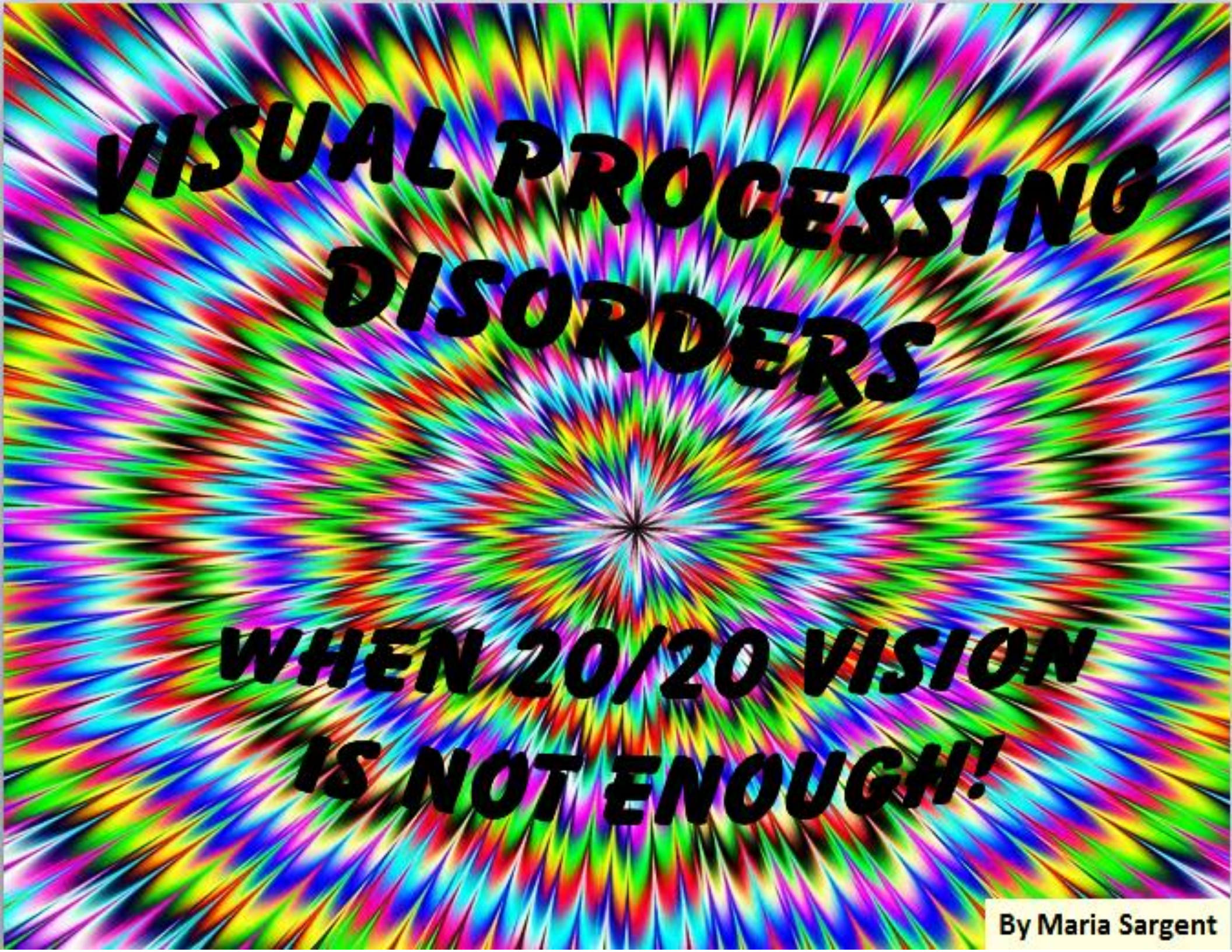
VISUAL PROCESSING DISORDERS
WHEN 20/20 VISION IS NOT ENOUGH!
By Maria Sargent

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What are Visual Processing Disorders?

Visual processing disorders are problems that fall outside of the normal visual acuity definition (near or far-sightedness). Children with these disorders may "see" just fine, but their brains do not process the information correctly. Because the problem is associated with how the brain uses the visual information being received, many of these students will test at or near 20/20 vision. In light of this discrepancy, it is easy to understand why so many students with visual processing issues are not diagnosed until they experience significant failure in school.

So, how can we determine whether a student is having difficulty with visual processing? We will eventually cover specific information for each disorder, but to get started; here are a few rules to follow:

1. **ASK the child what they see** I know this sounds so common sense, but I cannot tell you how often I will work with a child who has been referred for inattention or behavioral problems, and when I ask them about their vision, they will casually state that they see two of everything. The child does not realize that their "way of seeing" is unusual, and because the problems come on so slowly and so early the student does not remember seeing the world in a different way. This means a casual question of, "Can you see that OK?" will not work. They will just answer "yes" because it is the only visual state they can recall.

So, be specific when you question a student about their vision. Ask whether they are seeing double (define this for younger children). Ask them whether they are skipping lines, losing their place when

reading, etc. A quick questionnaire for your use can be found online at www.Neuro-Teach.com under the PROCESSING tab that provides some questions that can be used.

2. **Look at academic work** Again, this seems so common sense, but we often miss the clues a student gives us about their vision. Is the student always missing a section of their work? Do you see the child turning their head from one side to another when looking near versus far? Do they complete some work well and other pieces poorly, and if so, can you see a pattern? Is there a difference when the writing is crowded, a larger font, there is white space between sections, etc. Look for any information you can get!

3. **Observe movement around the room, in gym, and at recess** Many students with visual processing problems move poorly. They bump into people, their materials, or toys and seem to be accident-prone. You may see them walking well in the hall, but the minute they come to a staircase, they pause and seem to have difficulty. Sometimes parents will report the student gets car-sick easily, or you may notice they have difficulty on playground equipment like swings or merry-go-rounds. A physical education teacher may report incidents where the student consistently misses catching or kicking balls. Just remember that eyesight is much more than academic work, and many of our clues will be found outside the classroom.

4. **Take a VERY close look at any child being referred for school failure, attention problems or behavioral issues** Imagine what is must be like to be in a classroom and being unable to see well. It is not hard to understand why such a student would eventually avoid schoolwork and let their mind drift. It is also not difficult to see how they could eventually "find something else to do" especially if they are bright and bored. In other words, we may be missing the **cause** of academic failure, ADD/ADHD, and behavior issues if we do not look closely at visual processing. It saddens me to see so many students with visual problems being misdiagnosed with ADD and ADHD. Those checklists (i.e. to screen for ADD/ADHD, etc.) are useful, but they can only document the behavior you are seeing. They do not do a good job of determining the *source of the behavior*. It is up to YOU as the teacher to add some common sense back into the mix and look at these other issues…

Types of Visual Processing Disorders

So what are the different types of visual disorders? While you may see different professionals categorize them in various ways, we will be looking at the following three main groups in this document:

Eye Movement and Control Problems

These problems emerge when the muscles of the eyes do not work properly and/or one eye does not function well so the brain begins to turn "off" that eye to control the sensory input. When eyes do not move together or only one eye is functioning, it is difficult to complete almost all academic tasks. In many cases, you will see one of the eyes out of alignment (off-center) periodically, if not most of the time.

Visual-Spatial Perception Problems

These problems stem from how the brain perceives what the eyes are seeing. In these conditions, the eye is taking in the information properly, but the brain is not putting it together in the manner it should. Because vision is a very complex process, the brain really controls the process. You may think you are seeing what you are seeing, but in reality, much of vision is actually created in your brain. When that assembly process does not work properly, some pretty strange problems can occur. Some of the most unusual and difficult visual processing disorders will fall in this category.

Additional Problems

The last section will focus on problems that do not fit readily into the other two categories.

On the next page you will find a quick chart of the various conditions we will be looking at in this unit.

PLEASE NOTE: *The intention of this unit is to give you enough information to note possible problems and assist families in obtaining the proper medical diagnosis through a qualified professional. It is not meant to be used by educators to diagnose the student within the classroom. I KNOW you know this, but it is best to mention it directly* ☺

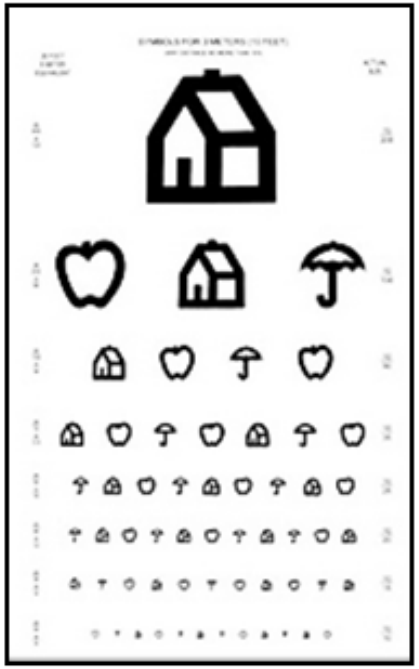
Processing Issue	Source of Problem	What you may see....
Teaming	Eye Movement & Control	▪ Blurred or double vision ▪ Loses place when reading
Convergence Insufficiency	Eye Movement & Control	▪ Difficulty seeing from board to desk and back ▪ May easily lose place or work very slow
Visual-Field Cut	Eye Movement & Control	▪ May routinely leave same portion of paper blank ▪ Will not notice missing area until it is pointed out
Visual-Closure	Visual-Spatial Perception	▪ Cannot recognize objects if part is covered ▪ Will lose objects or be unable to find them
Figure-Ground Discrimination	Visual-Spatial Perception	▪ Will not notice items against a crowded background ▪ Has difficulty with picture and word searches
Gestalt	Visual-Spatial Perception	▪ Will copy item outlines but miss inner detail OR// ▪ Copies items but separates pieces in strange manner
Face Blindness	Neurological / Gestalt	▪ Cannot recognize familiar adults and peers ▪ Cannot recognize own picture

Diagnosis

There are many wonderful eye doctors in the world, but they have different specialties and experiences. Because of this, you should advise families to search for doctors who have experience diagnosing visual processing problems in children.

Snellen Chart

Tumbling E Chart

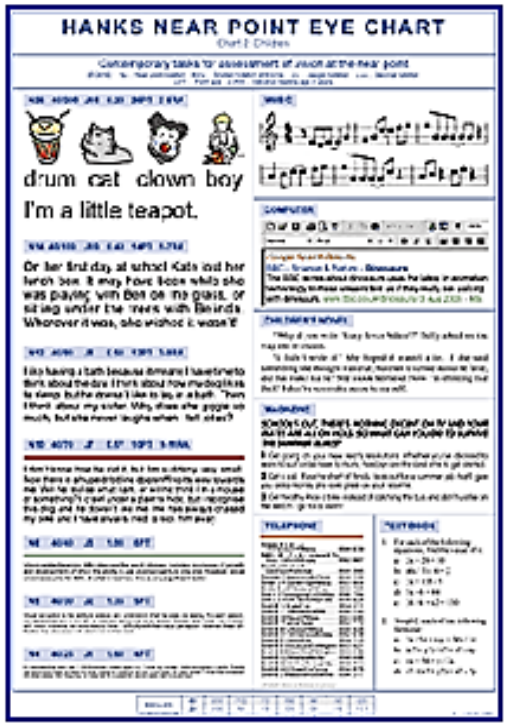


Allen Chart

The typical visual acuity exam determines whether a person can see a letter or symbol at 20 feet. The traditional chart most commonly used was developed by a 19th-century Dutch ophthalmologist named Hermann Snellen (1834–1908). This chart is now known as the Snellen chart. Other versions (Tumbling E and Allen Charts) are used for younger children who may not recognize letters yet.

It is important to realize that these vision charts assess distance vision (acuity); they do not determine many other aspects of vision. Other tests must be run to examine near vision and how the eyes are working together or perceiving stimuli. While most eye doctors *do* routinely screen for color blindness and misc. medical conditions, many do not perform these other tests in a routine eye exam.

Examples of "Near Point" Charts



To make matters worse, many children are not screened outside of school or the yearly physical performed in a medical doctor's office, and since and most of these locations only run a simple 20/20 chart in some form, other visual conditions may not be noticed. These children never see an actual Optometrist or "Eye Doctor" let alone experience these other exams.

This is why so many students with visual processing problems are not diagnosed. These children test as having perfect or near-perfect "20/20 vision" in the school setting or their yearly physicals, so visual problems are not considered when other problems emerge. You have to test specifically for many visual processing problems, and these tests are not happening on a routine basis.

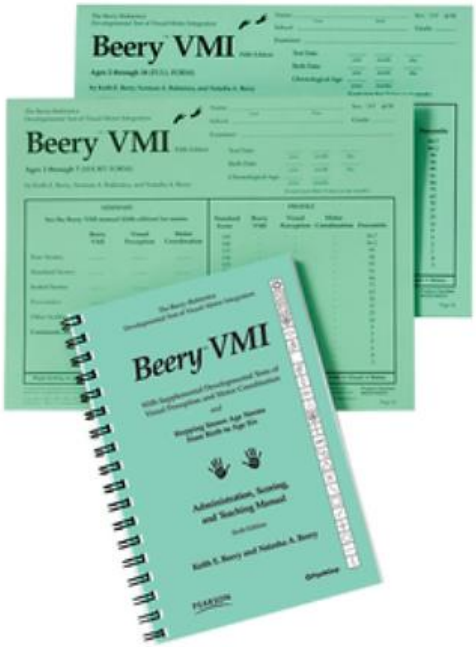
So, what should a family look for if they suspect their child has a visual processing problem? Well, the normal test for Visual Acuity at a Distance (normal 20/20 chart) must be completed, but in addition, here are the other tests that may be useful:

1. Visual Acuity at Near Distances (Near Point or Reading charts)
2. Eye Teaming Ability (Two eyes working together)
3. Eye Movement and Control Ability (Tracking and other skills)
4. Eye Focusing Ability (Keep focus when looking Near→Far and Far→Near)

Professionals: If one of your families cannot locate a doctor, the College of Optometrists in Vision Development can be a wonderful resource for locating a professional in your area. Their site also contains a wealth of information on vision development. The website can be found at http://www.covd.org/

Lastly, many of the tests used to examine visual perception (rather than medical eye function) are completed by other professionals, often Occupational therapists. Attempts are made to keep these tests "motor-free" so the ability to write and/or exhibit eye-hand coordination does not impact results. Please make sure that the two skills remain separate for the best understanding of the child's issues. Examples of motor-free tests include:

- The Developmental Test of Visual Perception
- The Test of Visual-Perceptual Skills
- The Motor-Free Visual Perception



Test that use some motor skills (i.e. writing or drawing) are used if the fine motor skills will not impact scores. Some of these tests include:

- The Bender Visual-Motor Gestalt Test
- The Frostig Developmental Test of Visual Perception
- The Test of Visual-Motor Skills-3
- The Beery-Buktenica Developmental Test of Visual-Motor Integration

Treatment

Treatment of visual processing disorders can be somewhat complicated. We are all familiar with students who have worn eye patches, but there really is much more to visual treatment----and also a great deal more controversy as well. For example, some professionals feel that eye control and movement problems are best treated through a combination of patching, and if needed, surgery by an Ophthalmologist (eye surgeon), and others feel that surgery should be a last-resort option and instead vote in favor of Vision Therapy, a treatment program that attempts to train the eye and brain to respond more appropriately to visual stimuli.

I personally do not favor one of these options over the other and have seen both used successfully, depending on the situation. In other words, that is a discussion best left between the diagnosing professional and the family since it is dependent on the student's particular case. That said, I do feel it is important to understand the nature of Vision Therapy. It is an amazing process and students going through it need your support. It is also good information since some of the simpler games and activities can be used casually in the classroom. Here are some links to get you started:

http://www.covd.org/?page=Research (research)

http://grantvisioncare.com/vision-therapy/ (FAQ)

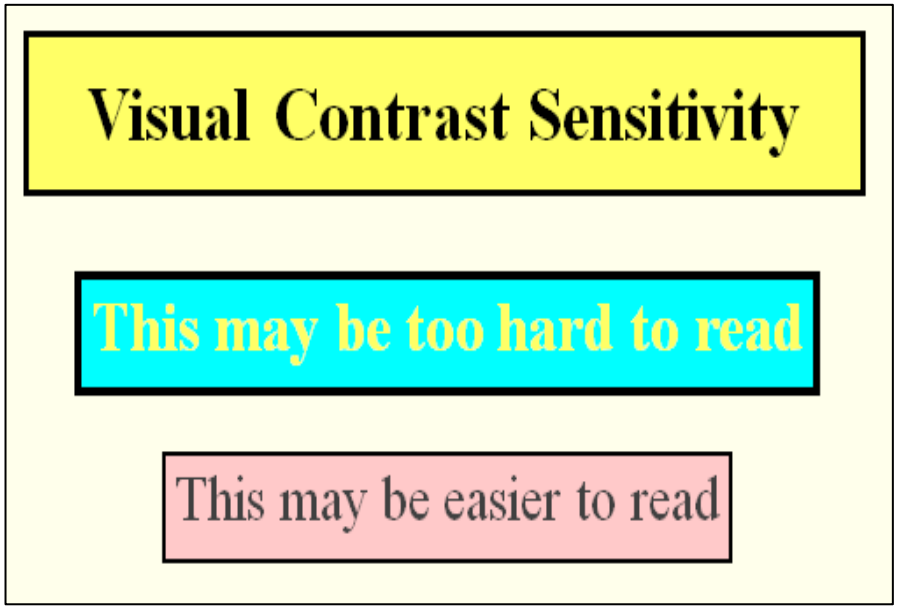
http://www.visiontherapy.org/ (general info.)

http://pinterest.com/covd/vision-therapy/ (examples)

http://www.childrensvision.com/photos.htm (photos)

General Classroom Solutions

We will eventually cover solutions for specific vision problems, but there are many general strategies you can use to make visual processing easier for all students, especially the child that is just developmentally young.

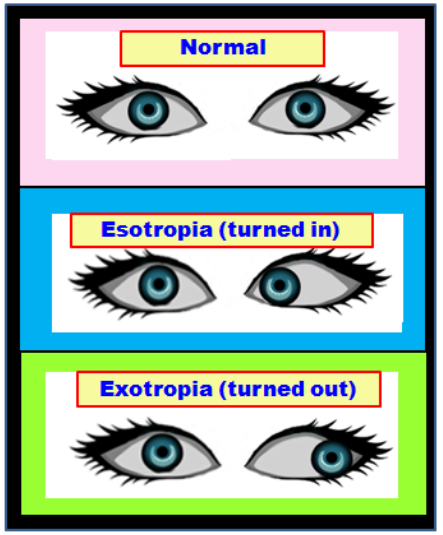


Here are some approaches to try:

- Enlarge print
- Use ***Comic Sans*** (free) font or **KG Neatly Printed font** (usually requires fee to download)
- Break visual tasks into small steps
- Give examples and draw pictures
- Reduce the color intensity or contrast of the computer screen
- Directly point out visual details in illustrations and other graphics
- Avoid having students transfer work between papers or between the board and a paper
- Use color-coded, darkened, or raised lines for students having difficulty
- Teach the students to use a reading placer (their fingers, ruler, or a paper window)
- Teach students to scan papers and their visual field (using their fingers as a guide can help)
- Outline information when reading demands are high
- Allow students to “rest” their eyes periodically
- Allow older students to record information and/or use a peer’s notes to supplement their own
- **Play games that teach visual attention, scanning, and other tracking and visual-coordination skills**

Eye Movement & Control Problems

Teaming Issues



Description

Our two eyes are made to work together. The eyes should move smoothly and be equal in strength in order for three-dimensional vision to function properly. If for some reason the eyes are not working together, then the brain has to manage the issue in some manner. In most cases, the brain will choose one eye to use and begin to ignore the other eye. This eye will eventually cause the eyes to appear "out of alignment".

When an eye begins to move out of alignment, it is formally known as **Strabismus**. If Strabismus goes on too long, vision in the off-center eye will weaken, and the eye will begin to "turn off" in order to control double vision. This semi-permanent decrease in vision is called **Amblyopia**. It is important to realize that even with glasses; the affected eye may not be able to process vision properly since this is also a problem associated with the brain's processing of visual input. In some cases, the brain will start to use one eye for distance vision and the other for near vision, seriously hampering three-dimensional vision.

What You Might Notice in the Classroom

The most obvious sign of a teaming problem is eye alignment. You will notice that one eye is not pointing in the same direction as the other eye. Please know that this non-alignment is not always constant nor is the same eye always affected. You may see the non-alignment come and go and/or the eye actually move off-center as you watch. This "wandering" eye is often the first sign that will be noticed. Other behaviors you may see include the squinting one eye, turning the head (using one eye) for distant objects and turning the other way (using the other eye) for near objects (this may be VERY subtle, so watch carefully!),

and/or evidence/complaints of double vision. Lastly, if you look closely at the pupils of the eyes, you can see a reflection of what the child is seeing. In children with Strabismus, this reflection will not be symmetrical.

One interesting item to note is that the larger the difference in alignment (i.e. the bigger the angle), the **less** the child will complain about headaches or eye strain. When the eye is that far off-center, the brain essentially gives up and does not attempt to make the two eyes work together, so there is little eye strain. However, when the eye is only slightly out of alignment or the problem comes and goes, eye strain can be severe and headaches common. So, if a child is complaining of eye problems or headaches but you do not see any problems with alignment, it may be that the problem is only emerging. Any time a child has the physical symptom of pain/strain; it should be looked into, regardless of the lack of other signs.

If Strabismus goes untreated, eventually Amblyopia will develop. When this happens and an eye begins to turn off, you may see more signs of the child tilting their head one way or the other to see. You may also begin to see clumsiness as three-dimensional vision is suppressed. This problem will especially be seen in tasks that require depth-perception (e.g., reaching for objects, catching balls, etc.). Some children may eventually go as far as to cover one eye when reading or trying to see objects at a distance.

Typical Treatment

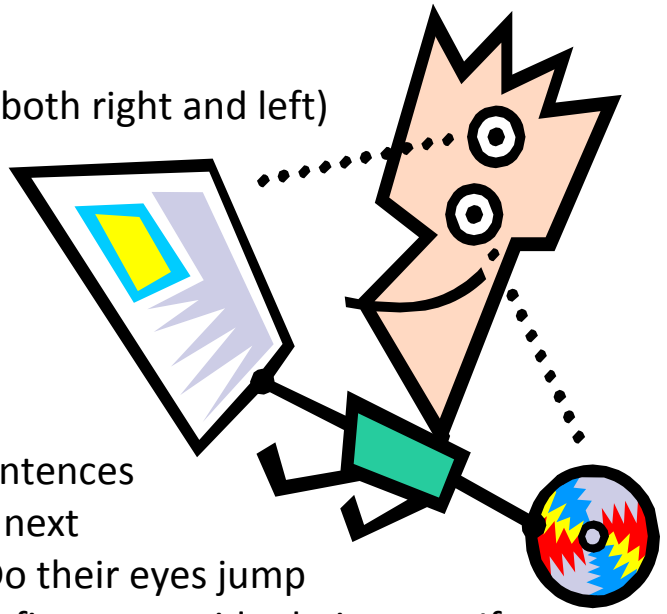
The two main treatments for this type of teaming problem are either Strabismus surgery, which will repair the eye muscles and realign the eyes, and/or vision therapy. Either of these methods may also include patching the stronger eye so the weaker one is forced to work or the use of prisms as part of the eye glass prescription. Glasses with one green and one red lens may be used to determine whether the child is suppressing one of the eyes and is also used for vision therapy for Amblyopia.

Classroom Activities to Strengthen Visual Teaming

The most beneficial thing a teacher can do to assist children with the development of their visual teaming skills is to make children aware of using both eyes. This can be done in the following way:

1. **Let children know they should only be seeing "one" of something**
   I know it sound simple, but children do not know this fact. I actually had one second-grader protest that I was wrong about this small piece information. As he said, "I have two eyes so I HAVE to see two of everything!" ☺ Needless to say, we had him tested and found out he had serious teaming problems. So, make sure to directly let children know they should only be seeing one of each item, and if they have double vision, even if it comes and goes, they need to let you and their parents know!

2. **Make students aware of how their eyes are moving**
   Simple games where children move their eyes to the farthest point (both right and left) without moving their head are easy to incorporate into the day. For example, can they turn their eyes to see a peer answering a question without moving their heads?



3. **Have students pay attention to how their eyes are moving while they are reading**
   Bring visual tracking to consciousness by having the children skim sentences across a page and then bring their eyes back to the beginning of the next sentence. Can they do this smoothly? Are they losing their place? Do their eyes jump around or start and stop? If they are struggling, have them use their finger to guide their eyes. If they find the task simple, how quickly can they use this method while reading? What about if they aren't actually reading (just skimming)?

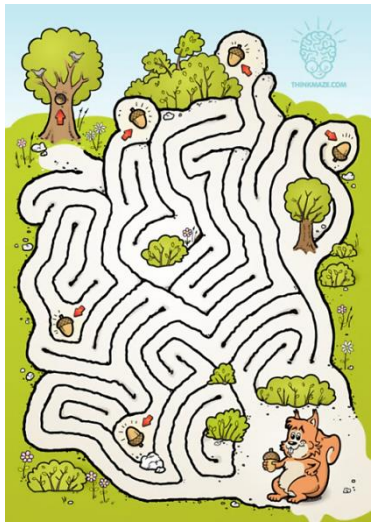
4. **Play games where children visually track**

Visual tracking is a skill that can be incorporated into many games. Here are some activities to try:

-Watch a rapid basketball game on video and try to keep track of the ball without moving your head.

-Throw different colors of medium-weight cord into the air and let them land on the ground, then track each piece with the eyes. Younger children can first complete this task with a toy car/animal. Note: The size, color, and number of cords can make this task easier or harder.

-Complete simple word searches visually then by hand (i.e., have the children find the word and then `"circle it" with their eyes before circling it with their pencil). Circle short words one direction and long words another.



-Complete mazes with their eyes and then go back and complete them with their pencil. www.thinkmaze.com has mazes in both color and black and white that are available for free download (at the time of this writing). An example of their beautiful products can be seen to the left.

-Play math games where children watch a swinging ball (suspended from the ceiling or sturdy fixture) and count the number of swings to complete simple addition or subtraction problems.

-Practice simple spelling words by "writing" them with the eyes. This can be done in print or cursive. Younger children can complete the same task but draw shapes or simple pictures.

NOTE: These games (*and all that follow for other visual processing problems*), though simple, do demand a great deal of the eye muscles and may be uncomfortable if done for too long of a time period. They should be used only once a day and for a very limited time period, especially at first. If a student cannot manage even "eye writing" one word or complete the most basic games, it could be a sign of a possible problem and steps should be taken to obtain a medical screening.

Eye Movement & Control Problems

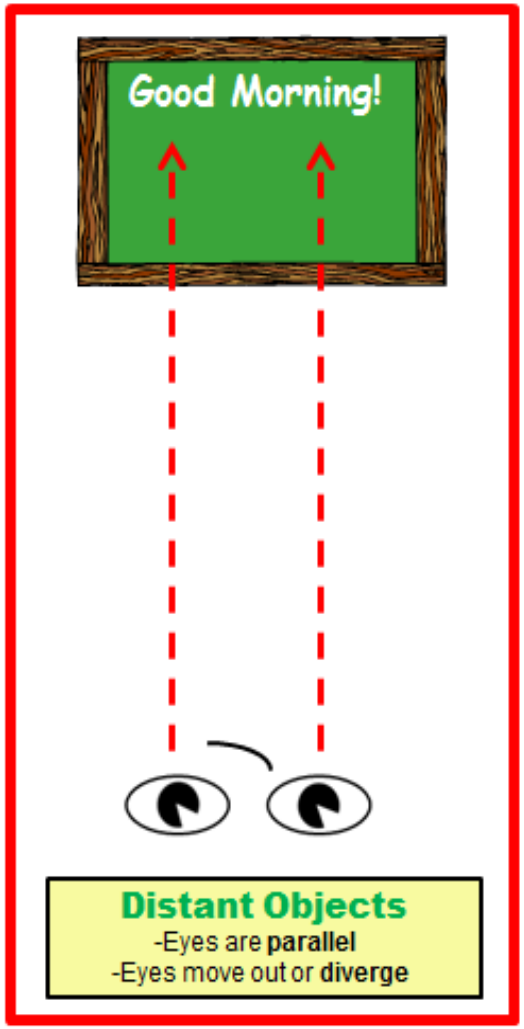
Convergence Insufficiency

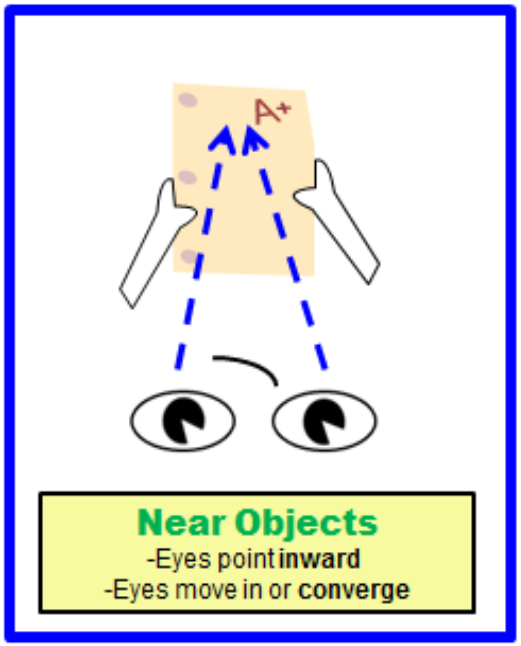
Description

Our two eyes were not meant to always point straight ahead. The eyes change position depending on whether they are looking at something far away like a bulletin board or something near like a paper on a desk.

When the eyes look at something far away, they are in parallel position, and when focusing on something near, they turn inwards or converge.

This ability to diverge and converge is very important. It should happen seamlessly and focus should never be lost as the eyes move from close objects, like their desk, to a teacher or peer across the room (far), and then back to their desk, book, or paper (close).





If this movement back and forth from near → far and/or far → near cannot happen smoothly or the student has to pause and regain their focus (i.e., item become blurry and/or is visually lost), the problem is known as **Convergence Insufficiency**.

What You Might Notice in the Classroom

Convergence Insufficiency is more subtle that Strabismus. Some students will show signs of eye fatigue, headaches, and double vision, but more often than not, there are no strong signs associated with the condition.

Instead, what you will see is a child who is failing to complete work and struggling in school. They will not be able to attend or concentrate and will often have difficulty reading, trouble remembering what is read, and/or words may appear to float or move off the page. In addition, some children will show sleepiness during academic activity or motion sickness. It is important to note that most children with Convergence Insufficiency will often have 20/20 vision!

As you can also see, many symptoms of this condition mimic other problems like ADD, ADHD, LD, etc. This is why it is so important to become aware of these visual problems. Many children are being misdiagnosed and not improving because the source of their true problem goes undetected.

Typical Treatment

Treatment for Convergence Insufficiency is also more complicated. While surgery may be recommended, it is very rare.

In most cases the student will be given some form of vision therapy to complete. In some cases the condition is so mild the work occurs totally at home. In most situations, though, formal vision therapy will be used. In those cases the student will be completing general activities but may also use computer-based programs and other forms of equipment. In addition, patching of an eye or prisms in the student's glasses may also be used if eye alignment and/or strength are a concern. In many cases the prism glasses are only used for reading and other academic work.

Classroom Activities to Strengthen Visual Teaming

Many home-based therapies are used, so there are many activities and websites that provide information and strategies. Here are a few to consider (see internet for complete directions for each item).

1. **Make children aware of how their eyes focus, diverge, and converge**

   Like double vision, most children are unaware of the fact that they should have no delay in focus when they look from near → far and back again. To assist them with understanding the physical process, have them look at a peer's eyes as they look at something far away and near. Also, teach them the words "diverge" and "converge" (they think they are SO cool to know this fact). In other words, make the process understood so the student can begin to sense if there is a problem.

2. **Pencil Pushups**

   One of the most common exercises for this condition is a simple home activity that can easily be done in school. Have the children focus on one letter on the front of their pencil and keep that focus as they move the pencil toward their nose. They should stop the second they see a double image. The exercise is often done for 15 minutes a day, five or more days a week.

3. **Eye Tag**

   Hang a chart of numbers/letters on the board (far), and give the children the same chart, in a smaller version, to hold in their hands. Have them go back and forth between the two and search for the number/letter you call out. Have them note any delays in their ability to focus or see the symbol clearly. Problems should trigger discussion with the family/professional assessment.

5. **Online Activities**

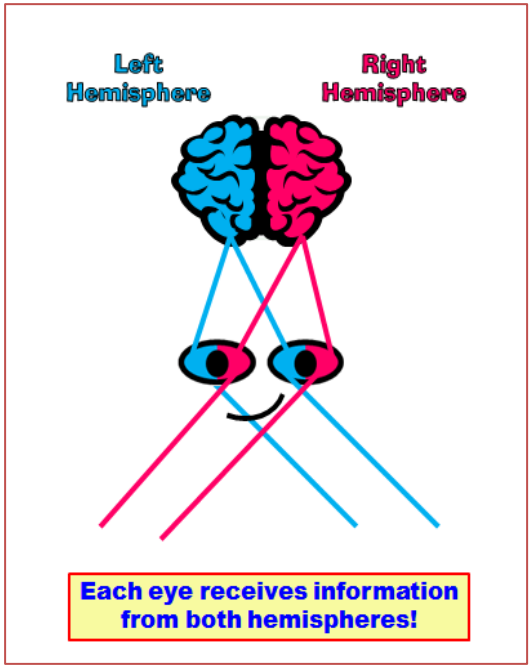
   Because much of this therapy occurs at home, there are multiple websites with electronic games/therapies. Here is one that provides wonderful step-by-step directions with pictures: http://www.tedmontgomery.com/the_eye/VT/therapy.html

Eye Movement & Control Problems

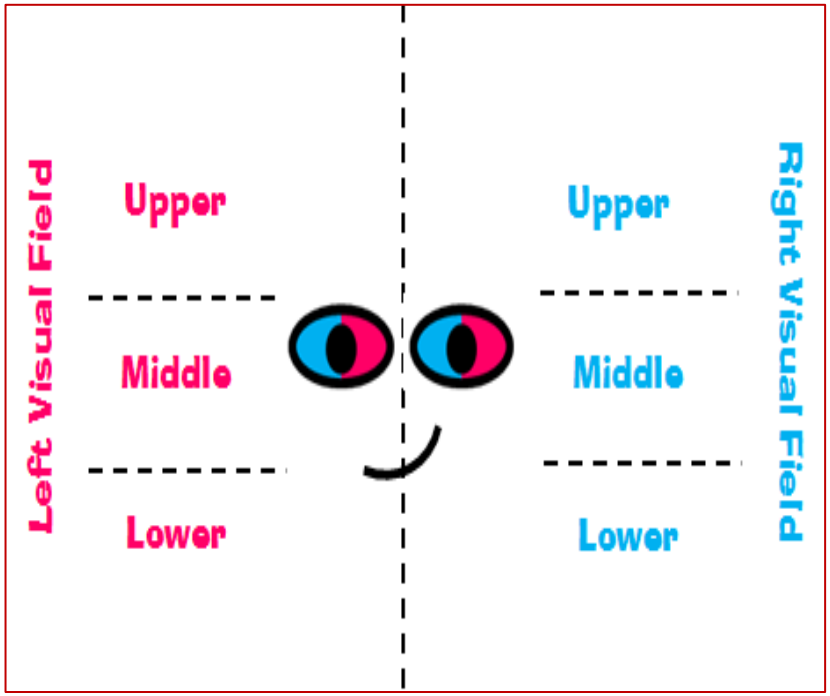
Visual Field Cuts (Neglect)

Description

Most people know that the right hemisphere controls the left side of the body, and the left hemisphere controls the right side of the body. Based on this fact, you would think that the eyes would follow the same pattern, but that is not the case. Each eye is "split", with half of each one being controlled by a different hemisphere (see image on right).



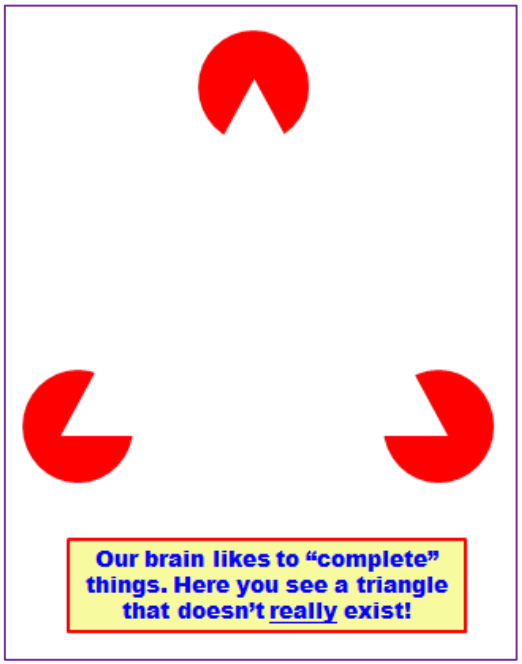
This differentiation is a good thing since it means if we lose one eye, we still have full brain involvement for the remaining eye and access to the total visual field (if the remaining eye and the brain are working properly).



At times, though, the brain does NOT work properly and part of the visual field is lost. When this happens, it is known as a **Visual Field Cut**. This cut can be expressed in one or both eyes, depending on where the problem is occurring. The most common source of visual field cuts is a stroke, optic nerve damage, and/or traumatic brain injury.

When someone has a visual field cut, they will "neglect" one part of the visual field----it simply does not exist for them. This is why this condition is also referred to as **Visual Neglect**.

Visual neglect is a rather strange condition in the sense that the person who has it WILL be able to notice the item they are not seeing, but usually only if the missing piece is pointed out to them. You might wonder how that could possibly be the case; don't they notice that there is a blank space in their vision? Well, that is the problem----**there is no blank space in what they are seeing**!



Our brains do not like vacuums. If something is missing, our brains will find a way to deal with that gap. In some cases, the brain will just "not notice" the missing piece, but if the area is small enough, the brain will actually "fill in" the missing section through a process called **perceptual completion** or **confabulation**. The brain just guesses what it *should* be seeing based on past experience and the surrounding scene.


The real scene


What someone with an upper left field cut might see
(the brain just continues the wall)

An Important Note!

Visual field cuts and neglect follow each other. The cut in the visual field usually leads to the brain beginning to skip that portion of the field since nothing can be seen. When brain injury or another trauma like a stroke causes this condition, it can be improved, but may never totally go away.

In young children, though, neglect can also be due to conditions like eye motor control problems and other eye conditions. As these are fixed, the visual field enlarges, but the child may have developed a *pattern of neglect*. This habit of "not looking" or using their eyes well to see the total visual field **CAN** be changed with behavioral assistance and therapy. This problem can especially be seen in the side or peripheral vision areas. With these little ones, you will need to remind them to "*use their side eyes*". We will cover some strategies that can be used to assist these children on the next page.

What You Might Notice in the Classroom

So, what does this look like in the classroom? The signs of a visual field cut or neglect are there, but you must watch for them closely, especially because the clues may be subtle. Here are some signs to note:

- -A pattern of missing a particular section of a paper
- -Consistently not noticing people or objects on one side
- -Neglecting to eat food in one section or side of their plate
- -Drawing objects where part or half is missing
- -Turning head back and forth to see rather than moving the eyes
- -Unable to find missing objects that are plainly in view
- -Squinting and/or rubbing the rub eyes
- -Complaining of headaches, fatigue, and/or dizziness
- -Chronically tilting head in a particular direction
- -Losing place when reading

Example of Left Visual Field Neglect
*(NOTE: Student will **NOT** notice the section is missing until it is pointed out!)*

Typical Treatment

The approaches used for this condition depend on whether there is true damage (a visual field cut from brain or optic damage that is leading to neglect) or a developmental problem due to another eye condition (i.e., Strabismus that has slowly caused a child to neglect their peripheral vision).

If the problem is damage related, many different options may be tried including patching and stimulation along with compensation activities like scanning exercises and cues to remind the student to specifically look at the neglected part of their visual field. The success of these treatments will depend on the nature of the damage. Since neglect increases with fatigue, the students are also taught to leave difficult and demanding tasks for times when they are rested.

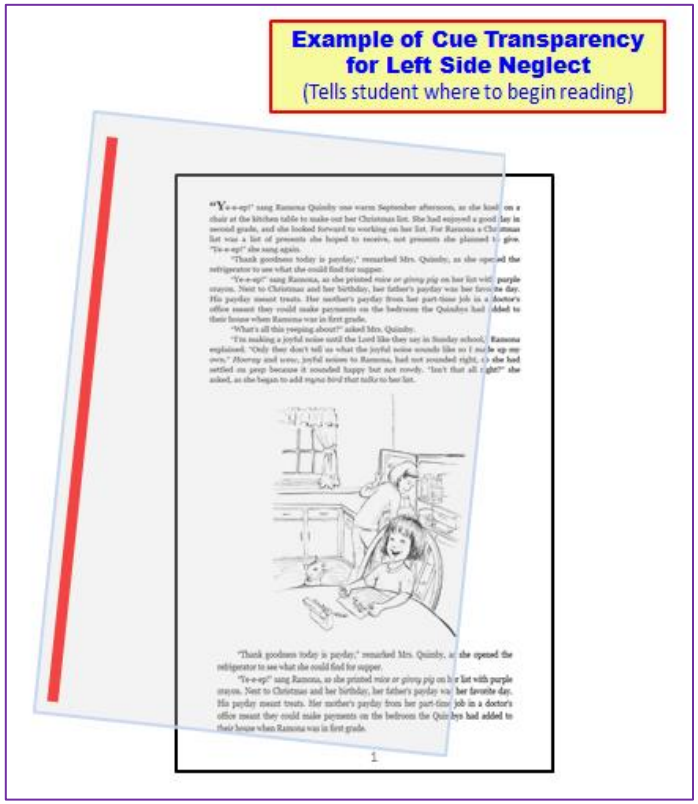
If the problem is developmental and stems from another eye condition, the treatment include a mix of strategies to correct the eye condition that led to the neglect (e.g., removing double vision) and working with the student to become aware of their full visual field. Here are some examples of how this is done:

-**Directly teaching the student to scan**: You can introduce this concept by having the student compare looking out across a big area (usually the playground) with their eyes, and then with binoculars. Even if their visual field is narrow, they will usually see less of their surroundings with binoculars than with their eyes. Make them aware of how limiting binoculars are and how they have to turn their head to "see everything" when binoculars are used.

Relate this experience to their own eyes and explain that they are seeing only part of what their eyes really could see (just like the binoculars). Then introduce the concept of opening their side vision, scanning all parts of their visual field, etc. This will take practice and a lot of reminding. You may want to use a visual cue (e.g., picture of eyes) that you can point to as a reminder/cue.

-**<u>Develop a cue to help them remember to pay attention to their neglected side or area</u>**:

This strategy is fairly easy to implement. Just use some type of visual cue or symbol (most often a red line) and place that cue on a transparency/clear plastic sheet. Then lay this under the student's paper or over the student's book and teach them to "look for their symbol" and makes sure to complete or read that neglected section.



For example, a student with left field neglect should be taught to look for the red line on the left to remind them where they should begin reading. A student with right field neglect can use a red line to signal where they should <u>end</u> reading. Others will use the cue to remind them to shift their eyes and see if that portion of their work was actually completed or accidentally left blank.

Some children may need to use parts of their body (e.g., their finger) to assist their eyes, especially when they are first learning to use a visual cue reminder. This additional physical cue can be faded over time.

This approach can also be used at a physical level to remind children to "open their side eyes". For example a student who often neglects their peripheral vision can be taught to check themselves by holding up their fingers/hands at the very limit of their visual field. This type of reminder can be good to use right before the child is put into a situation where side vision will be important (e.g., going to physical education class, walking in the hall, going to recess, playing ball, etc.)

Testing for "Side" Vision

Classroom Activities to Strengthen Use of the Full Visual Field

There are many games that can be used to strengthen this skill. Here a few you can try:

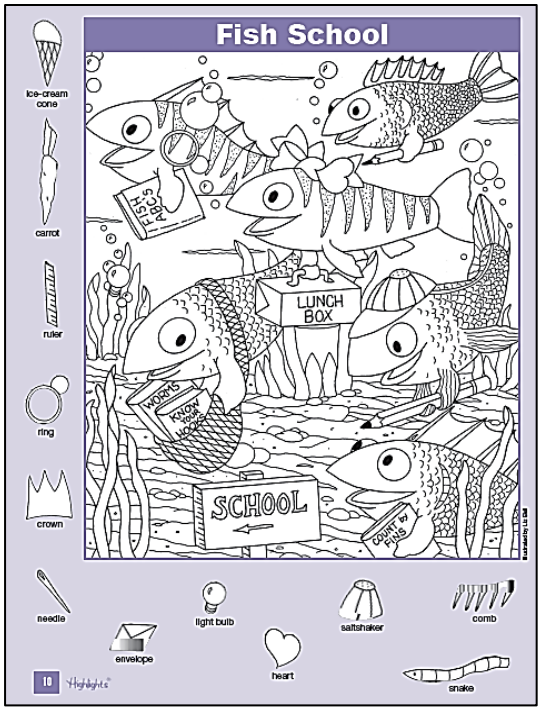
1. **Teach children about their visual field and have them test where their personal visual field ends**
   As I have mentioned before, it is very useful to directly teach children about their visual field. Depending on the age of the students, this can be integrated into a lesson on left and right, the Hokey Pokey, direction on a compass, etc. This game can especially be useful to use as a professional because you can see which children appear to be struggling with a part of their visual field.

2. **Partner games where children work on side vision**
   Play simple games where children work with a partner who is making faces, holding up pictures, writing numbers, etc. on the edge of their visual field. The goal is for the student to be able to see what their peer is doing without turning their head. Any symbols can be used for this game, and it can be easily integrated into subject areas (e.g., working addition problems or spelling/reading words).

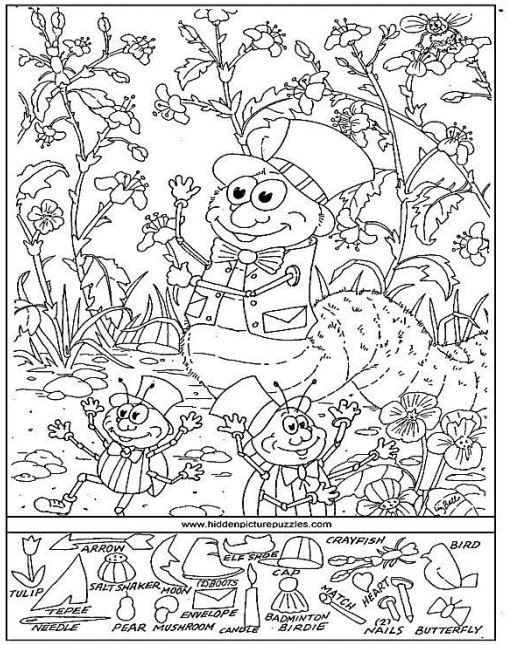
3. **Round the clock or desk**
   Take a moment and have the children stare at the middle of their desk and try to see everything on it without moving their eyes. Have them picture moving around a clock to see if there is any parts of their desk that they cannot see. The same game can be played with children looking around the edges of the room.

4. **Scanning games**
   Any activity that incorporates scanning is useful. This includes scanning newspapers for spelling words or punctuation symbols, looking for pictures in “hidden picture” book, word searches, etc. Free hidden pictures sheets can be found on the internet. A few of the best resources can be seen on the next two pages.

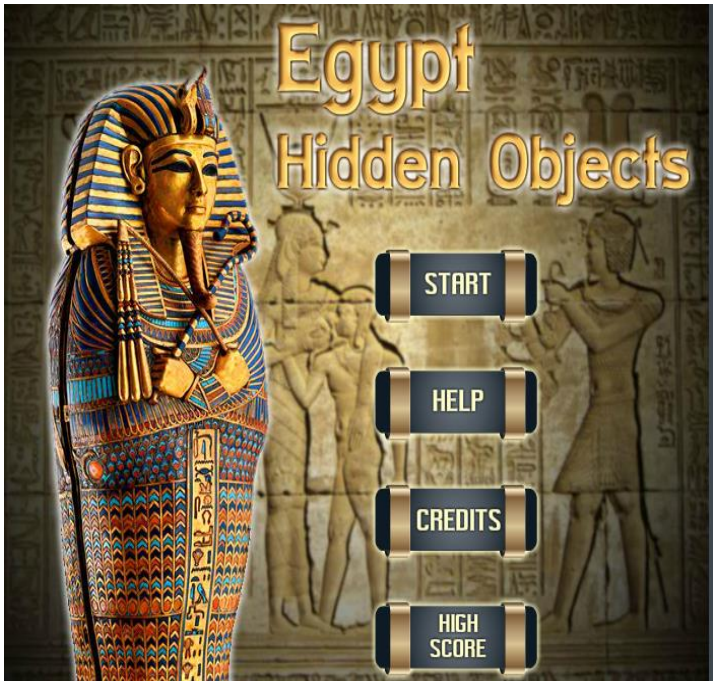
https://www.highlightskids.com/games
(free, online for children----the most loved source of these pictures!)

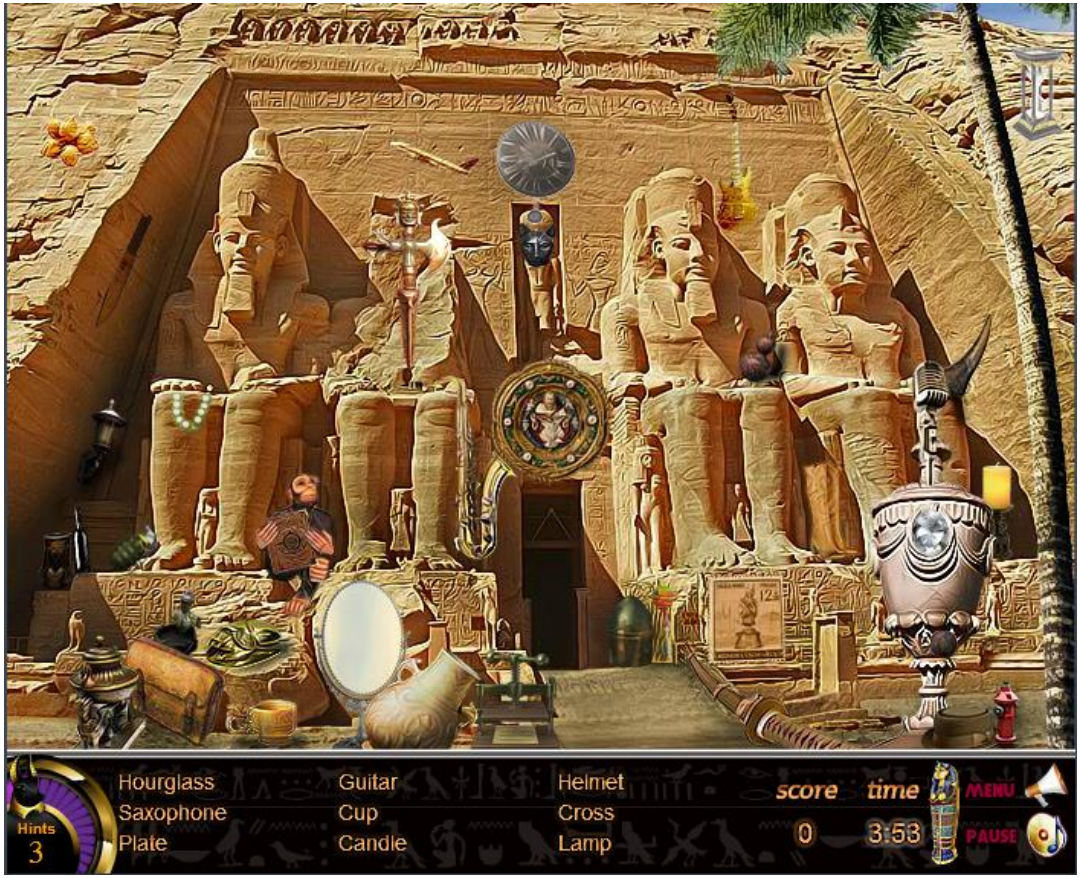


http://www.educationworld.com/a_lesson/worksheets/Highlights
(free, online version for teachers---they are also printable)



http://www.allkidsnetwork.com/hidden-pictures/
(free, online for children….printable)





https://www.hiddenobjectgames.com (This is a free source that uses real pictures in color and more mature themes that are appropriate for older students. Games are interactive, have special effects, provide hints, and are quite challenging! You will have to sit through some advertisements, but this site is a favorite for most children…)

Visual-Spatial Perception Problems

Visual Closure Problems

Description

Visual Closure is a skill we often take for granted. The ability to "close an object perceptually" means that if shown only part of something, we are still be able to figure out which object is being shown. In other words, we are able to complete the object mentally even though we are only seeing a partial picture and/or receiving incomplete information. Not only is this skill critical for daily life, it is the key to being able to read smoothly and with speed.

What You Might Notice in the Classroom

A student experiencing problems with visual closure will often be a poor reader. They will need to move through words letter-by-letter and will find scanning with any speed virtually impossible.

These students also tend to lose objects easily since they cannot recognize them unless they can see the object's **total** outline. This means that they will not be able to find their own coat in a crowded locker and cannot locate simple objects like a pencil, books, or an eraser in or on a messy desk, even if they can see part of it!

In addition, children with visual closure problems may show related deficits in completing items mentally. They often cannot infer meaning from illustrations in a book, they cannot hypothesize outcomes (e.g., math equations and science experiments), and may also have difficulty formulating complete thoughts or sequencing actions.

Since visual closure is a skill that is related to many academic activities, you may also see problems in any of these areas:

- general writing skills
- completion of construction activities (e.g., art products) unless all steps are shown
- spelling, sentence, and paragraph construction
- understanding of geometric forms and/or geometry
- problems with dot-to-dot s, puzzles, or blurry worksheets
- recognizing pictures in stencil form
- using story starters or any other writing prompt
- working with geo-boards and other math manipulatives

Typical Treatment

If there are problems that may be impacting visual closure (e.g., strabismus, etc.) these will be treated medically in the manner typical for that condition.

Beyond that, most of the treatment for this condition is completed in a therapeutic setting by an occupational therapist or other professional using a variety of visual-perceptual activities and/or technology-based games.

These activities can also involve objects, familiar toys (e.g., puzzles), and various writing tasks. Since these activities can also be completed in the classroom, we will examine some of them in the next section.

Classroom Activities to Strengthen Visual Teaming

Let's begin with some strategies you can use to assist this type of student. Some things to consider include:

- Having the student sit near the front and/or where they can see clearly without visual barriers
- Keeping worksheets, writing on the board, and other visual materials very sharp and clear
- Giving step-by-step directions and using visual cues
- Guiding the student to find objects by using features that do not change and can be recognized in partially obstructed form (e.g., finding their coat in the locker by color, not small details)

Some familiar activities that can be used to develop visual closure (and other visual skills) include:

1. Dot-to-dots

2. Puzzles

3. Word and picture searches with adult support (must use care so they are not frustrated)

4. "Fill-In" sheets (incomplete pictures, shapes, words/sentences---if difficult, adult *must support*)

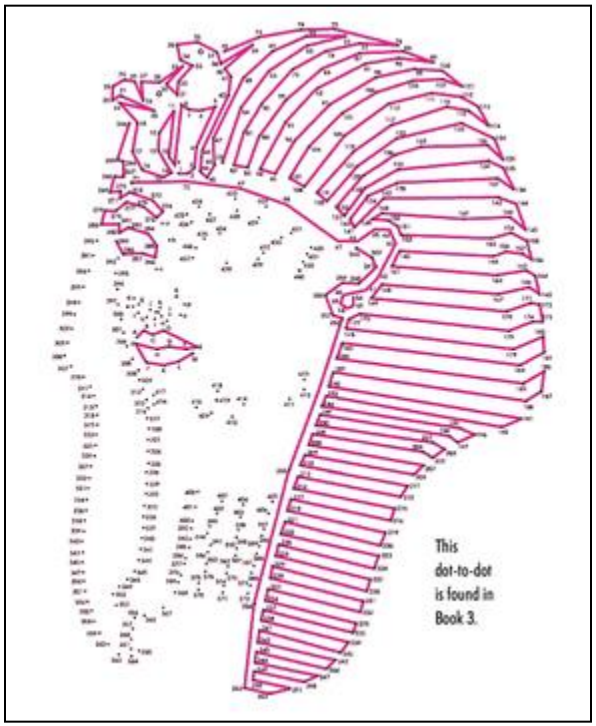
5. "Matching" (complete and incomplete pictures, shapes, words, or sentences)

6. Stencils and rubbing pictures (e.g., picture appears as pencil is rubbed over). See if they can recognize the picture before they are finished.)

7. Scrabble and similar games

8. Construction of art projects, models, paper airplanes, origami figures, dioramas, etc.

The difficulty with some of these activities is the age-level. Please know that there ARE some very sophisticated and interesting products on the market that are wonderful for older students who need a little work on this skill. Just look on the internet, and you will find some fantastic items ready for your use. Here are some links to get you started!



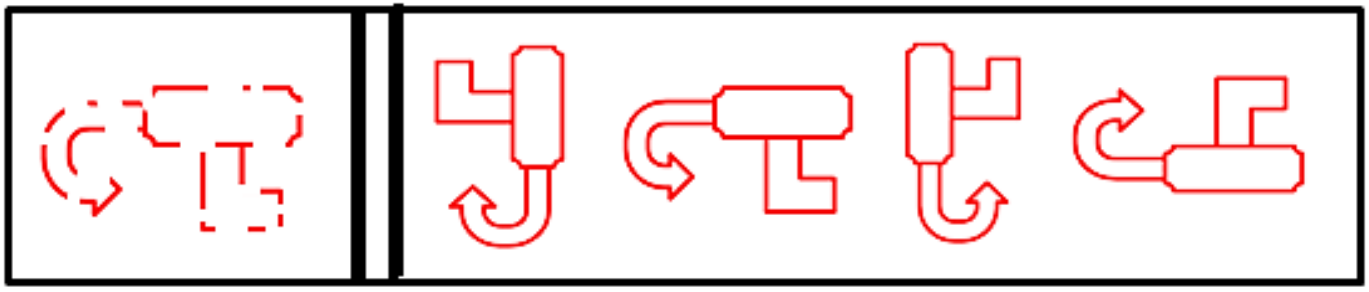
Dot-to-dot papers are not just for young children. Here is a lovely source of difficult dot-to-dots that can even keep an adult occupied!
http://www.thinktonight.com/Advanced_Dot_to_Dot_Books_s/204.htm

NOTE: Just make sure the level is not too hard for a student having visual closure issues. I have modified some of these to make them easier by partially drawing in pieces myself and/or whiting out and then replacing some of the numbers. You can then photocopy to make a new (but easier) sheet that has that more "adult" theme but is easy enough for a struggling student's success. Also, I have taken simple line drawings of my own, erased parts of the lines and added in my own dots using a graphics program. An easy way to make your own numerical dot-to-dot sheets (…or letter-to-letter, month-to-month, etc. pages).

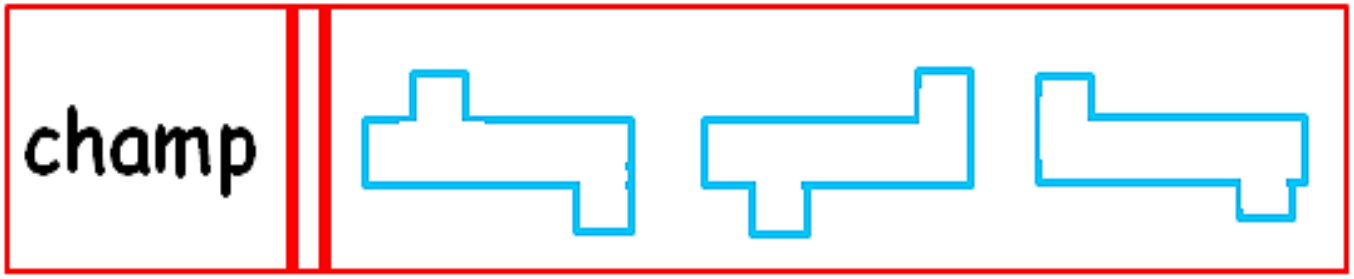
Here is a nice game that allows older students to roll body parts of a monster or animal and then draw them. A fun activity that will keep both students who need this work, as well as others who do not need it, engaged. Similar activities can also be found on this site…
https://therapyfunzone.net/blog/product/roll-a-creature/

Here are some additional games you can search for or make:

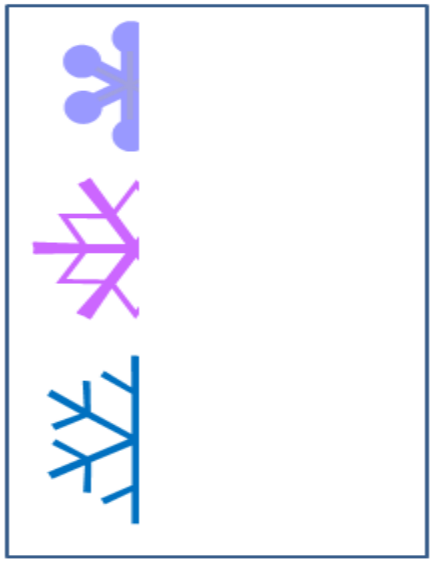
Masking games (part of picture is covered) These games can include simple or complex scenes. The degree of masking used is just adjusted.



Picture completion These games use simple pictures, complex shapes, or even words that the student must "complete" in some manner...

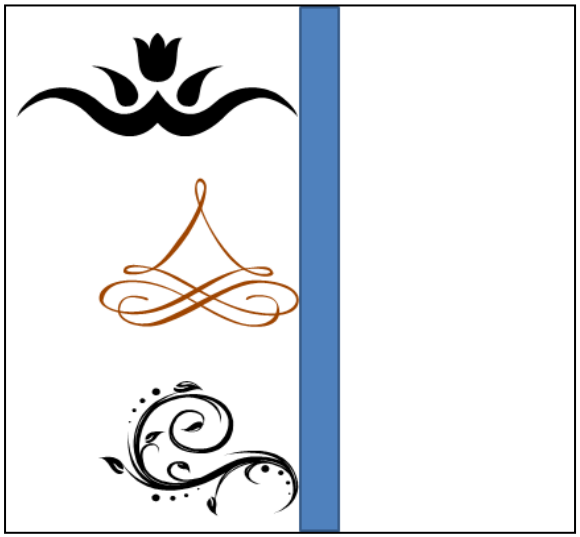


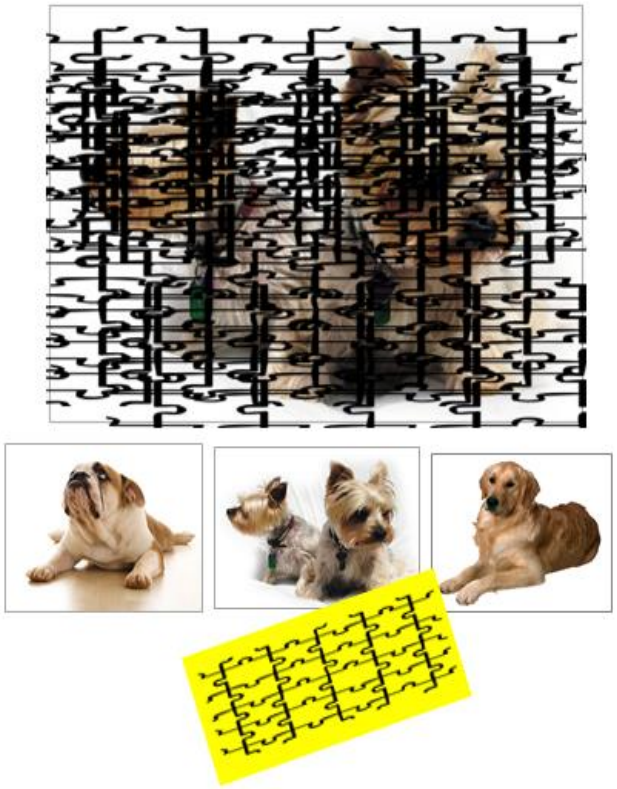
..or visually match in some manner. Either activity is useful.



Additional activities involve **completing shapes** by drawing (example on left). If constructed wisely, these can be made quite complex and appropriate for older students. For example, the **mirror image** activity (to the right) would definitely be challenging for most students.

Regardless of the activity, you can easily make these items yourself, if you wish.

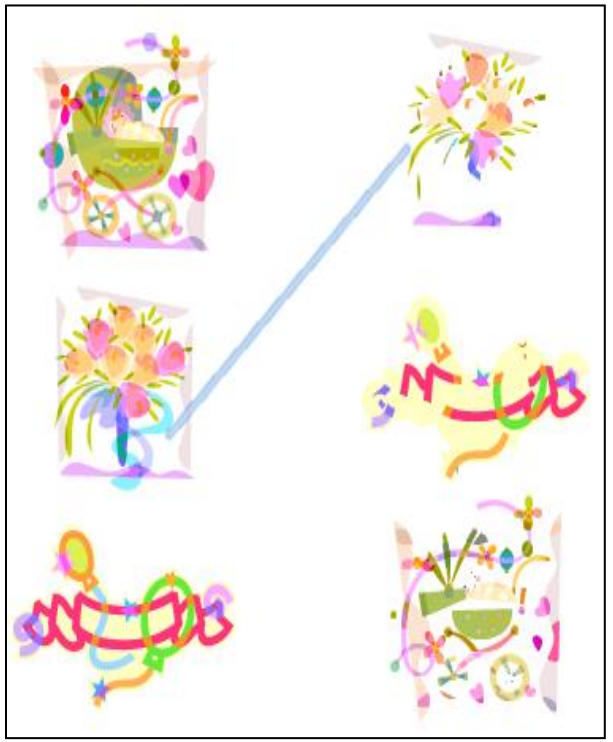




For example, the sheet on the left was constructed by placing a picture in a PowerPoint slide (or graphics program) and then superimposing a jigsaw **png** over the picture. This can also be completed in most document or graphics programs.

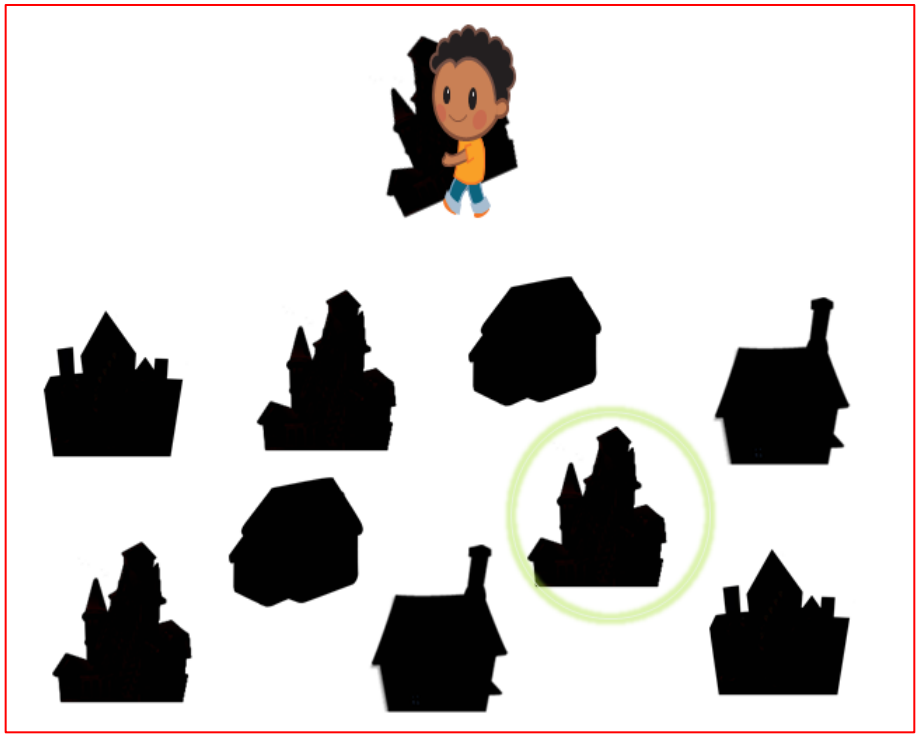
NOTE: *A png picture has no background, so it can be placed over other pictures without obscuring them. By placing more and more jigsaw pngs over the picture, you can change the level of masking.*

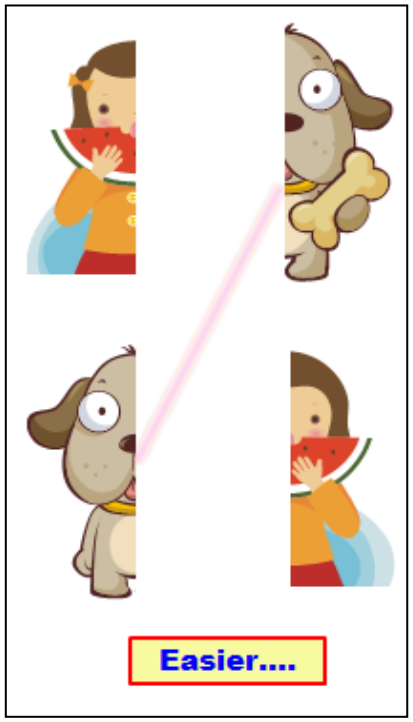
In a similar manner, the example on the right was made by importing pictures and then using a graphics program to delete (or change to white) some of the colors.

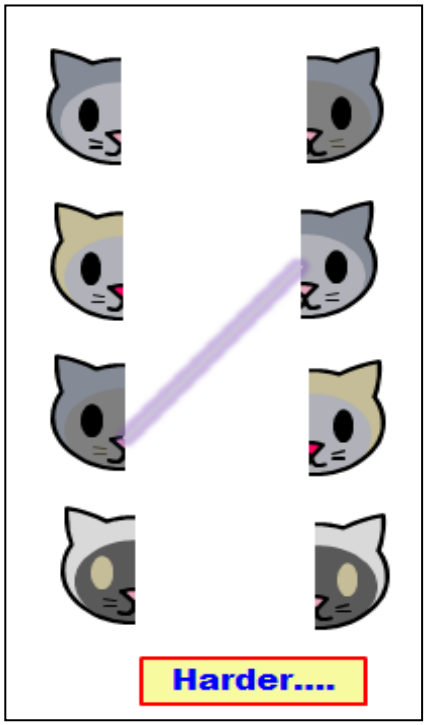


More ideas? The example on the right was created by taking several pictures (shown to the left) and converting them to black.

This can be done color-by-color, by changing the gamma (color concentration) to black or changing the contrast to its highest level. An easy way to produce any game you wish!







Whether you create these activities on your own or look for commercial products, just make sure to really examine the level of the games you use.

For all visual tasks (including this condition), the goal is to challenge the students who are typically developing while providing the support needed by the student experiencing difficulty. With a quick glance, the differences in level should be easy for you to recognize, regardless of your experience with visual interventions. See the example to the left for one example of how image detail impacts the difficulty of a game. When in doubt, contact a professional, often an O.T., for assistance with appropriately leveling visual materials.

Visual-Spatial Perception Problems

Figure-Ground Discrimination Problems

Description

The ability to see an object when there is distracting information in the background is known as Figure-Ground Discrimination. This skill is important because visual information is rarely given in isolation. Even as we walk, we have to be able to see the sidewalk against the grass, other pavement, toys, etc. In other words, figure-ground is an essential skill for life as well as academics.

What You Might Notice in the Classroom

Children with problems will not be able to pick out and keep attention on objects or pieces/details of an object if the background is crowded. These children may not be able to locate spelling words in a paragraph, words in a dictionary, find their place on a worksheet, or locate an item on a map. They often cannot locate their pencil in a messy desk, follow along in a book while someone else is reading, notice the details in an illustration, or figure out where a teacher has written information on a whiteboard. They may also have difficulty with information presented in a sequence (e.g., do not notice the + in the problem 3 + 2 = ____).

Typical Treatment

Like visual-closure, most of the activities that support this skill are general enough to use in a regular classroom. Specialized therapies conducted by an occupational therapist or other professional may also include computer-based work, screening for color-blindness, and other related issues. Many children with figure-ground problems may also need assistance with visual discrimination skills in daily life (e.g., movement through a crowded hall, finding lost objects, etc.)

Classroom Activities to Strengthen Visual Teaming

There are many activities to help students with figure-ground problems. Many of the items we have previously discussed, like picture-finding activities, can be used for this problem as well. In addition, here are general strategies you should consider:

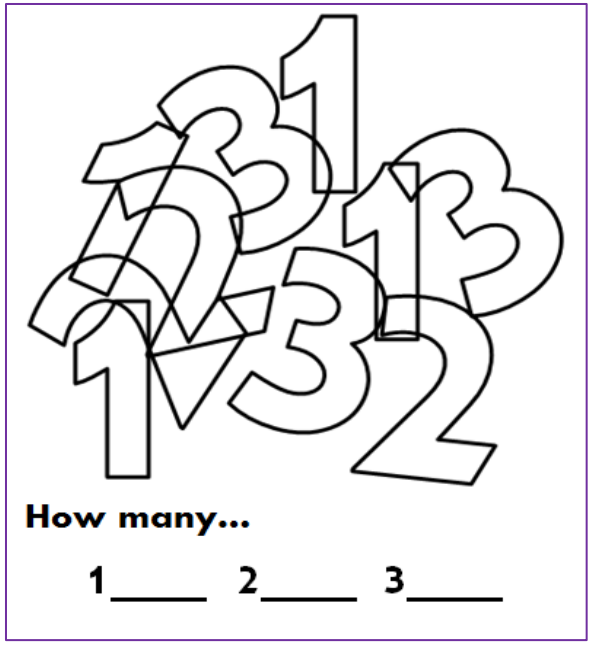
1. Avoid a cluttered room or too many visuals/objects on the walls and board
2. Reduce the child's visual distractions by placing them in the front of the room
3. Enlarge worksheets
4. Use a book marker or guide to help students keep their place while reading
5. Play games where attention has to be switched from one item to another
6. Limit copying from the board or transferring information (i.e., avoid using a separate sheet to record answers)
7. Use contrasting colors and/or highlighting when showing items on board or whiteboard
8. Highlight parts of the paper that need to be completed, the lines to fill in or cut, etc.)
9. Teach orientation cues (e.g., use color and positional words---right, up, side, etc.)
10. Practice searching for information (e.g., telephone book, dictionary, internet searches, etc.)

And, these games and toys can be very helpful:

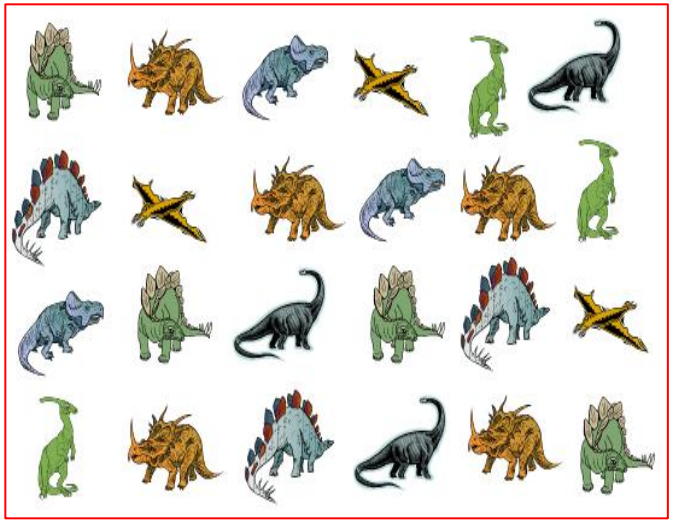
1. Pick-up sticks
2. Jigsaws
3. Bingo
4. Board games (e.g., Candy Land, Chutes and Ladders---anything with a busy background)
5. Treasure hunts, "I Spy" games and "What Has Changed/Is Missing" pictures
6. Finding words, endings ("ing"), punctuation, etc. in paragraphs or in newspapers and magazines
7. Sorting and tracking (i.e. maze) activities
8. Pick out one type of object from a box containing a mixture of items
9. Hidden pictures and word searches
10. Create mosaics, paint-by-number, or art projects that are constructed from a model or guide

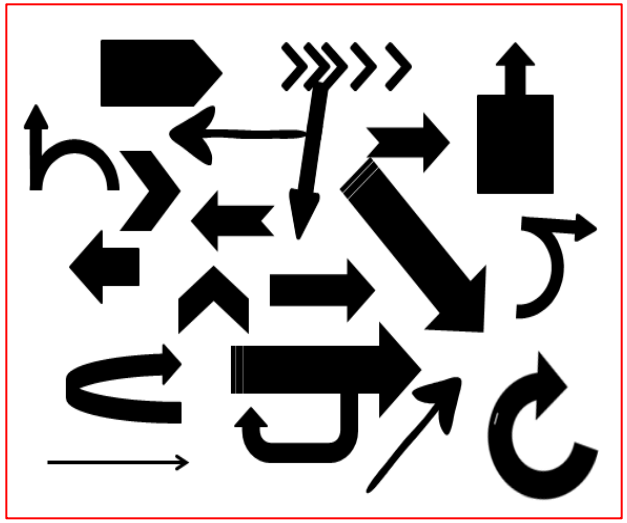
You can also create simple sheets and games where students have to count the number of objects that are visually noticed despite a busy background.

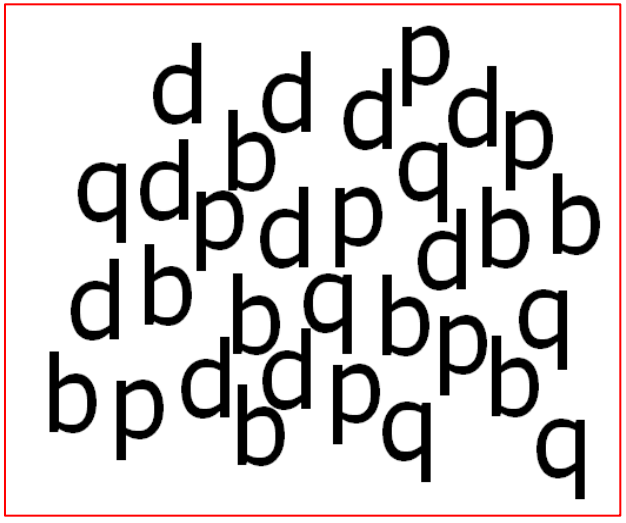
For example, students can count the number of flowers (on left), or a harder task, the numbers (shown on the right).



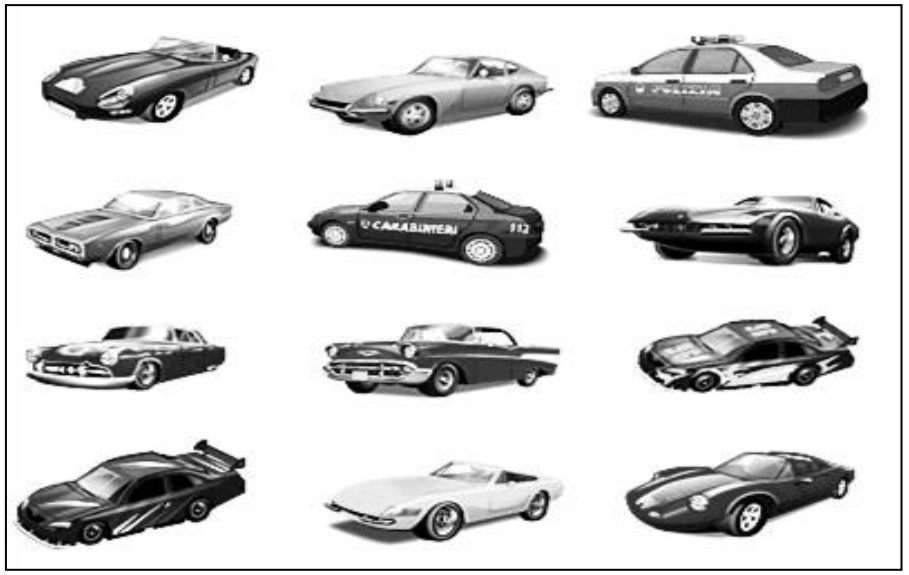
Scanning activities can range from easy, such as finding a picture or "reading the pictures left→ right (far left photo below), to moderately challenging, like finding an arrow direction (middle photo), to quite complex, like finding a particular letter (photo on far right). The level and complexity is easy to change.

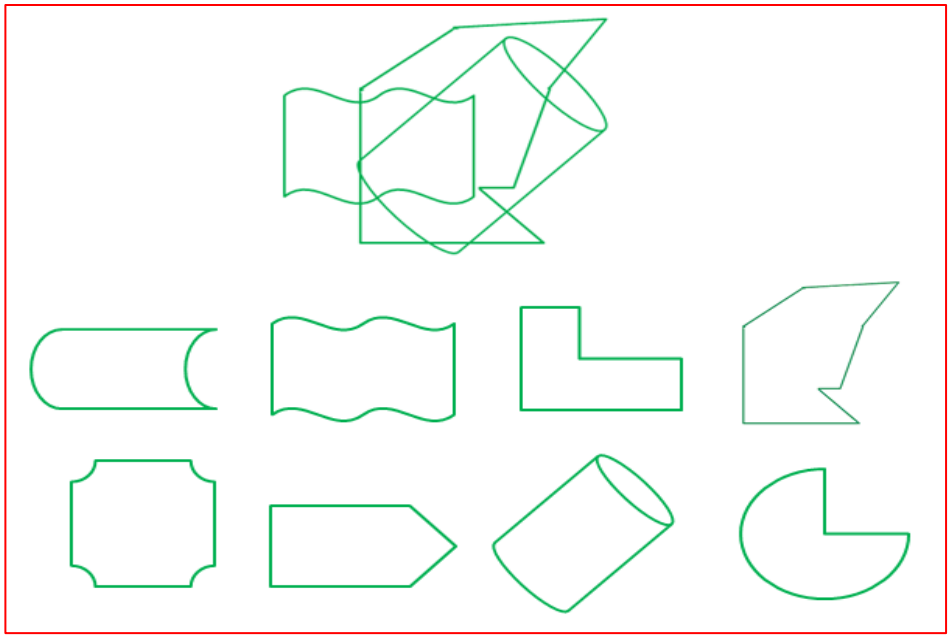






It is not only the amount of detail or clutter that changes the task, but color can also play a large role. For example, the pictures on the left (below) would be much easier to search for, match, etc. than the exact same picture on the right, now in gray-tone. You often can make a game more complex just by turning it into a black-and-white product!





Since many students with visual-perceptual problems are very intelligent, you may have to really think about how to make your activities challenging and fun.

For example, a shape finding activity can be very easy or much more challenging, as the example at the left shows. Think through how to keep the students interested and look for new products with the challenge your students may need.

Visual-Spatial Perception Problems

Visual Gestalt Issues

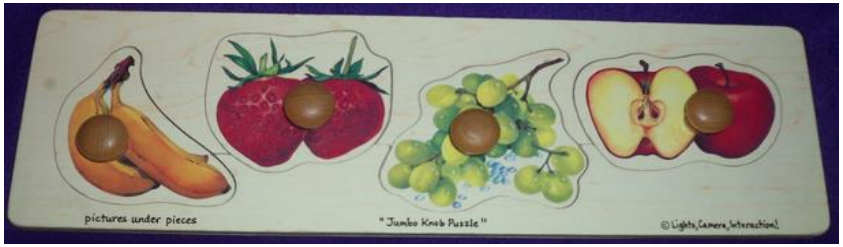
Description

Gestalt issues are rather difficult to research since many just group them in with visual-closure, visual-discrimination, or figure-ground problems. You will sometimes see students labeled as having visual-gestalt issues, though, so I will at least mention them in this document.

Gestalt perception are associated with how the brain perceives the details of a picture or how objects are grouped together. Most feel that there are four variables involves, which are as follows:

1. **Closure**- Do the items complete a pattern?
2. **Similarity**- Do the items seem to go together?
3. **Proximity**- Are they visually close enough that the brain sees them as a "whole"?
4. **Details**- Is there an implied symmetry or connection?

Puzzles strongly support the development of gestalt skills. For example, a young child's puzzle will have separate pieces like the one to the right.

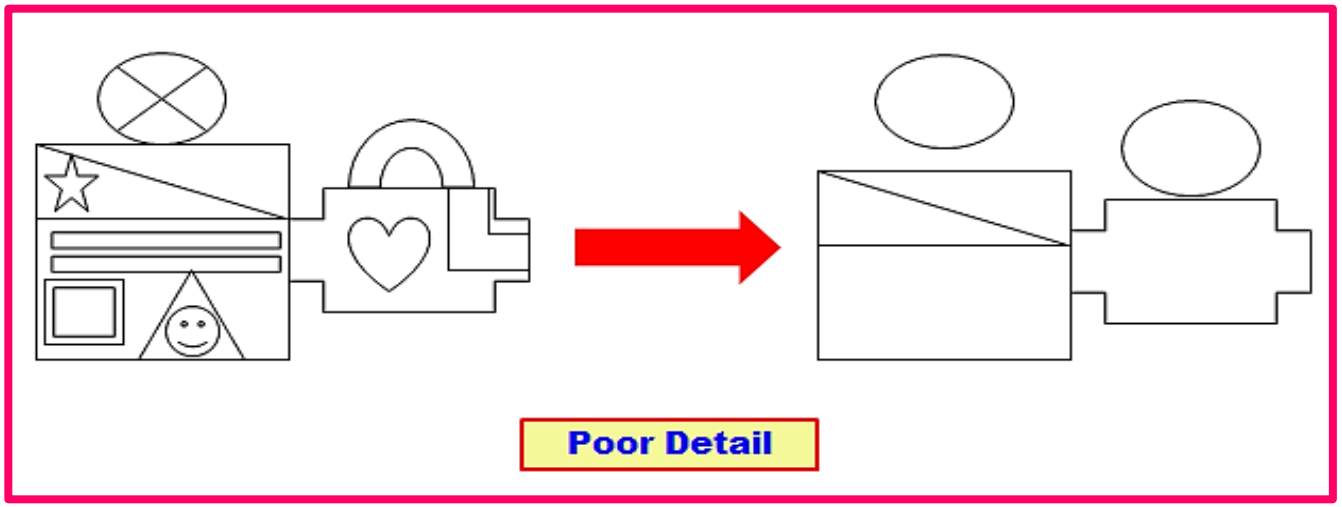


Eventually, though, we begin to force their children's attention to how those puzzle pieces go together. A transitional puzzle for that purpose can be seen to the left. The small details are drawn on the puzzle back (e.g., grass) to encourage the child to see the separate pieces of the ball, dog, bone, etc. as part of a larger, "whole" picture. There is much more to this fascinating topic, and I have outlined the puzzle sequence in the document titled, *Sequences: Neurological Steps for Skills*. It can be found under the TEACHING tab on the website.

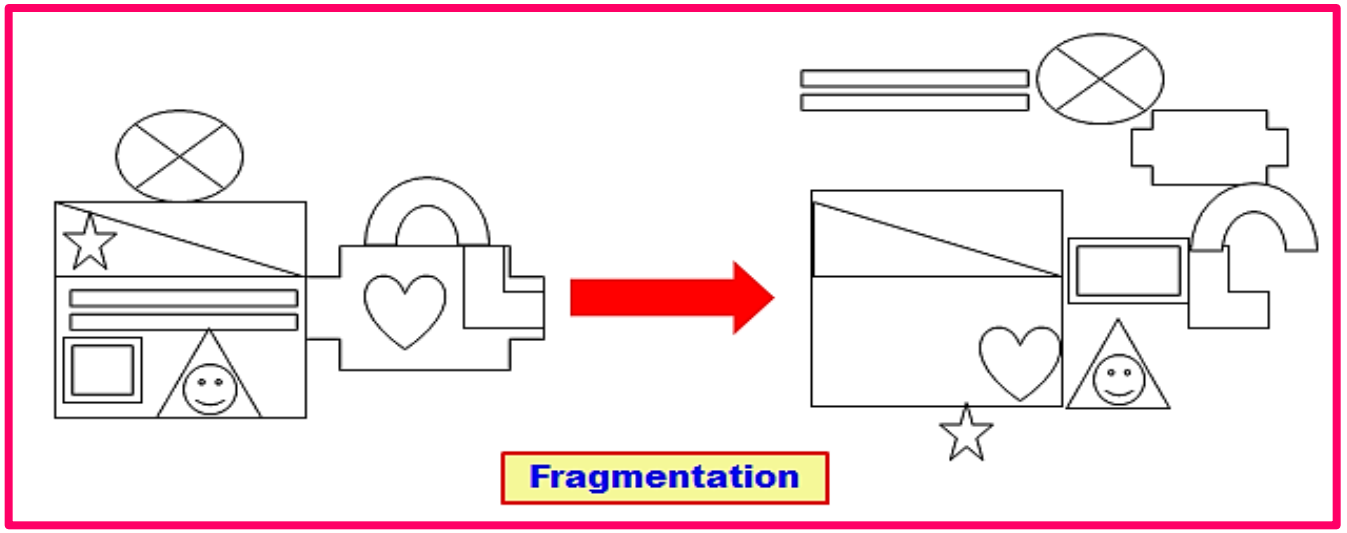
What You Might Notice in the Classroom

Those who speak about visual gestalt usually group the problem into two categories:

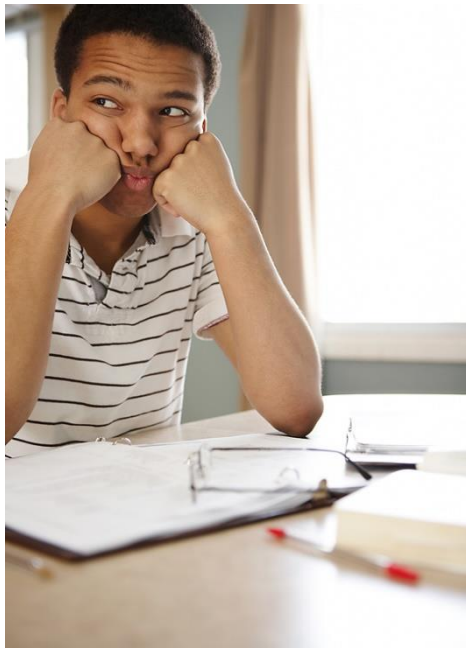
1. **The loss of detail** (Student does copy/see the inner details of the figure or sequence).



2. **The fragmenting of a whole** (Student copies/sees the details but not how they go together).



Obviously the loss of detail or the fragmentation of a whole can be devastating for academics.



As teachers, we assume that if we "show" a child something, they are actually seeing the totality of what we show…and exactly as we show it. But, as you now understand, this is NOT necessarily the case for all children.

We can only imagine how spelling words, math equations, pictures, worksheets, art projects, and other visuals must appear to these students. I am sure the whole world must seem quite confusing, especially when we realize this loss of detail or fragmentation is not standardized (it may change every time they see that same object or item). This means that a visual like a spelling word, equation, or sentence that appears fragmented *may look totally different each time it is viewed*. It truly makes a teacher wonder how they learn anything at all!

Typical Treatment

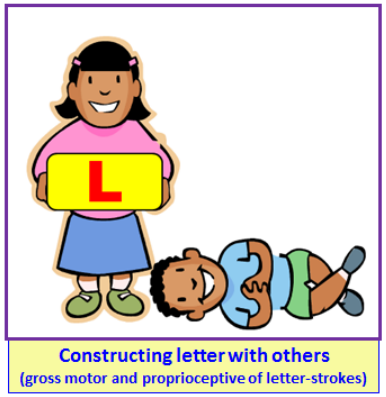
Treatment for gestalt problems is similar to treatment for visual closure and figure ground problems and often uses the same activities. Complicating conditions (e.g., strabismus) may also be treated at the same time. Emphasis of intervention is on noticing detail or understanding the integrity of the object so all pieces can be put into their correct places. Since the visual cues that allow this to happen are not dependable, though, alternative forms of processing/checking visual information are usually taught.

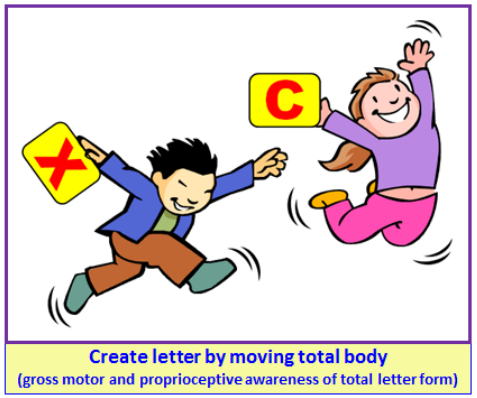
For example, the letter B may appear in various orientations or with different formations to a child with this condition. If we help the child construct the formation of the letter B using **motor memory (**child is able to write it with eyes closed because they know the physical formation/sequence), then the child can use that motoric memory to check and see if their visual information is correct.

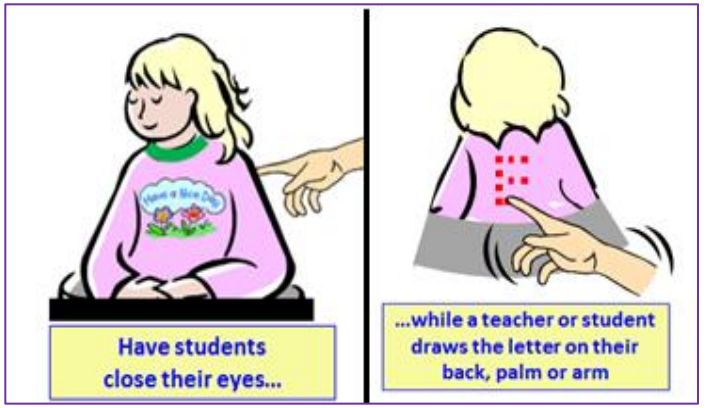
Classroom Activities to Strengthen Visual Teaming

In light of this, any of the visual activities we have mentioned earlier can be useful to these students, but they may require some level of accommodation to assist them in understanding the visual information they are receiving. Here are some additional suggestions that can help the student begin to "check" the visual information they are receiving using motoric and other means.

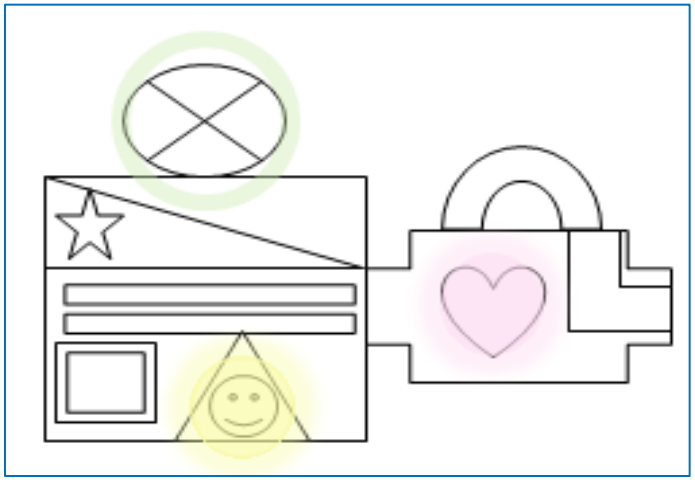
1. Use motor and sensory cues to understand letter direction and other symbols (e.g., writing them in sand, on their back, making them with their body, etc.)



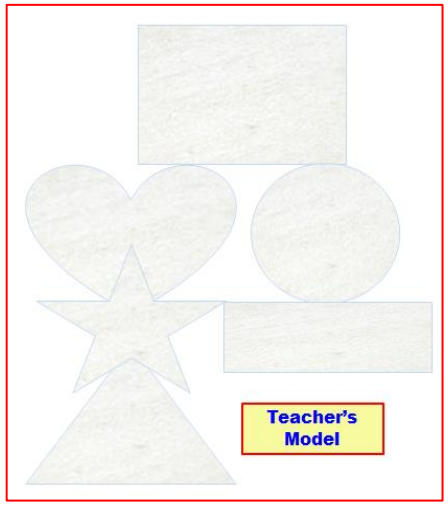


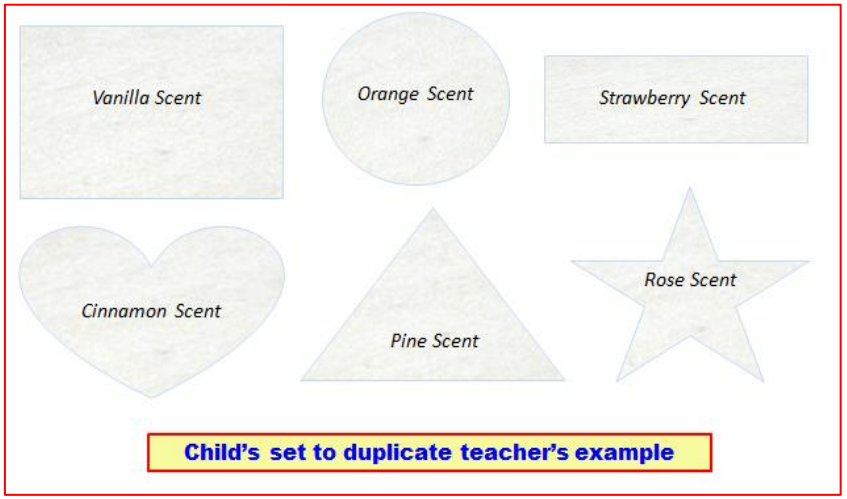


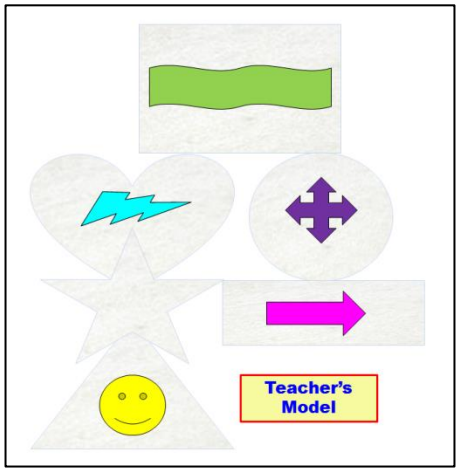
2. Teach them to highlight key details or the outline of objects (depending on the gestalt problem) so they can check to see if that piece can also be found in their final product and/or is shown in the correct manner. You can also teach them to systematically check words, letters, and objects by tracing them with their finger (use motor memory to see if they are correct).

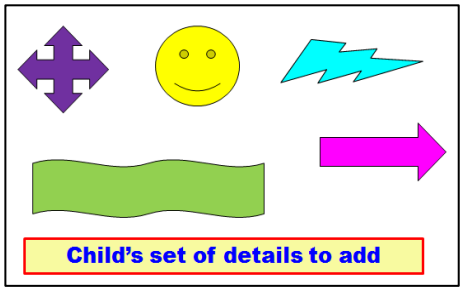


3. Use sensory cues to give the student additional information while they are working on difficult tasks. For example, create shapes that have sensory cues (e.g., sand, glue, fabric edges) or olfactory cues (cinnamon, vanilla, etc.). Then, create a complex picture using the shapes, and have the child duplicate it with their own set. They can then check to see if they are correct by using the non-visual cues that you provided in their model (the vanilla scented one should be on top, etc.).









Adding colored felt shape "details" to this activity can make the task more challenging, especially for students with gestalt problems where inner details are usually ignored. For example, adding felt details to the teacher set and then providing the same "detail shapes" to be added to the child's picture brings this activity to a whole new level (hits both general position and interior detail).

By adding more than one detail, smaller details, and/or removing the color cues (all shapes are black), the task can continue to be adjusted to higher levels.

Unique Problems

Prosopagnosia (Face Blindness)

Description

Prosopagnosia or Face Blindness causes a person to be unable to recognize faces to some degree. It was once thought to be a rare condition and only due to brain injury. Now, however, it appears that 1 in 50 may have some form of this condition, and in many cases, it has been inherited.

Face blindness is an unusual condition since so much of our brain is devoted to the recognition of faces. It is one of the first visual stimuli that will hold our attention and is so important that a whole section of the brain is devoted to this skill.

This is why it takes so little for our brains to "see faces" in trunks of trees, on the moon and in other objects. Our eyes from the very beginning are searching for faces.

So how can something like face blindness occur? Well, the condition varies widely, but there are patterns that we see. In all cases people with face blindness CAN recognize features (e.g., eyes, noses, mouths), but the actual processing that links these features into a recognizable whole (face of a person) is lost. In many ways, it is a "gestalt" issue limited to the details/features of faces.

This condition can include any combination of the following:

- ❖ Inability to hold features in memory (NOTE--not all agree that memory is involved in this condition)
- ❖ Inability to link features into a "whole" face (the "gestalt-type" of problem mentioned earlier)
- ❖ Inability to recognize faces from other objects, even inanimate ones (rare)
- ❖ Inability to recognize only faces which are familiar
- ❖ Inability to recognize unknown faces and characteristics (e.g., young or old, female or male, etc.)
- ❖ Inability to recognize any face, including their own (even when looking in a mirror)
- ❖ Lack of social skills (some feel this may be the issue for many people with Asperger's and autism)
- ❖ In some severe cases, people with face blindness can develop secondary anxiety disorders
- ❖ In some cases, the inability to recognize and hold places in memory may also occur as a related issue

What You Might Notice in the Classroom

Clearly students with some form or level of face blindness will typically struggle with social issues. They may also experience other limitation in their daily life. Some typical problems are:

1. Unable to recognize own picture
2. Unable to recognize peers, especially out of context (i.e., outside of their normal classroom)
3. Unable to follow visual storylines (i.e., cannot follow characters and storyline in a video)
4. May lose teacher/class when walking with them in a crowded hall or on field trips
5. May tend to make silly faces in pictures or in mirror so they can recognize themselves
6. May show poor social skills, lack of friends, and general anxiety when with people
7. May not be able to recognize peers, especially they are dressed in the same sports uniforms or school uniforms

Typical Treatment

Since this condition is permanent, the focus must be on the coping mechanisms that will make social interaction and daily life easier. These include any of the following:

- Learning to use outside characteristics to recognize people (e.g., hair color, cut, voice, etc.) and standardizing them as needed (e.g., homeroom teacher always wears a yellow exercise watch, parent always wears an unusual/distinctive shirt whenever out in public, special shirt always worn by the teacher on field trips, etc.)
- Learning to cope when learned cues change (e.g., haircut causes them to no longer know person)
- Becoming social and smiling at *everyone* so people you casually know but do not recognize are not offended
- Developing safety mechanisms so student does not go with wrong parent, class, teacher, etc.
- Using a peer-buddy to assure safety on field trips and other activities that occur outside the confines of the classroom or school
- Developing ways to recognize self (e.g., keep an unusually colored shirt at school and have the child wear it anytime photos are being taken… so they can always recognize themselves in pictures and videos).
- Finding an adult family member or mentor who has coped with the condition
- Teaching the student to advocate for themselves, ask for help, and explain the condition to others

Classroom Activities to Strengthen Coping Skills

Any activity that accomplishes the above list is useful. I have found the last bullet (advocacy) to be especially important. These students will be dealing with this condition their whole life, and in many cases, with their own children someday. They must learn to be vocal about their needs, limitations, and strengths in order to avoid the social crippling that can accompany this condition, especially if care is not taken. Education of others is key to successful function, and since most people find the condition fascinating, the student is rarely rejected when an explanation provided.

Unique Problems

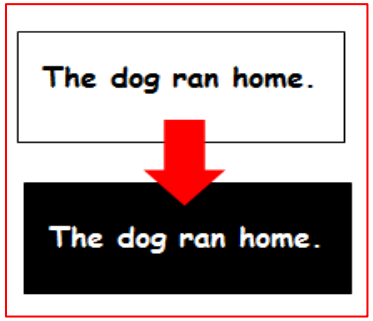
Irlen Syndrome

Description

Irlen Syndrome is a condition that crosses both visual perception and reading disabilities. For a long time, many did not believe it even existed. It was thought to be a form of Dyslexia (often referred to as Visual Magnocellular Deficit). Now, though, most feel it is a separate condition in its own right.

So what is **Irlen Syndrome** (often referred to as **Scotopic Sensitivity System**--**SSS**)? People with Irlen do not process printed symbols in the same manner as typical readers. Due to an unusual sensitivity to contrast and light, students will experience visual perceptual problems, including words that shift, turn darker or lighter, or even appear to be floating off the page onto other surfaces, such as a wall or board.

Many students with Irlen Syndrome will never complain about their eyesight. Since most see other parts of their world in a typical manner, they do not realize that the way there are viewing print is unusual. Please note, though, in rare situations, Irlen can influence all vision (some will see a haze or miniscule dots placed or moving across their visual field at all times). In other words, Irlen is as varied as the children who have it---and it is the source of some of the most unusual cases I have had!



For example, I had one child years ago who had been retained in both kindergarten and first grade. When I was asked to see him, the school was already discussing retaining him a third time or moving him to a specialized placement. It was clear, though, that the child was quite bright. Upon questioning he told me he COULD read but found it too scary to do often. When questioned further, he revealed he hated reading because, "The white page with the black letters turned to a black page with white letters" with no warning, and that flip frightened him. He had Irlen Syndrome, but no one had ever bothered to ask….quite sad!

What You Might Notice in the Classroom

The following are signs of this syndrome, but since students do not know that what they are seeing is unusual, you may have to question them to determine whether some of these symptoms are present:

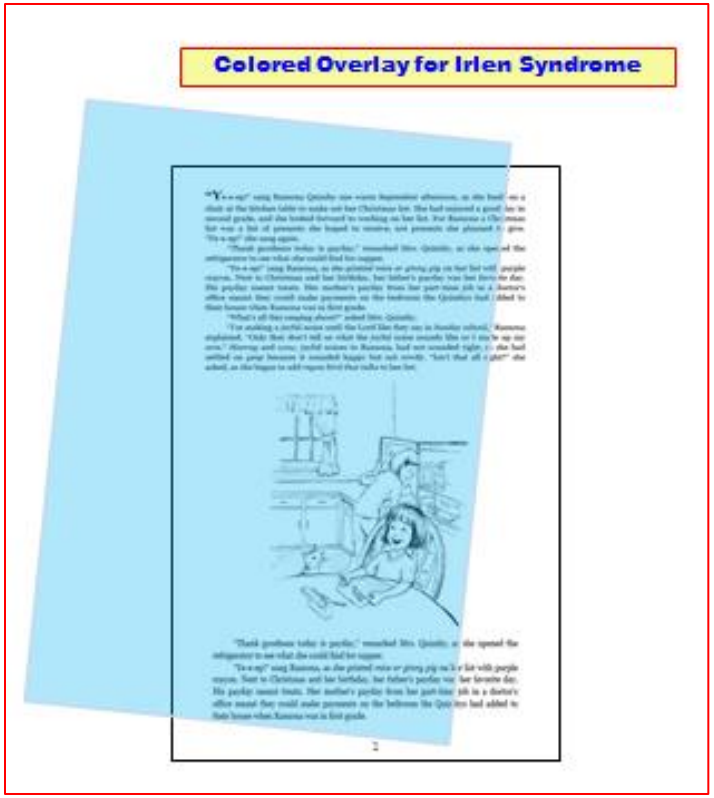
- headaches or fatigue when reading
- skipping words, sentences, or losing place while reading
- poor comprehension skills and reading test scores
- problems with some forms of lighting and general light sensitivity
- problems with clumsiness (often due to depth perception issues)
- words/sentences that shift, turn, blur/fade, darken/lighten, have a halo, vibrate, or move around
- page surfaces that twinkle, flash, flicker, or are too bright or have too much of a glare to see
- a need to move body or head to focus on written material
- prefer for working in dim or working with eyes partially covered
- rubbing eyes or closing them often (this can "clear" the issues for a moment)

Typical Treatment

The main treatment for this condition is the use of colored glasses and/or colored overlays that reduce the contrast and modify the light coming into the eyes.
The colors used will vary because not all students will respond in the same way.

The most useful colors, in my experience, have been a light yellowish-amber or a light blue, but the spectrum is too varied to be sure without checking them all. These **Irlen Filters** can be found through many companies. Here are two stores that carry them as of this writing: https://irlen.com/colored-filters/ and https://www.irlenvisions.com/ . I have also used colored transparencies (much cheaper) successfully. Just make sure you continue to use one brand since the color shades vary greatly across companies. The specific color to be used and the method (overlay, glasses, computer background changes, etc.) should be guided by a professional familiar with the condition since a slight change in hue/intensity can really make a big difference to the student.

Classroom Activities to Strengthen Visual Teaming



Assisting students with Irlen Syndrome usually involves the use of colored glasses or overlays. As long as the correct overlay is used, the student often will not have additional difficulty.

It may also be important, though, to become more aware of visual contrast being used when visuals appear on computers, whiteboards, and other electronic projection systems.

For example, look at the difference contrast makes in the example to the right. Sometimes the smallest change in color can make a world of difference.

Now that so many computers allow you to adjust background color easily, the change only takes seconds and rarely affects (or is even noticed by the other children in the classroom). Again, professionals who treat this condition can assist you with finding the right color-mix intensity that should be used for a particular child.

Visual Contrast Sensitivity

This may be too hard to read

This may be easier to read

*Adjust *Font* on Computer
*Reduce Color on Display
*Change Fonts to **Comic Sans**

Resources

In closing, please realize that some of the best supports to assist you will be found in your own community or school district. Occupational Therapists can also be an especially wonderful source of information. Meanwhile, I have provided some general links to get you started, but a simple search for your student's particular condition and needs will usually prove to be more useful. In most cases, a resource list will also be provided to you by the student's medical and/or therapeutic professional.

http://www.ncld.org/ (National Center for Learning Disabilities; provides resources on many other disabilities as well)

http://www.ldonline.org/article/6390/
(Learning Disabilities Online; provides resources on many other disabilities as well)

http://children.webmd.com/video/vision-therapy-children (video on vision therapy)

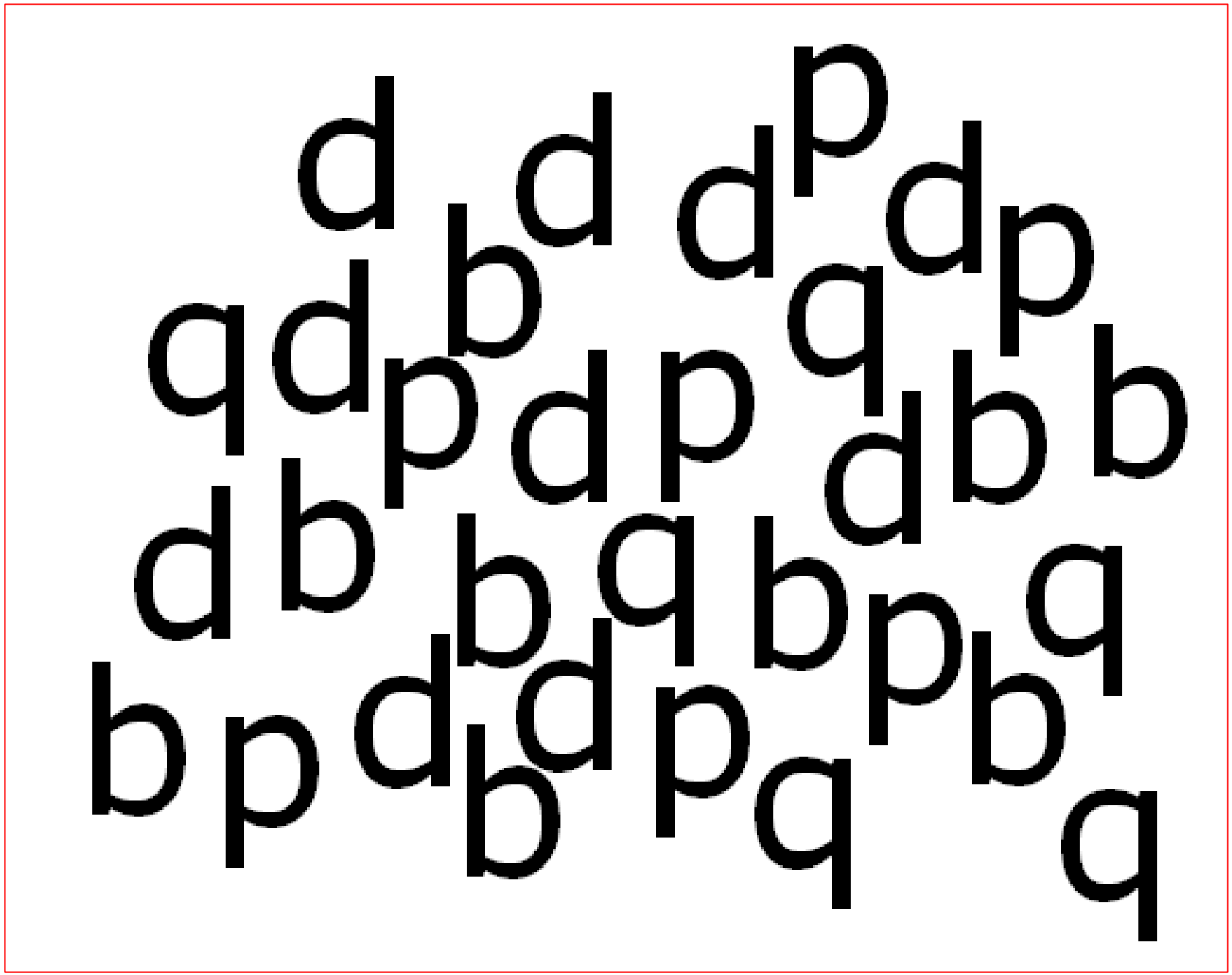
http://grantvisioncare.com/vision-therapy/ and http://www.optometrists.org/sorkin/index.html (resources vision therapy)

http://irlen.com and http://www.hale.ndo.co.uk/scotopic (simulations of Irlen Syndrome)

http://www.vision3d.com/frame.html and http://www.eyecanlearn.com/ (online info and exercises for the eyes)

If for some reason a link is broken (they change SO often) just go back to the primary organization the link came from and search from there. That will usually help you find where they moved the information or take you to something similar. In addition, a general search of the internet, Pinterest, YouTube, etc. will typically yield a wealth of information for every condition.

How many flowers do you see? _____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q d b q p
p d p d b b
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b p d d p b
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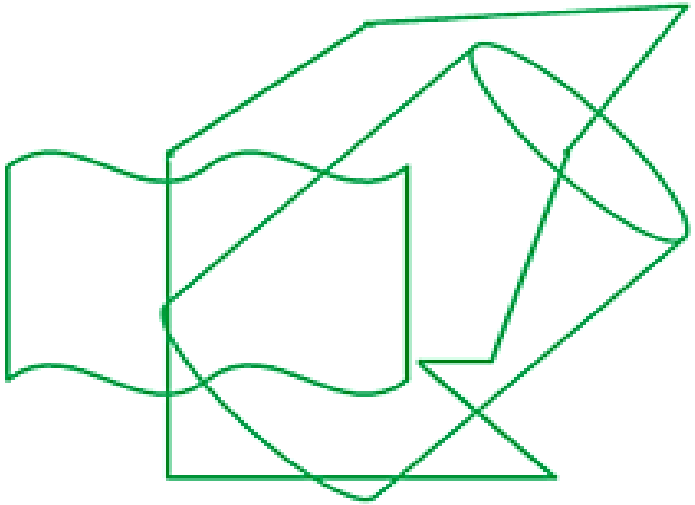
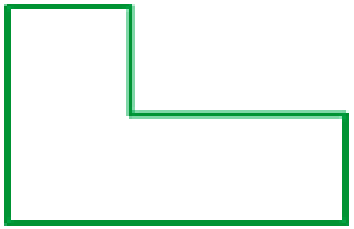
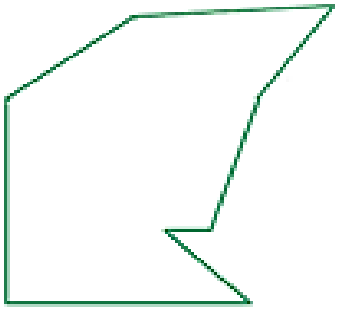
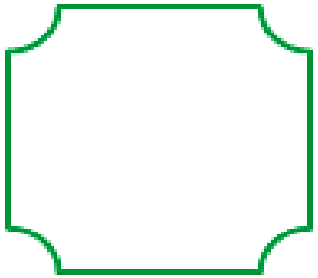
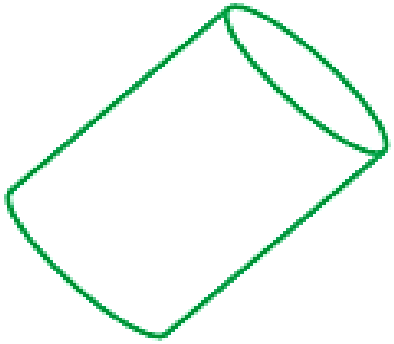
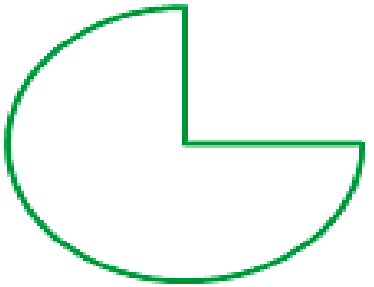




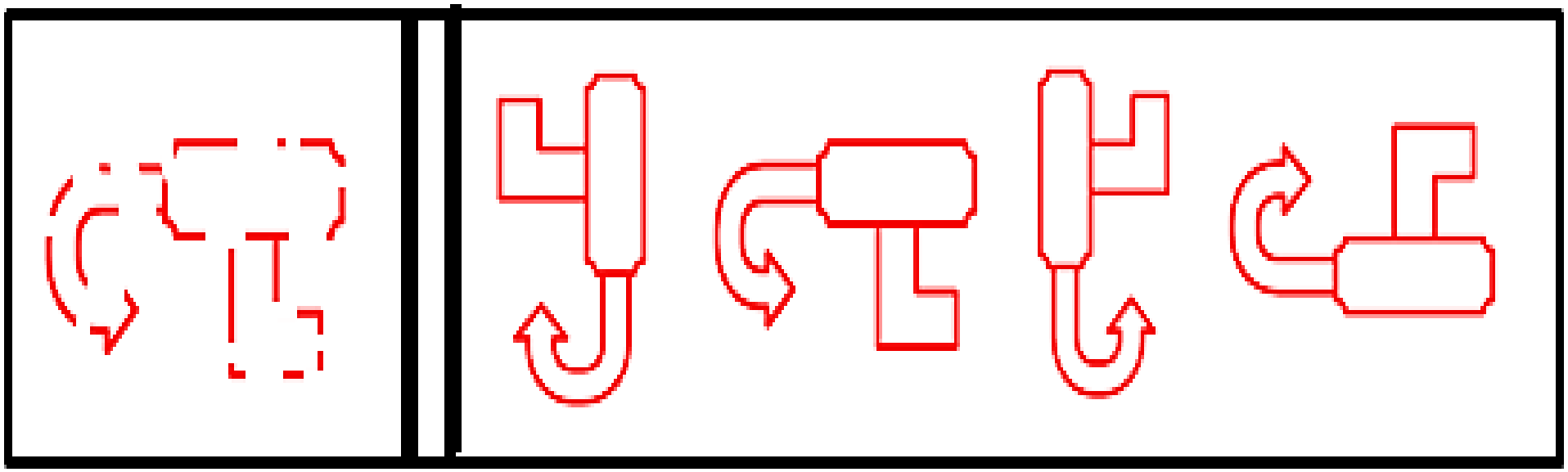








How many houses look the same as this boy's house? _____



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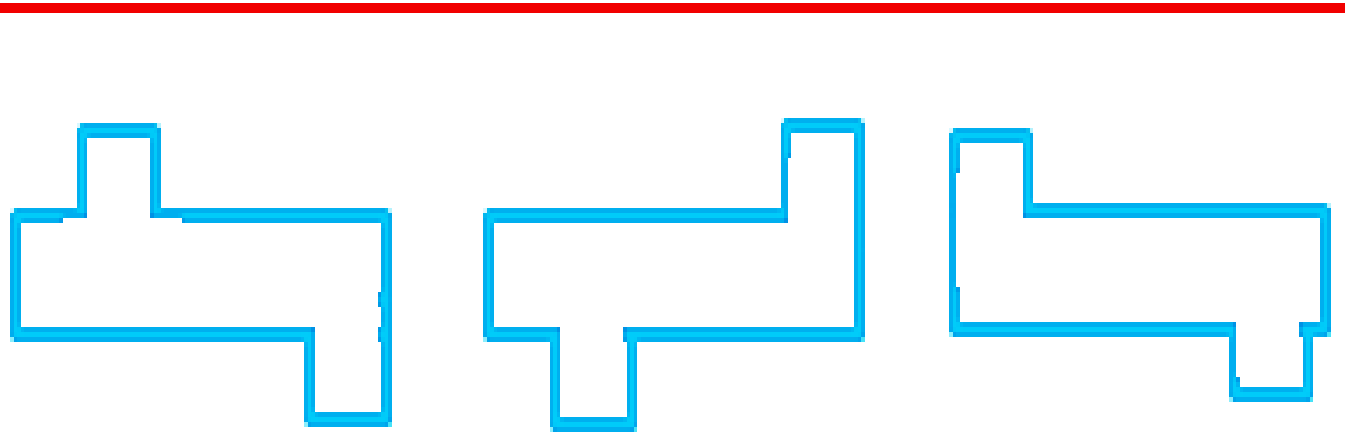

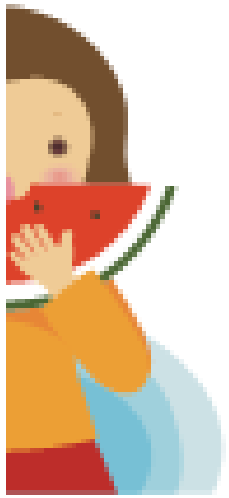

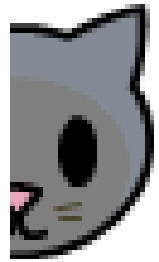

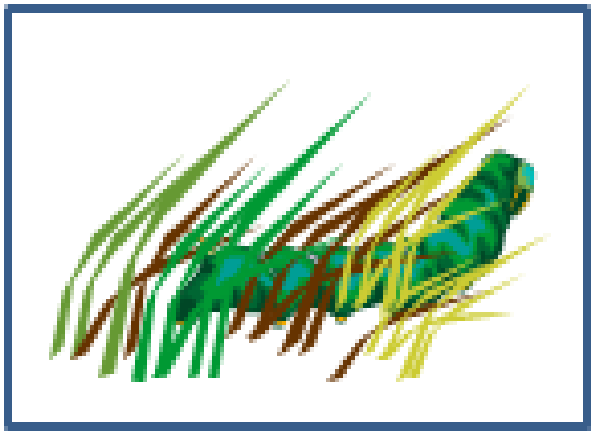

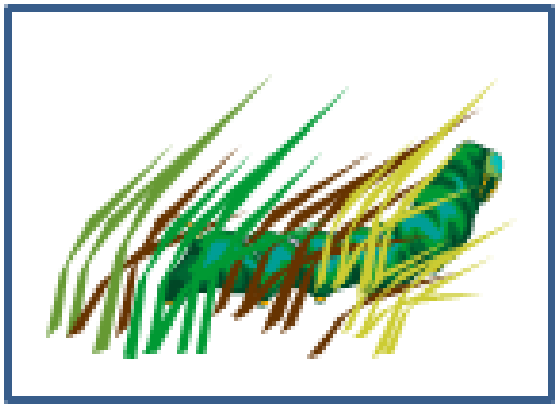

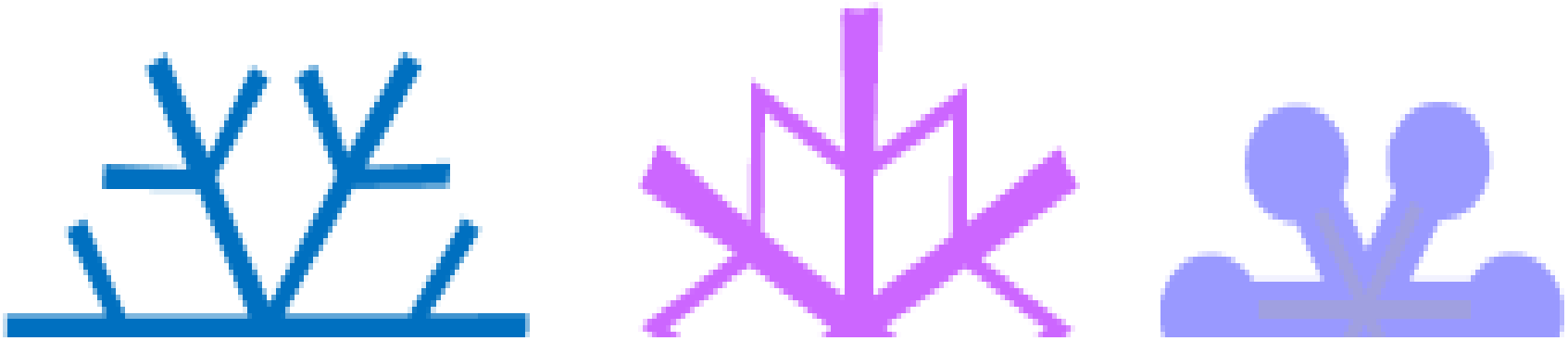

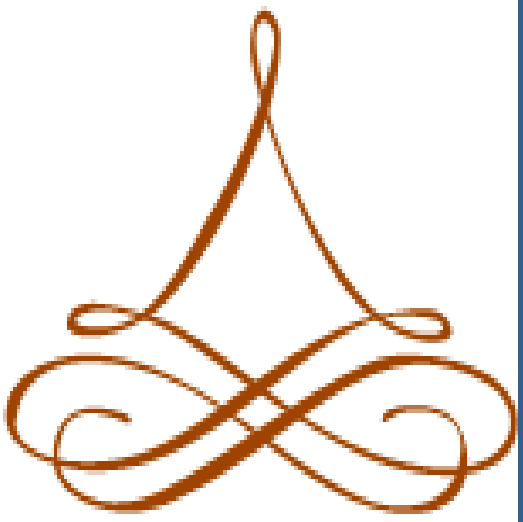

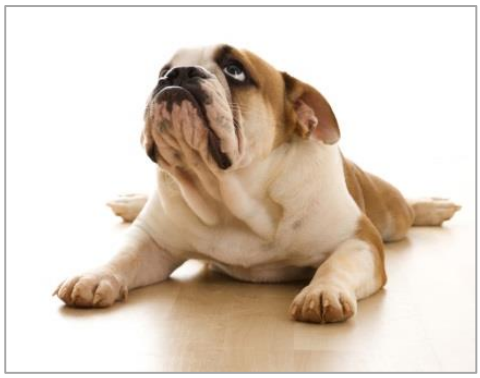

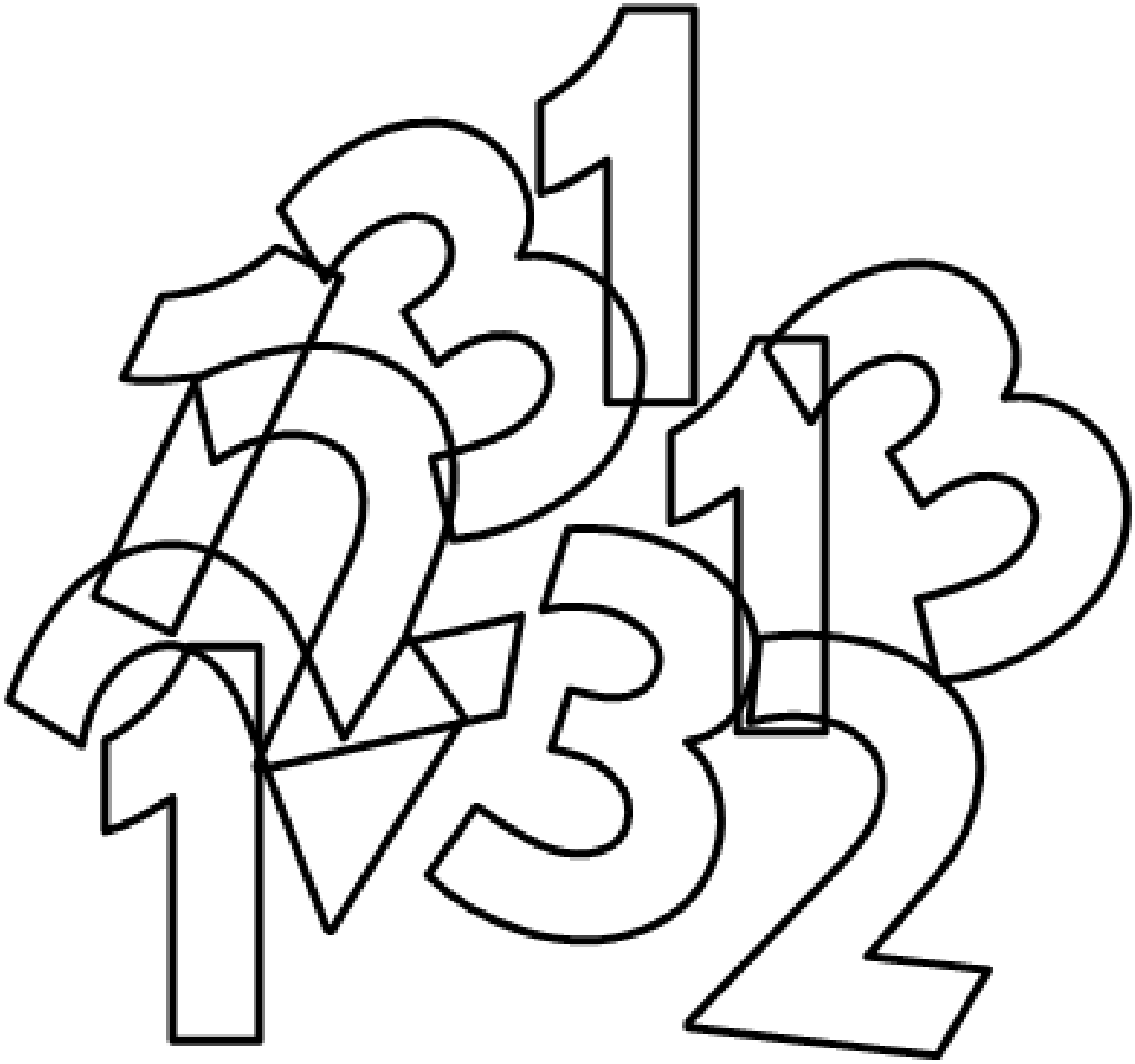

How many...

1____ 2____ 3____