8: Developing visual skills – Resources for basic visual functions

1. STRATEGIES FOR CHILDREN/YOUNG PEOPLE WITH CVI – THOUGHTS ON WORKING WITH CHILDREN WITH CEREBRAL VISUAL IMPAIRMENT

Children who have CVI receive incomplete information about the world, which they might not be conscious of, as many of them have never experienced a different visual perception. Still, they will have difficulties in gaining a balanced understanding of people, places, activities, shapes, forms, sizes or processes of events and happenings taking place around them.

The purpose of an assessment of the child's visual skills is to observe closely, in a wide variety of conditions and situations, how the child uses his/her vision and/or reasons why a child is not using their vision to 'see.' Even when an assessment is successfully completed, the tested ability to 'see' can differ to a great extent from the child's ability to utilise sight. An important aspect of every assessment should be how an adapted environment can support the child to see.

As important as a thorough visual assessment is an assessment of the child's compensatory strategies, e.g. using other senses and to build interventions based on the strengths and interests of the child. To put pressure on the child to get them to use more sight than they want may lead them to avoid using their vision. Stimulating the child's vision is to offer him or her well adapted

materials based on the child's abilities, giving opportunities for learning instead of limiting their access.

In this section the project has gathered material that can be used to both assess, maintain and develop the visual skills of a child with CVI.

2. STRATEGIES FOR CHILDREN/YOUNG PEOPLE WITH CVI RESOURCES FOR VISUAL SKILL DEVELOPMENT[10]

Simple overview: Areas of Visual Skills

Visual Skill	Description
Visual Awareness	Awareness that something visible is present in the visual field
Visual Attention	Attend to an object as blockage of light or due to characteristics of the object
Localisation	On becoming aware of a visual stimulus, turn eyes, head or body towards it
Fixation	Direct gaze and lock eyes on an object or light source
Tracking	Fixate and visually follow a moving object or light source
Transferring gaze	Transfer visual attention from one stimulus to another
Scanning	Search an area, looking from one element to the next to locate a desired object or person
Visually directed reaching	Eyes used in conjunction with hands and body to swipe, kick, reach or move towards things seen
Visual discrimination and recognition of objects	Recognise familiar objects, recognise different or similar objects.
Visual discrimination/ recognition of images and detail in pictures	Discriminate objects and detail from various backgrounds (low—high contrast, plain—complex backgrounds, small—large objects)
Identification and perception of patterns, numbers and words	Discriminate between similar and different shapes and letters

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[10] Shared by Positive Eye: taken from Positive Looking 1

Visual functions	Description	
Visual awareness	**Light** Different kind of coloured lights/torches/penlights. Coloured cellophane to place over front of torch. Light up (UV) toys, UV lights, reflective papers and objects, disco ball, survival blanket, bright silk coloured fabrics, light up wand, CD.	**Objects** Brightly coloured balls, toys or objects, hand size to smaller objects, streamers, shiny pompoms.
Visual attention	Wide range of large – small bright objects and toys, funny hats/head gear, brightly coloured bow ties, bright red lipstick, black eye liner, highlighted eye brows, jazzy sun glasses, puppets, squeaky toys, whistle sticks, shiny pompoms, penlight torches, bright coloured socks/gloves with bells sewn on the toes/fingers (child and adult sized).	
Fixation	Torches, mirrors, refracted surfaces, large bright toys or objects, striped black and white cards, bull's eye black and white cards.	
Tracking	Range of lights- torches, penlights; different sizes of brightly coloured objects and toys; different contrasting backgrounds; pull along toys; windup toys; yoyo; bubbles; range of different sized balls; spinning tops; toy cars; novelty pull along toys – snakes, caterpillars.	

Transferring gaze	Lights – e.g. Christmas lights, pen lights, light up novelty toys. Coloured objects of different sizes, large to small. Black and white objects – different sizes, large to small.
Scanning	Wide range of objects, large – small in size, shapes, everyday household items and paraphernalia, e.g. spinning tops, beads, hundreds and thousands, balls of different sizes, marbles, buttons, rice, lentils, brushes, paper clips, pegs, toys in bright colours, toy cars, trucks, trains, Lego etc.
Visually directed reaching	Brightly coloured objects (large, hand size and smaller). Mobiles and activity frames, balloons, streamers, shiny pompoms, socks/gloves with bells sewn on finger tips and toes, clutch ball and building bricks.
Visual discrimination & recognition of objects	Wide range of familiar household and everyday objects in different sizes, e.g. 3D shapes, objects used in the home, school, play, outside environment (e.g. cups – sauce, knives and forks, brushes and combs, toothbrush- toothpaste, pots and pans, wooden spoons, metal spoons, toys - balls, vehicles etc.).
Visual discrimination of images and pictures	Black and white/colour photographs/pictures of shapes, familiar objects and activities, ranging from simple to complex. Pictures/photographs of people (black and white/colour) ranging from individual photographs to group photographs, family and familiar people and unknown people.

3. STRATEGIES FOR CHILDREN/YOUNG PEOPLE WITH CVI
VISION AND SEEING

The motor elements of vision include[11]:

- **Visual fixation**
- **Visual following**
- **Shift of gaze and saccades**
- **Accommodation**
- **Convergence / divergence**
- **Alignment of the eyes**
- **Binocular function**

Visual motor processes represent a part of visual functions which enable us to make sense of, move within, and interact with the world we can see with our eyes. To use vision effectively in everyday life, we use basic, middle and higher visual functions.[12]

How we **perceive** involves a complex combination and interaction of neuromuscular, neuro-sensory and proprioceptive feedback from the eyes, other senses and organs.

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[11] Hyvarinen, L., Jacob, N. (2011). *What and how does the child see?* Vistest Ltd.
[12] Shared by Positive Eye Ltd taken from Positive Looking 2

The perceptual abilities include:

- **attending** to a picture or words in a book
- **scanning** methodically to search for detail
- **identifying** an object from a group
- **recognising** an object when only part is visible

Acquiring visual sub-skills is an on-going developmental process and is vital in the development of learning strategies to understand print, symbolic form, pattern, number etc. which are elements in all areas of learning. In the child with a visual impairment or additional needs these skills may take longer to develop. **They may need to be taught** as they may not be acquired through incidental learning.

The visual sub-skill areas associated with **optical functioning** including:[13]

- Awareness
- Attention
- Fixation
- Tracking
- Transferring gaze
- Scanning
- Discrimination of objects
- Discrimination of images
- Identification of letter, numbers

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[13] Shared by Positive Eye Ltd taken from Positive Looking 2

4. STRATEGIES FOR CHILDREN/YOUNG PEOPLE WITH CVI
VISUAL SKILL: DEPTH PERCEPTION

Stereovision is the perception of depth in 3-dimensional structures, obtained on the basis of visual information deriving from the two eyes. It is the highest degree of binocular vision.

Observation suggestions:

- If the child is ambulant, watch how they understand and use steps, mats, manage changes of surface colour and playground equipment. If they have poor depth perception they might confuse a change of surface colour with a step (although this might not always be apparent in a very familiar environment)

- How does the child understand and manage kerbs and steps? Are the feet lifted up too high or too low?

- Does the child attempt to step up or down over shadows or contrasting shapes on the ground?

- Place a low bench or box on the ground for the child to step onto or over. How accurate is their movement?

- Place a strip of fluorescent tape on the floor. Ask the child to step over it and observe their response

- Some children only notice moving things and will create the illusion of motion by moving themselves

- Does the child need to stand still in order to look at things, or do they seem to be continually on the move?

- If there is an opportunity to observe outdoor play, look for the child's response to brighter light and how they adapt to the darker environment as they come back inside

5. PHOTOGRAPHS – RESOURCES[14]

Visual Awareness
Awareness of Light
Photographs of ideas and suggested resources

Visual Awareness
Awareness of Objects
Photographs of ideas and suggested resources

Does the child demonstrate awareness of the object with a brief pause, altered breathing pattern, vocalisation, body, head or eye movement?

15

Visual Attention
Photographs of ideas and suggested resources

Encourage the child to attend to a variety of different objects, alter size, colour, shape, contrast and introduce in different parts of their visual field.
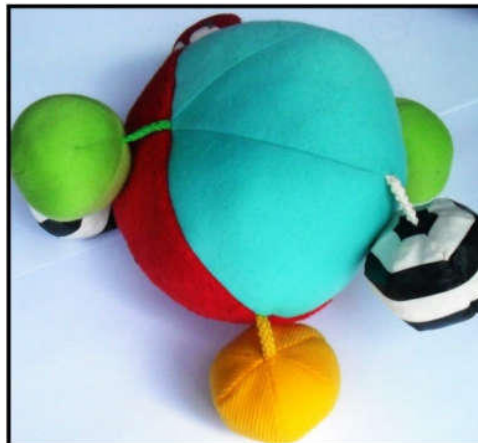
Fixation
Photographs of ideas and suggested resources

Assess if the child can fixate on an object

16

Tracking
Photographs of ideas and suggested resources

Keep light within the child's range of vision and move it slowly to right, left, up, down, diagonally and circularly.

Transferring Gaze
Photographs of ideas and suggested resources

Encourage child to switch gaze between two visual stimuli

17

Scanning
Photographs of ideas and suggested resources

Discrimination of Objects
Photographs of ideas and suggested resources
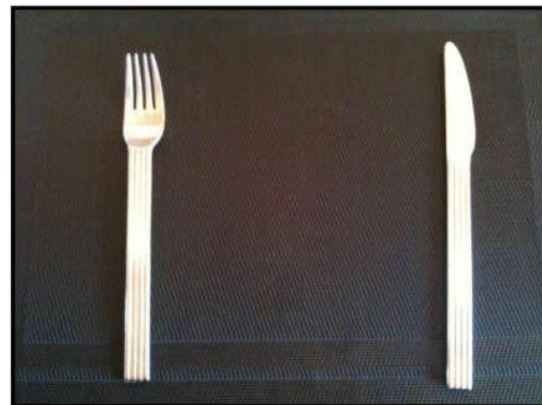
Match common objects that go together

18

Visual Discrimination of Images and Pictures (including discriminating and recognising people)
Photographs of ideas and suggested resources

Match pictures that belong together

Part 9: Developing visual skills – Resources for visual perceptual skills

1. FRAMEWORK OF VISUAL PERCEPTION SKILLS[19]

Visual Discrimination	Ability to make distinction, to identify external features and internal features of objects, pictures and shapes
Visual Figure-ground Discrimination	Ability to isolate a specific object from the background or surrounding visual information
Visual Closure	Ability to make sense of or recognise a total picture or object when only part of it is visible
Visual Motor Coordination	Ability to effectively use hands & body parts in partnership with vision to perform tasks involving the efficient manipulation of tools or objects
Visual Memory	Ability to recall past experiences and store and retain that information
Visual Spatial Relations	Understanding of one's self in relation to others and objects around us and the relationship between others and objects

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[19] Shared by Positive Eye Ltd – Positive Looking 2

The visual perceptual skills which can be developed in children related literacy could be:[20]

> - **Visual Discrimination** (including 2D and 3D objects/shapes/ representations, perspective, photographs, black & white, colour, symmetry, pattern and facial expressions)
> - **Figure Ground** perception/discrimination
> - **Visual Closure** and recognising critical/key features
> - **Visual Motor** integration including hand-eye coordination and scanning, eye teaming
> - **Visual Memory** or recall, and recall of left to right sequencing
> - **Spatial awareness:**
>   - understanding of gesture
>   - posture
>   - inter-social behaviours
>   - position in relation to other visual elements
>   - the understanding of conversions of 3D to 2D representations
>   - the understanding of changes relative to oneself as they change in relative size and orientation

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[20] Shared by Positive Eye Ltd – Positive Looking 2

2. VISUAL PERCEPTION RELATED DORSAL – VENTRAL STREAM DYSFUNCTIONS ON ACCESS TO READING AND MATHS TASKS[21]

A child needs to have the ability to visually process and visually attend to develop print awareness skills. Children with CVI can experience disturbances in processing the visual information that is transmitted to the brain, affecting their reading and writing development. The two main types of visual processing disturbances are ventral stream dysfunction (what pathway, affects visual recognition) and dorsal stream dysfunction ('where' pathway, impacting on visual attention and search skills).

I. Dorsal stream dysfunction	Impact on reading	Impact on maths
Crowding This means the degree of interference caused by neighbouring letter characters. This will depend on several factors, including the space between the characters and their size.	If there is no adequate spacing between the letters, the child may experience problems seeing each letter within the word.	If there is not adequate spacing between the shapes, objects or numbers presented, the child may have difficulty seeing one from another and all the elements in the task.

[21] Reference: Lizabeth Barclay (2015). Assessments linked to interventions: Literacy and Math. In A. H. Lueck, & G. N. Dutton (Eds.), *Vision and the Brain: Understanding Cerebral Visual Impairment in Children*. New York: AFB press.

I. Dorsal stream dysfunction	Impact on reading	Impact on maths
Visual clutter This means the child may have difficulty when there are too many objects, letters, items or details presented to them. Also the way in which they are represented and organised can lead to difficulties in performing the task set.	Too much print or too many images presented on a page or within an image can lead to the child having difficulties processing the information.	To many numbers or images of shapes or complex maths layout presented to the child at one time can lead to the child having difficulties processing the information.
Visual sequential memory This means the child may have difficulty remembering details presented visually in the correct order.	The child may have difficulty remembering the correct sequence of letters in a word. This may impact on their ability to spell words correctly.	The child may have difficulty remembering the sequence of numbers e.g. counting up in 5's, 10's times table work.

I. Dorsal stream dysfunction	Impact on reading	Impact on maths
Visual search This means the child may have difficulties with visually searching the environment or work-sheet/textbook/computer screen for a specific object or target positioned amongst others. The child may have difficulties with moving their eyes from one object to another.	This means the child may have difficulties with finding a specific word, phrase, sentence, moving to the next line, scanning a page for a specific paragraph.	This means the child may have difficulties with finding a specific number, set of numbers, particular question from a page of their maths textbook.
Simultaneous processing of information This means the child may have difficulty processing information when they are expected to use more than one sensory channel (e.g. vision, hearing and tactile). This may be caused by the condition **simultanagnosia** – the inability to perceive	This means if the child is asked to listen to the story whilst reading the text and hold an object relating to the story, it may impact on their ability to process information.	This means if the child is asked to hold concrete objects whilst counting and listen to a CD of counting whilst doing so, it may impact on their ability to process information.

I. Dorsal stream dysfunction	Impact on reading	Impact on maths
more than one item at once. They may also experience an associated condition apraxia of gaze, which means the child may have difficulty moving their eyes easily from one object to the next.		

II. Ventral Stream Dysfunctions	Impact on reading	Impact on maths
Shape agnosia Agnosia affects the child's ability to process sensory information. This means the child may have difficulty processing shape information.	This means the child may have difficulty recognising the shapes of letters.	This means the child may have difficulty recognising the shapes of numbers or geometrical shapes.

I. Dorsal stream dysfunction	Impact on reading	Impact on maths
Visual Memory This means the child may have difficulty remembering past visual experiences and link this to current experience.	The child may have difficulties with recalling letters or words they have read before when reading current text.	The child may have difficulties with recalling numbers they have read before when reading current numbers.
Visual form constancy This means the child may have difficulty mentally manipulating a form and visualising the resulting outcomes.	The child may have difficulties with recognising the same letters regardless of changes in size, **shape**, and orientation. The child is likely to reverse letters (e.g. 'p and q' and 'b and d').	The child may have difficulties with recognising the same number/shape regardless of size, shape and orientation.

3. VISUAL DISCRIMINATION ACTIVITIES TO SUPPORT WRITING, LETTER FORMATION AND SPACING

Examples of possible goals:

- To recognise familiar objects
- To discriminate between people and objects
- To recognise photographs
- To recognise pictures
- To recognise outlines
- To understand and making inferences from pictures

Suggested ideas:

- Make up stories using 3 details/objects from a complex picture
- Match pictures of super heroes to cartoon outlines
- Find details from models/dolls and spot differences
- Spot differences in photographs
- Group pictures with similarities
- 'I Spy' games (some useful ones online)

VISUAL DISCRIMINATION[22]
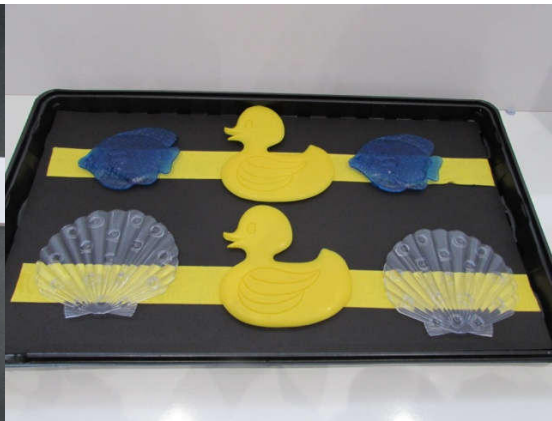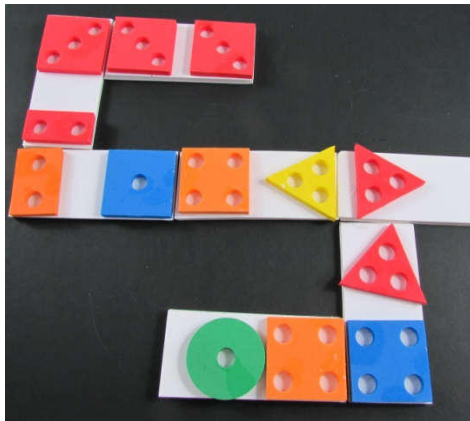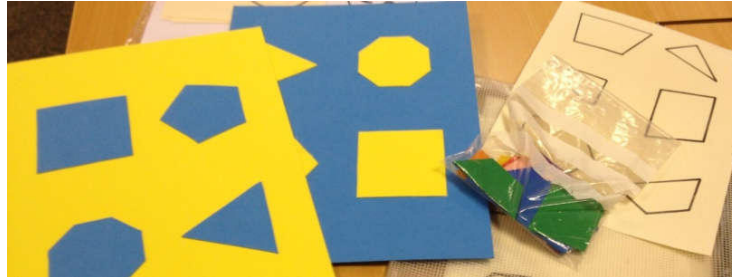
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www.positiveeye.co.uk 2016: Positive Looking 2

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[22] Photographs on this page are shared by Positive Eye Ltd

4. FIGURE GROUND ACTIVITIES[23]

Possible Goals may include to:

Discriminate

- Objects against different background

- Between letters or symbols against a visually 'busy' background

- Between moving objects against different background

Identify

- Distinctive features of 3D real and abstract objects/figures

- Coloured items in pictures by pointing

Locate

- Small details in a patterned background

Recognise

- How action and movement is depicted in pictures

- Perspective in pictures

Sequence

- Pictures by size, time, event, etc.

Match

- Pictures by fine detail

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[23] Reference: Positive Looking 2 – Positive Eye Ltd

Distinguish

- Between print and pictures in books

Suggested activities:

- Looking for a tool in a tool box
- Picking out a pen in a pencil case
- Using 2 pieces of the same wrapping paper with pictures– cut out pictures to match against the second piece
- Laminate pictures and ask child to circle with white board pen named objects or features (NB avoid glare but matt laminate may not rub off successfully)
- Ask the child to cut out the pictures identified

VISUAL FIGURE GROUND ACTIVITIES[24]

Picking objects from different backgrounds

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[24] Photographs on this page are shared by Positive Eye Ltd

5. VISUAL CLOSURE ACTIVITIES[25]

Possible goals:

- Relate part of an object to a whole
- Find an object or toy which are partially hidden
- Assemble a familiar object from component parts
- Identify the missing parts of an object

Suggested activities:

- Two sets of objects, one set placed on a tray, one set in a bag. Individual objects from the bag are revealed gradually to match the critical features of objects and make sense of them. (Do this activity in 3D and also with 2D images)
- Draw a picture/find pictures on internet with one part missing e.g. elephant without a trunk, a glove without a thumb, a cup with only part of a handle
- Linking parts of an object or scene to other parts to reason how they relate
- Exploration of features of objects – 'the bucketness of the bucket!' The handle, the circle formed by the top and the bottom of the cylindrical shape, the rolling space inside and the rectangular shape on the outside, the size, shape, colour and relative volume to other containers etc.
- The shape of a flower represented from the side and from above
- The shape of a cup from the side and from above

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[25] Reference: Positive Looking 2 – Positive Eye Ltd 2016

VISUAL CLOSURE ACTIVITIES[26]

Simple 2D jigsaws, stencils and 2D matching shape games

Photograph of objects from different angles

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[26] Photographs on this page are shared by Positive Eye Ltd

6. VISUAL MOTOR – COORDINATION ACTIVITIES[27]

Possible goals to include:

- The development of strength in hands, wrists and fingers

- Developing the ability to use fingers independently of each other

- Improving use of tools/gadgets

- Improving pencil control

- Promote good visual function including fusion and accommodation

- Promote reading speed and efficiency

Suggested activities to do:

- Dressing: buttons/buttonholes, laces (or toggle laces), Velcro-fastening, self-care including toothpaste on a brush and brushing, using mirrors, brushing hair or cutting nails cleaning shoes

- Eating and table activities – using cutlery, placing plates and dishes on a table – using a cup, serving own food, pouring drink, buttering bread, etc.

- Peeling a banana

- 2D activities using paper and pencil/pen, tactile raising paper – tracking exercises, mazes, tracing shapes/letters, colouring shapes/pictures, dot to dot or colouring tactile pictures

- Representational drawing conventions – changing basic shapes into familiar conventional images (e.g. circle – a cat, a face, an egg, a dog). Rectangles – a house, a car/truck, a chair or a table

- Fitting objects together – lids on jars, nesting boxes or lids on boxes;

- Clapping games

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[27] Reference Positive Looking 2 – Positive Eye Ltd 2016

VISUAL MOTOR COORDINATION ACTIVITIES[28]

Fitting objects together lids on bottles

Manipulation of objects – scooping rice with measuring spoons

Making pastry – using cookie cutters

Threading beads

www.positiveeye.co.uk 2016: Positive Looking 2

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[28]. Photographs on this page are shared by Positive Eye Ltd

7. FORM CONSTANCY ACTIVITIES

See a form and find it among other forms, even when the size is different or the form is rotated. It is the ability to recognize forms, letters or words despite their orientation (e.g. upside down, sideways or inverted).

The child may have problems with:

- Reading – the child may not recognise familiar letters when presented in different styles of print (e.g. fonts, size or colour)
- Mastery of the alphabet and numbers may be at a slower pace as a result
- May not recognise errors made when writing, spelling or completing maths activities
- Confusion between "p, q and g", "a and o", "b and d"
- The transition from printed letters to cursive letters is often a challenge to children with CVI or VI
- Accurately understanding the size of objects regardless of their distance
- Examining things from an angle
- Understanding volumetric concepts such as mass, amount and quantity
- Recognising objects/items that should be familiar when environmental conditions change
- Attending and focussing on work tasks

Suggested Activities:

1. **Activity one: Building blocks**

   - Using construction activity sets to build block designs to a diagram or a model (e.g. Lego or Duplo)

2. Activity two: Copying activities

   - Create copying activities for the child to complete. Begin with simple black outline pictures, pictures of one object, enlarged pictures or pictures with a detail removed. Ask the child to copy the picture.

   - Gradually build the complexity of the image for the child to copy.

   - Use 2D plastic shapes and position on Gripping Stuff (sticky surface from www.grippingstuff.com) on the child's workboard and create patterns for them to copy

3. Activity three: Which shape fits

   - Present a black rectangle with a shape cut out from it

   - Present two or three options of the cut out part presented at different planes. Ask the child to select the correct one to fit back into the rectangle
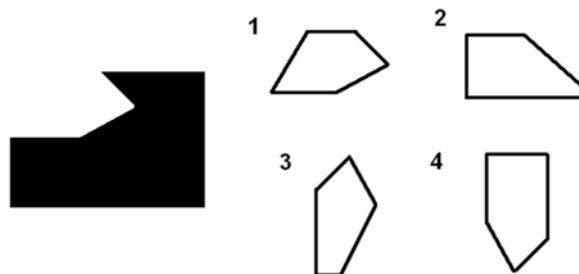
29

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4. Activity four: Play arrow turns
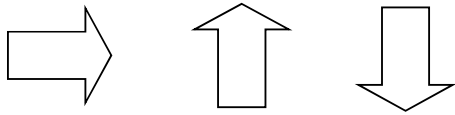
- Give the opposite direction of the arrow: down for up, up for down, left for right and right for left
- Alternative: say clockwise quarter turns: up becomes right, right is down, down is left and left is up

Two tips:

a) When learning a letter form, have the child work in the same plane as it is being taught (they need a vertical board if that's what you're using)

b) Teach them to tilt their head or eyes if they have trouble visualizing something at a certain angle

8. VISUAL MEMORY ACTIVITIES[30]

Possible Goals may include:

- Learning to pay conscious visual attention
- Developing the ability to remember and recall concrete objects
- Recalling the layout of a room
- Recalling where things have been placed on a table top
- Remembering written information accessed earlier

Suggested activities:

- Following and repeating patterns with threading beads or pegboards
- Recall of series of written numbers building up to telephone numbers
- Memory frames – memory technique – imagine putting a group of objects in a room/on a boat/raft, on a set of steps, on a line, in a park – to aid recall
- Create 'memory' journeys inside and outside
- Include actions in experiential learning and embed details to recall by drawing attention to detail e.g. let's look at the tree together, it has a thick trunk
- 'Kim's Game': remember a group of objects and then say which one is missing after re-revealing. Vary this game to include objects with the same colour, objects with the same initial sound e.g. pen, peg, paper, plug, Peppa pig.
- Remembering how to put together a construction toy

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[30] Reference: Positive Looking 2 – Positive Eye Ltd 2016

VISUAL MEMORY ACTIVITIES[31]

Pair objects that go together, by shape, size, texture, purpose

Pairs games

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[31] Photographs on this page are shared by Positive Eye Ltd

9. VISUAL SEQUENTIAL MEMORY ACTIVITY

Suggested activities to do:

1. Acitvity one

   - **Aim**: to remember ten pictures or objects in sequence from left to right

   - Two picture cards are placed on the table

   - The child names the pictures

   - An additional card is placed down on the right and the first card is turned over to conceal its picture

   - The child names all three pictures

   - Continue as above until all ten cards can be named from memory

2. Activity two

   - Two picture cards are placed down and a silly connection between them is thought (e.g. "The cat has a box on his tail and he is up a tree with a circle on his head)

   - Continue until all ten cards can be remembered in sequence

   - When the child can remember the sequence, one card is turned over so that the child can see all but one of the pictures

   - He must then name the missing picture

3. Activity three

   - The above can be played with objects instead of pictures (e.g. pencil, paper clip, rubber, etc.) and a silly association is made between them

   - One object is then removed for the child to name, by remembering the sequence

   - A space can be left where the object should be or, more difficult, the space is closed up and the child must then go through the remembered sequence until he finds the missing object.

10. SPATIAL RELATION ACTIVITIES 1 – 16 AND GENERAL STRATEGIES

General strategies to explore when supporting a child with visual perception difficulties

- Sit child square on to the board or face to face, to avoid having to turn towards visual and verbal stimuli
- Display boards should be in the child's direct line of vision with the minimum opportunity for distraction, adjust to compensate for restricted vision/field defects
- Position the child at eye level to the computer screen
- To encourage visual attention, work face to face so that the child can see facial expressions and the adult can check the direction of eye gaze and eye movements
- To encourage and support writing and other practical organisational learning skills, sit alongside the child to enable them to have the same angle of vision
- The child should be seated in the front or middle of the group during group work
- Ensure that the child has enough space to work effectively at the table
- The child may find it easier to work on paper positioned at an angle to the edges of the desk. Use a clip board which the child can adjust to the angle they require
- Surfaces should provide a clear background for writing, drawing, etc.

Activity 1 – Visual spatial-relations colour the matching shapes
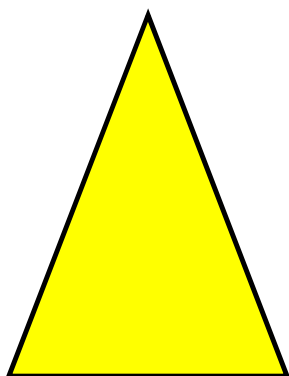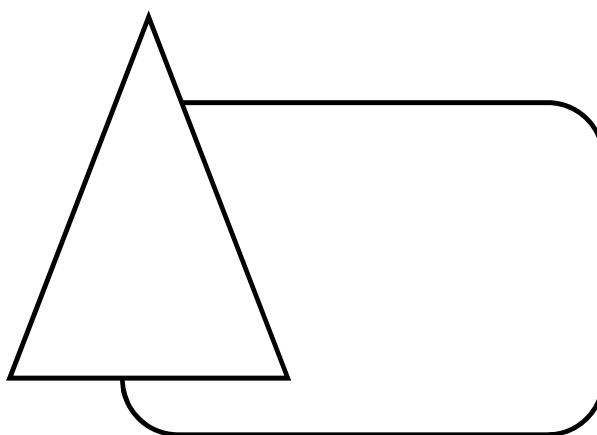
Activity 2 – Visual spatial-relations colour the matching shapes
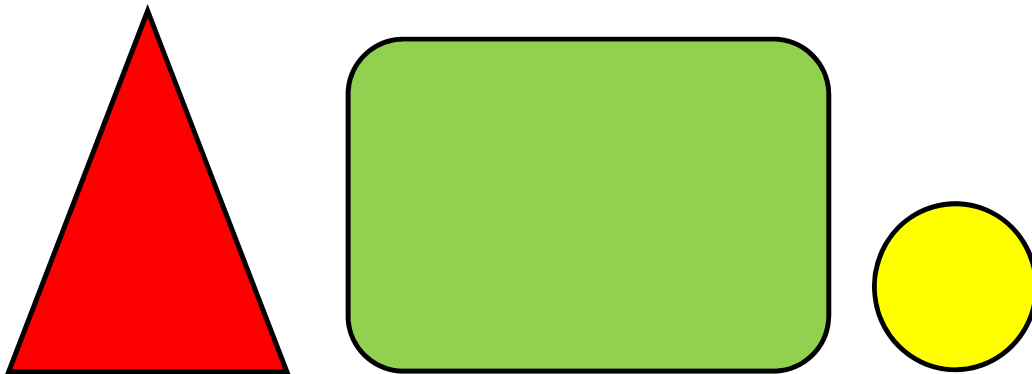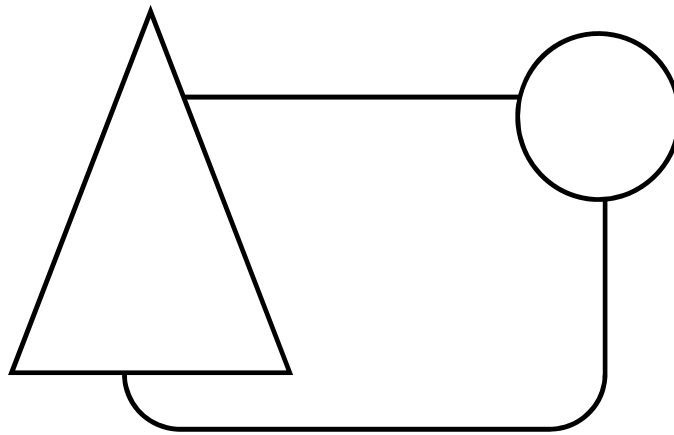
Activity 3 – Visual spatial-relations draw a line between the shapes that are the same
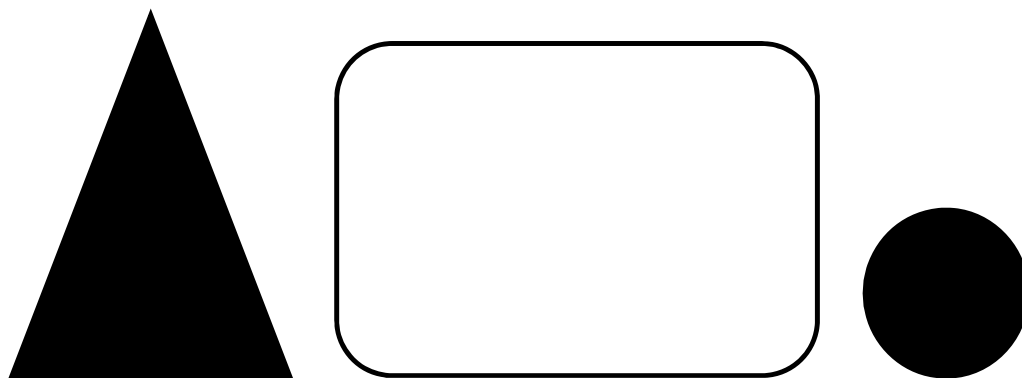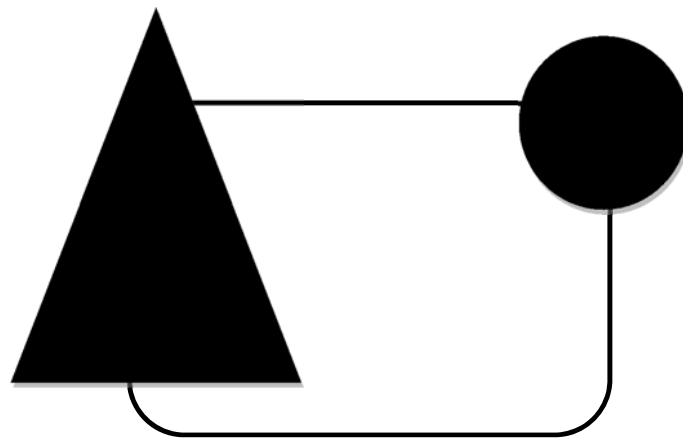
Activity 4 – Visual spatial-relations draw a line between the same shaped pattern
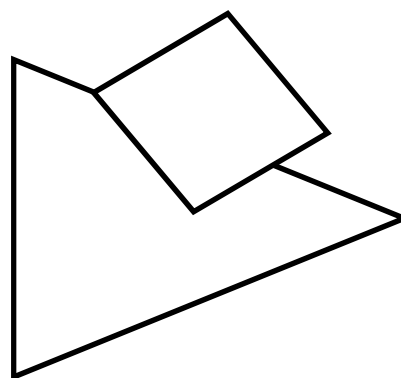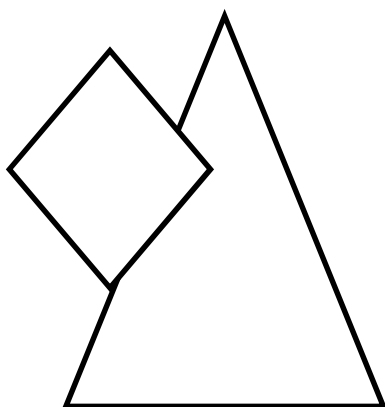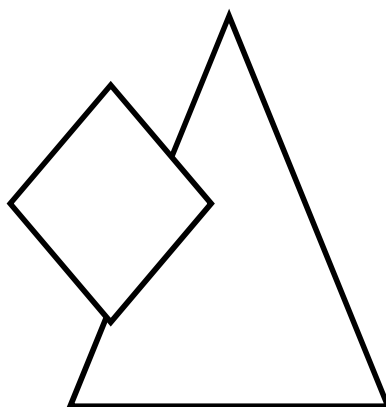
Activity 5 – Visual spatial-relations draw a line between the same shaped pattern
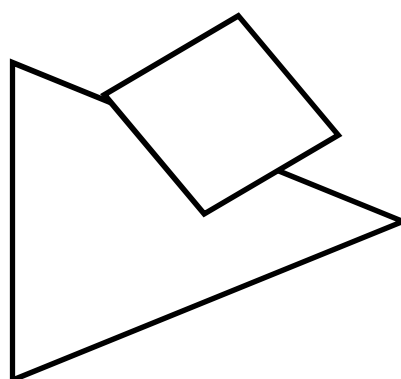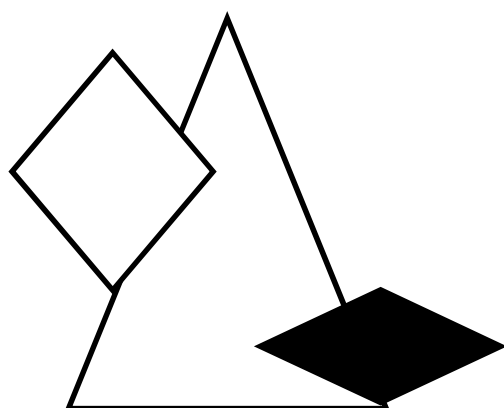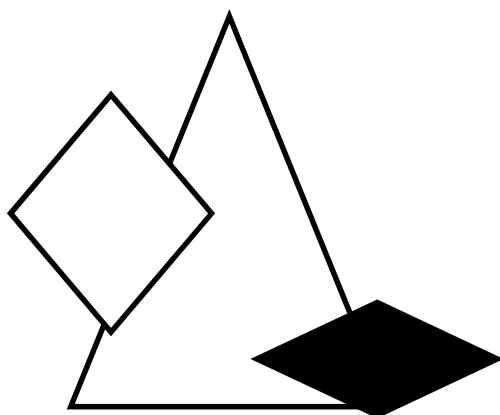
Activity 6 – Visual spatial-relations colour the shapes
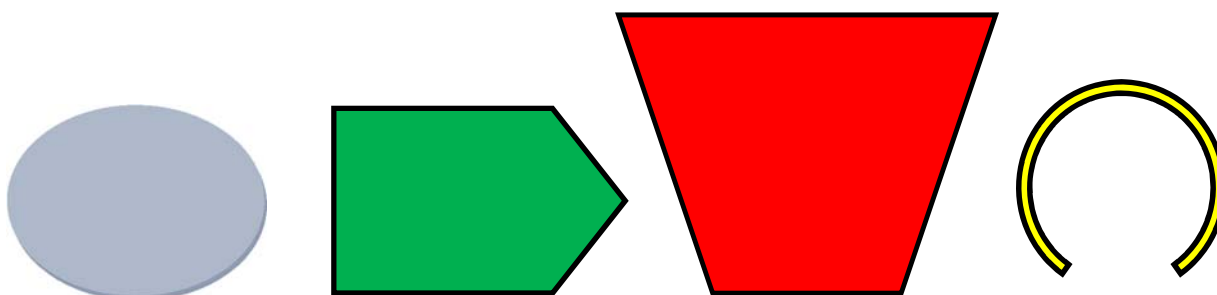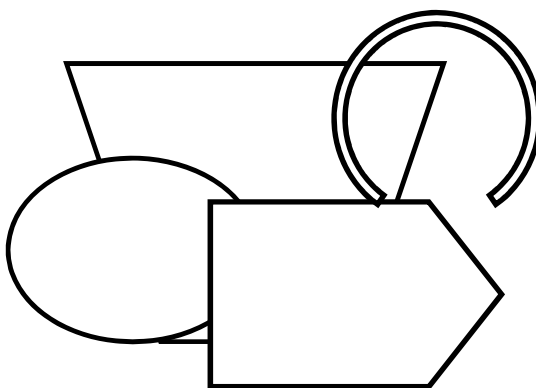
Activity 7 – Visual spatial-relations circle the odd one out
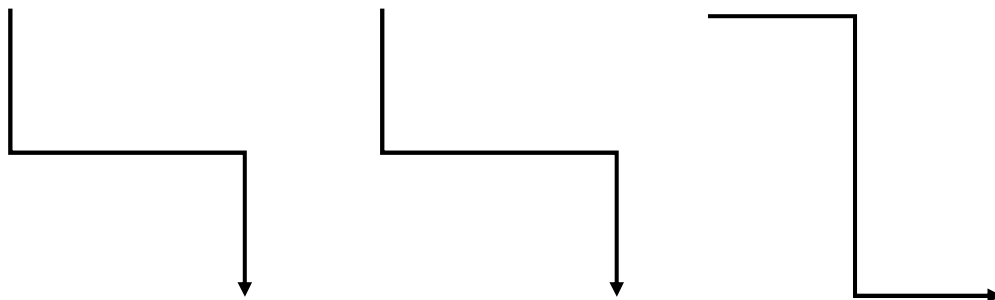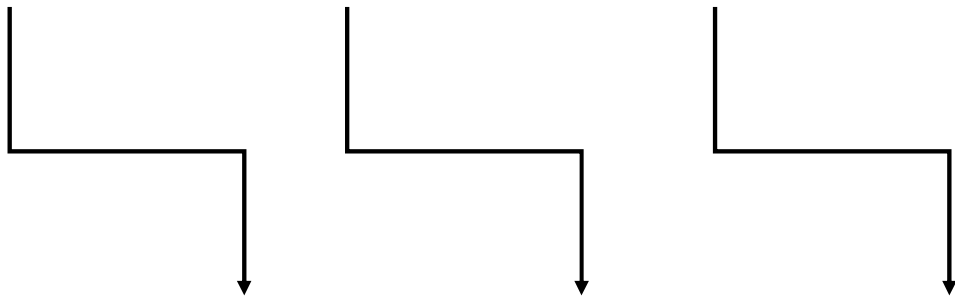
Activity 8 – Visual spatial-relations circle the odd one out on each line
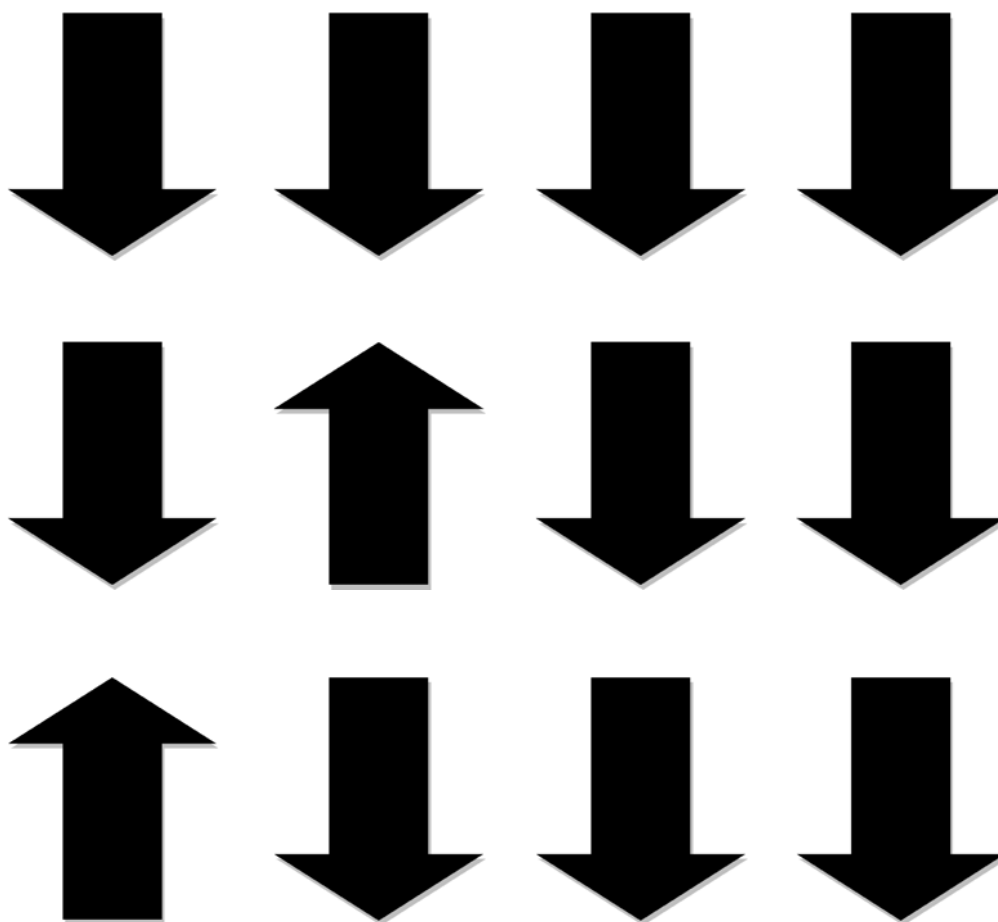
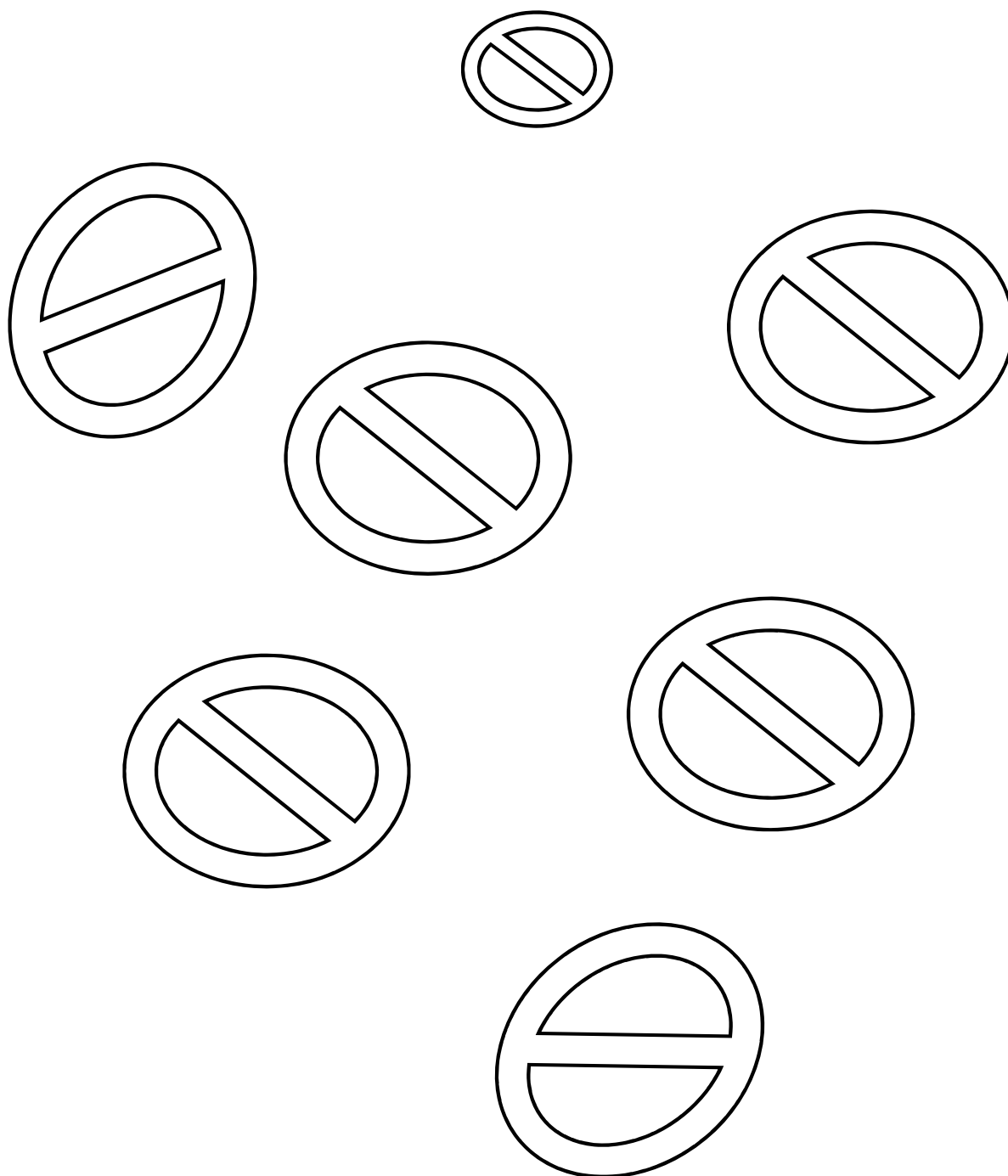**Activity 9 – Visual spatial-relations circle the odd one out on each line**
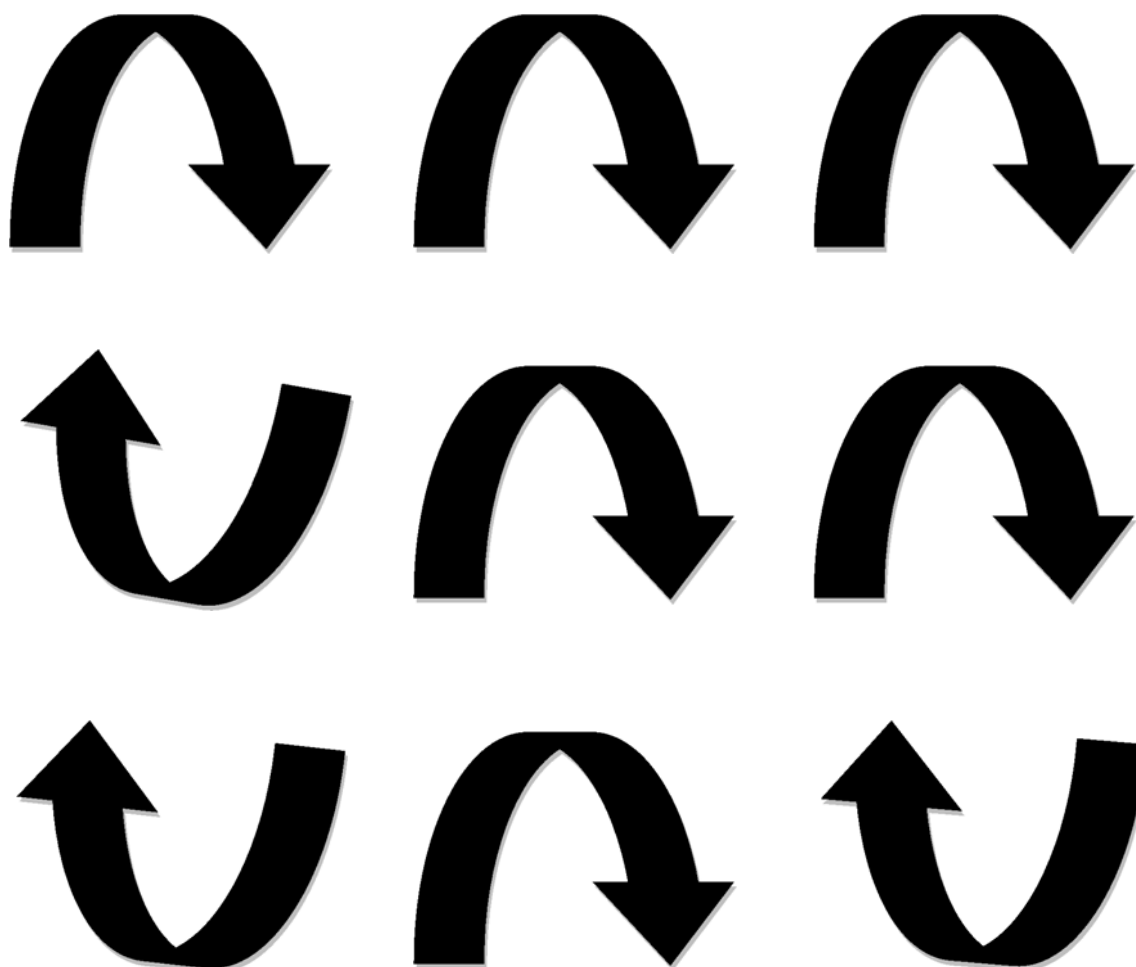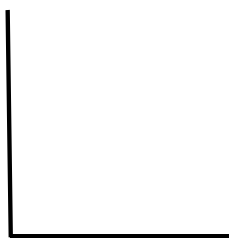
Activity 10 – Visual spatial-relations

circle all the lines that curve this way
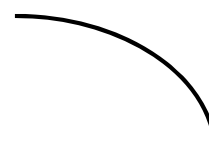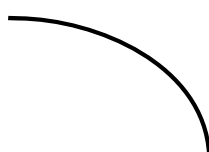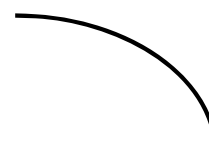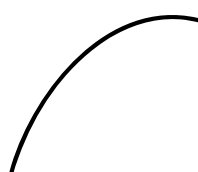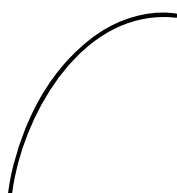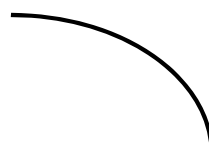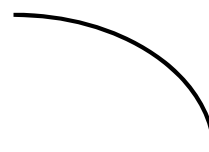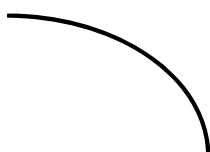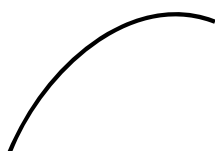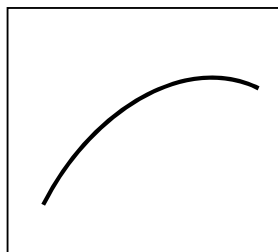
Activity 11 – Visual spatial-relations
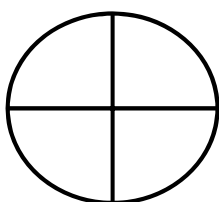## colour all the shapes which are presented like this

Activity 12 – Visual spatial-relations
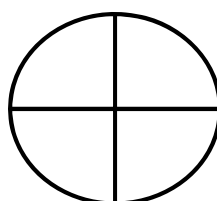## draw lines to complete each rectangle
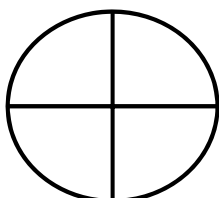
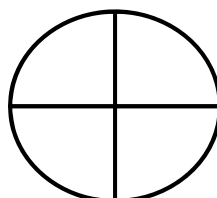## Activity 13 – Visual spatial-relations

Colour top left quarter

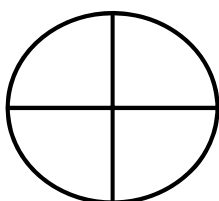Colour bottom right quarter
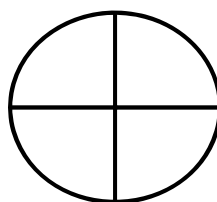
Colour bottom right quarter

Colour bottom left quarter

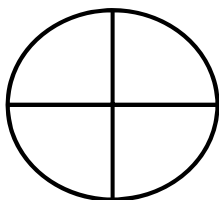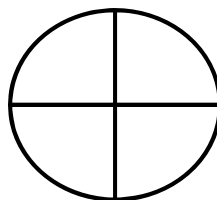# Activity 14 – Visual spatial-relations

Colour left half

Colour right half

Colour top half

Colour top half

Activity 15 – Visual spatial relations activities
Slap-tap to support laterality[32]

Two important considerations in spatial relationships are **laterality** and **directionality**.

Children who reverse letters are often lacking in this important perceptual skill.

Laterality is the ability to know right from left on oneself.

Slap-Tap Letter Reading

Supports integration of laterality with directionality. Left – right body awareness with left – rightness of other objects.

Supports the child to recognize common letter reversals:

1. Translate the loop on the letters' stem to the corresponding body part:

   • p has the loop on the top right of the stem = Right hand

   • q has the loop on the top left of the stem = Left hand

   • b has loop on bottom right of the stem = Right foot

   • d has loop on the bottom left of the stem = Left foot

2. As you read the letters aloud, tap the appropriate body part at the same time.

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[32] **Reference:** Eye Can Learn (n.d.). Retrieved from http://eyecanlearn.co m/perceptions/spatial/slap-tap/
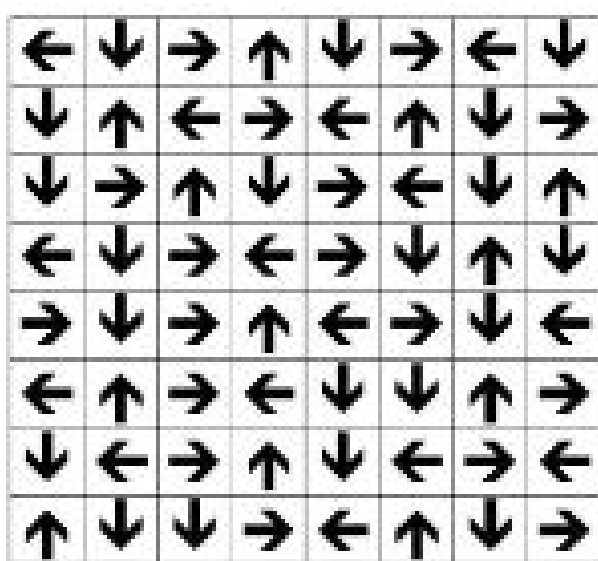
p q b d q p b d q p

q b p d p d q q d p

b q p d b q p d q d

b p b q p d b q p b

q b q p q d b d d b

d p d b q p b d q p

d q b d q p p b d q

Activity 16 – Visual spatial relations activities[33]

Directionality is the ability to see right and left on other objects.

Able to detect how words appear left to right on a page of text.

Know the difference between letters (e.g. *b* and *d)*.

DIRECTIONALITY: Name the Arrows

1. Say the direction of the arrow: up, down, left or right.

Letter Tic Tack Toe with *b* and *d*, *p* and *q*.

Use similar letter pairs to develop spatial relations and improve letter reversals. If the child makes a mistake and writes the letter backwards, the square goes to his partner.

[33] **Reference:** Eye Can Learn (n.d.). Retrieved from http://eyecanlearn.co m/perceptions/spatial/slap-tap/

VARIATION: Use right and left arrows to help directionality.
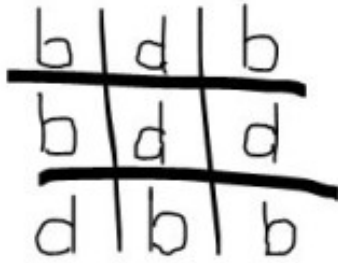
Visual – spatial relations

Photographs on this page are shared by Positive Eye Ltd

Small world play

Nets of shapes
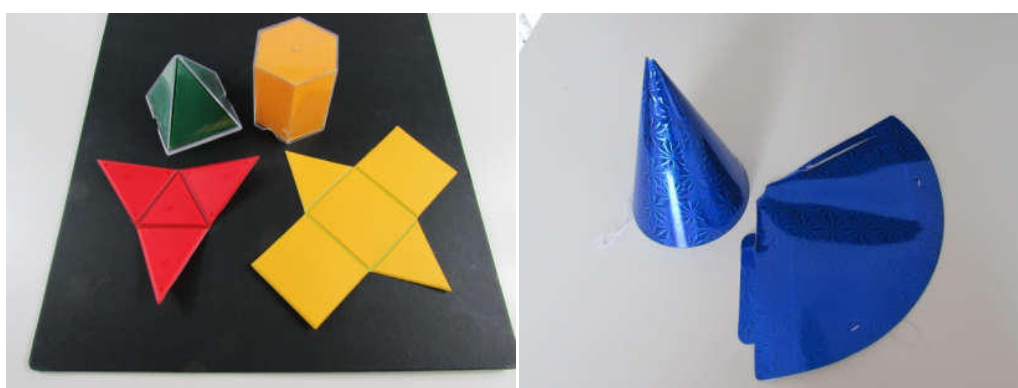
Part 10: Checklist when assessing children with CVI

1. CHECKLIST – PATHWAY OF ACTIVITIES WHEN ASSESSING CHILDREN WITH CVI
ON REFERRAL CONSIDER THE FOLLOWING

1.	**Interview with parents** Have you asked this type of question during the interview?	✓ **Comments**
	Case history/cause of the CVI	
	Do you know if your child can follow a visual stimulus with their eyes?	
	Is your child interested in what is on an iPad or a computer screen?	
	Does your child grasp or tries to stretch toward a visual stimulus?	
	What is your child's stamina level like?	
	Does your child have a favourite colour?	

		Comments
	What kind of toys does your child like (e.g. sound, light or touch)?	
2.	**Has the child been seen by the Ophthalmologist / Optician / Optometrist?**	**Comments**
	Have they looked and reported on the child's pupil size with a pencil light (motility) and assessed the child's stereo vision (according to age)?	
3.	**Has an observational assessment been performed by the Ophthalmologist / Optician / Optometrist and Teacher advisor? Have the following areas been considered during the observation?**	
	How does the child look at visual stimulus?	
	Does the child follow the visual stimuli's movement?	
	What colours does the child like?	
	Does the child's eyes cross at midline?	

	What kind of visual stimuli does the child like (e.g. beads, pictures, colourful things, stimuli with light and sound)?	
	If there is no information about the above from the referring ophthalmologist, the Institutes/local hospital Ophthalmologist / Optician / Optometrist need to look at: • Focus • Accommodation • Do eyes follow visual stimuli • Movement of eyes (saccades) • Strabismus • Nystagmus • Colour vision	
4.	**Has a visual acuity test been performed by: Ophthalmologist / Optician / Optometrist)?**	
	Near vision	
	Distance vision	
	Visual field (functional)	

5.	**If there is a suspicion or confirmed damage to the ventral stream, have the following tests been performed?**	
	Lea Rectangle test and Lea Mailbox game (can be performed by the Optician or teaching advisor/teacher of VI).	
6.	**Has an observation been completed of the child in their environment (e.g. at home or in kindergarten/school)?**	
	Performed by teaching advisor/teacher of VI. Consider how does the child react to sound stimuli, move around and interact with his/her environment, use touch/auditory skills and fine motor skills?	
7.	**Have other tests been considered (if appropriate) which may be useful to perform at home or in kindergarten/school?**	

2. VISUAL PROFILE

Provide brief history/eye condition of the child:	
Has the child ventral or dorsal stream difficulties? **Describe impact on access to the curriculum and environment.**	Comment:
State if the child has the following: Strabismus? Yes/No Nystagmus? Yes/No Colour vision? Yes/No	Comment:
How does the child use their functional vision?	
Visual stimulus	Comment:
Does the child look directly at a visual stimulus?	
Does the child have a favourite visual stimulus? Yes/No If yes, what is it?	
Visual field	**Comment**
At what point are objects observed when brought into left / right / up / down visual field?	
Does the child block either eye to look through one?	

Colour vision		Comment
Response to colour	Matching colours	
Red Y/N	Y/N	
Yellow Y/N	Y/N	
Blue Y/N	Y/N	
Green Y/N	Y/N	
Orange Y/N	Y/N	
Purple Y/N	Y/N	
Black Y/N	Y/N	
Contrast sensitivity		
How does the child respond to stimuli presented on:		Comment:
High contrast		
Low contrast		
Patterned background		
Eye Movements		
Do the child's eyes cross at midline? Yes/No		Comment:
Can the child focus on visual stimuli? Yes/No		

Can the child accommodate? Yes/No	
Are the eyes able to perform saccadic movements? Yes/No	
Can the child's eyes follow/track visual stimuli? Describe tracking. E.g.	
Can child follow a moving person across the room?	
What is the best viewing distance for the child to perceive an object/activity?	Near _____cm Distance_____cm
Mobility/daily living skills	
Can the child move around confidently in a known environment? At home: Yes/No In school/kindergarten: Yes/No	
Can the child move around confidently in an unknown environment (e.g. at a friend's house or in the shopping centre)?	

Fine and gross motor skills	
Does the child have any problems relating to their fine motor skills? Yes/No If yes, explain.	
Does the child have any problems relating to their gross motor skills? Yes/No If yes, explain.	