

# Assessing Vision Development Through Pictures and Shapes



Introducing the Lea Puzzle

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# Table of Contents

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□	What I See: Visual Milestones for the 1st and 2nd Year.....	1
♥	Why Check Your Child’s Vision?.....	2
○	Children “At Risk”.....	2
🏠	Using the 3-D Lea Puzzle.....	3
□	Concept of Pictures Representing Objects.....	4
♥	Covering the Eye.....	4
○	Early Play With The Lea Puzzle.....	5
🏠	Vision Testing Products.....	6

The LEA Puzzle was designed to support the development of the concept of pictures representing objects and at the same time introducing the pictures that are used during early visual acuity screening. The Lea Puzzle is also useful in training motor functions, eye hand coordination and spatial concepts.

The puzzle is used in visual assessment and early intervention programs for children and adults with varying impairments. Children with delayed development may need to play with the Lea Puzzle for months even at school age before visual acuity testing is possible.

Most children playing with this puzzle are healthy and normally sighted. Their play situation changes as they grow. Often it goes through the phases described on page 5.



## **What I See:** Visual Milestones for the 1st and 2nd Year

### **0-3 Months**

As a newborn infant, I look at light sources and turn my eyes and head toward them. I develop eye contact between 6-8 weeks and follow objects that move slowly, first horizontally later vertically. By the end of the second month, I become interested in looking at mobiles.

### **3-6 Months**

I discover my hands, reach toward objects, then grasp hanging objects. I watch toys fall and roll away. My visual interest sphere widens gradually. I don't mind it if you cover my eye without touching my face (figure on page 2).

### **7-10 Months**

I notice small bread crumbs. First I touch them, then I try to grab them. I like to watch you draw simple pictures for me. I also recognize objects that are partially hidden.

### **11-12 Months**

I love to play hide and seek and I know my way around my home. I can look out the window and recognize people. I also start to recognize some pictures.

### **18 Months**

I can play with simple puzzles. I am interested in books and pictures and I can recognize that pictures are representations of real objects. I like to watch you draw while you tell stories. I may be able to name pictures and objects, such as my LEA Puzzle shapes—apple, house, block and ball.

### **24 Months**

I love to scribble and color. I understand pictures can be large and small and still represent the same thing. I can also arrange similar pictures in groups. At this age, my vision can be tested while I play—when I am in the mood! When my vision is tested, I see small pictures equally well with my right and left eye.



# ♥ Why Check Your Healthy Child's Vision?

Most babies and children develop their sight without any problems. However, a few healthy children and many children with disabilities need treatment by an eye doctor during early development of vision. If you have any concerns about how your child sees, it is important to have your child's vision checked.

Vision problems that are detected early can be treated before any loss of vision occurs. Keep an eye on your infant's visual development—especially during the first year. At the age of 3 months, your child should be using both eyes together most of the time. After 6 months, even an occasional eye turn requires evaluation. If your baby's behavior does not follow the Visual Milestones listed on page 1, discuss your observations with your pediatrician or eye care professional. Deviation from normal development can often be corrected if found early enough with glasses, training, medications, or even surgery.

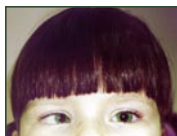
## ○ Children "At Risk"



The most common problems in vision are amblyopia (lazy eye) and strabismus (squint). Lazy eye is an eye condition in which the child becomes accustomed to not using one eye. Lazy eye shows no visible signs, which makes it difficult for parents to notice that an eye problem exists. Strabismus is a misalignment of the eyes, with an eye turning in or out, occasionally or constantly.



Certain children are at higher than average risk for problems in their early visual development. It's advisable to have these children examined by a pediatric eye doctor at the age of 7-9 months—even if the infant's eyes appear straight. Ask your eye doctor whether your child is at risk for vision problems.



You can learn how your child uses his or her eyes even before a formal test can be done. When your baby is playing and is intently looking at a toy (preferably holding it with both hands), cover the right eye by bringing your hand or two fingers in the front of the eye without touching the child. If your baby continues to look at the toy with the left eye, the vision in the left eye is probably fine. Wait a short while, then cover the left eye and observe whether the child continues to look at the toy as before\*. If vision in one eye is notably worse than in the other eye, your child will respond by tilting the head or by pushing your fingers away in order to see with the better eye. If you have any doubts about your child's vision, consult with your pediatrician and your eye doctor.

\* This is shown in the video, "Testing Of Vision In Pre-School Years" at <http://med-aapos.bu.edu/aapos/audvid.html> and at [www.lea-test.fi](http://www.lea-test.fi).



## Using the 3-D Lea Puzzle

The 3-D LEA Puzzle is designed to help your child develop eye-hand coordination and to learn to match and name the puzzle shapes. These puzzle shapes are also the symbols that will be used later to test the child's vision. By playing with the LEA Puzzle, you prepare your child for the test situation at home or at the doctor's office by the age of 1 1/2 - 2 years instead of the usual 3 - 4 years. Make playing with the Lea Puzzle a special activity, much like reading together. This way, it keeps your child's interest each time you play.

When the child starts throwing puzzle pieces, gently tell him/her that balls and regular blocks are for throwing. Throwing toys is important play at the age of 9 - 13 months. The child is experimenting with echoes comparing them with the movement and landing of the object in his/her well-organized visual space to build auditory spatial concepts. If thrown, the puzzle pieces may break or harm other children or infants around them.

Let the child find out how to put the puzzle pieces in the tray. Just show the child how you take them and put them in a row on the table and how you put them back in the correct spaces while saying "I like to play with these puzzle pieces, they have nice shapes and fit in their places. You might like to play also." Since matching color develops several weeks to months before matching black and white shapes, start on the color side.



house, dog house,  
garage, arrow, etc.



ball, ring, sun,  
circle, etc.



block, brick, window,  
box, square, etc.



apple, heart,  
butterfly, etc.



# □ Concepts of Pictures Representing Objects

You can help your toddler develop the concept of pictures representing objects by tracing around the 3-D puzzle forms. The child will be interested in watching you draw the shapes and can then color (or scribble) the drawings.

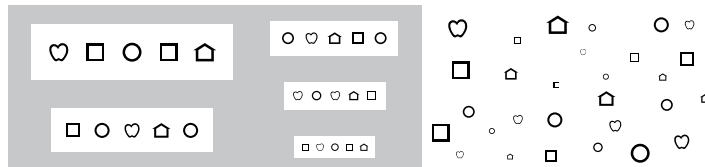
Compare the drawings and the 3-D shapes. Show the child that the puzzle piece can be placed on top of the picture of the shape. Now draw pictures of houses, apples, balls, and blocks smaller and smaller so the child learns that the name can be the same although the size varies. This activity prepares your child to look at the small symbols on the tests.

When the child is accustomed to looking at the small pictures you may show the small pictures of the test symbols printed at the bottom of this page.

# ♥ Covering the Eye

First play with the puzzle with both eyes uncovered until the child is familiar with the puzzle. When the pictures are easy to recognize, introduce the game of covering one eye at a time. The best way of covering an eye is to use a pirate's patch. The child may want you to use the patch too! A non-threatening eye cover is a cap pulled over one eye. Sometimes the child will allow covering of one eye but does not accept the covering of the other eye. In such a case it is likely that there is a difference in the visual function of the two eyes. Report your finding to your eye specialist.

If the child accepts alternate covering of the eyes, play with the puzzle while covering one eye at a time. When the child masters this play situation (s)he is ready to be tested by the doctor or by your eye care specialist.



## Early Play With the Lea Puzzle

The following short story of a Finnish infant is an example of how the puzzle can be used from an early age. James received the puzzle as a present from his grandfather at the age of 10 months. At that age the only use he found for the puzzle was tasting the round pieces, the circle and the apple.

Three weeks later he found out that the puzzle pieces could be stacked on each other. He turned the puzzle pieces and the board over and over again and explored the cut-outs with his little fingers. At this stage the puzzle pieces were just the right size for grasping and dropping. James quickly noticed that he could throw the puzzle pieces and get an adult to bring them back. This was replaced by throwing other toys.

At the age of eleven and a half months James started to put the orange circle and the blue square in the correct cut-outs. The other two pieces were apparently too demanding and frustrated him so they were kept aside. He began to recognize the white box at a distance and was very proud to be able to open and shut the lid and put all the blocks into the box. At this same age of eleven and half months James started to watch very carefully when an adult drew a line around a puzzle piece to create a picture of the piece. He also watched how the puzzle piece could be placed on the picture.

At the age of exactly one year James could spend quite a long time in getting the puzzle pieces out from their cut-outs and then putting them back. The circle and the square were placed in their correct cut-outs every time and he clearly preferred playing with them. He was able to place both the house and the apple in their cut-outs although his motor abilities and concentration were stretched to the limit. When all four pieces were in the correct places he made everyone in the room aware of how clever and dextrous he was.

A month later, at the age of 13 months James started to become interested in the black and white side. Again the circle and the square were the easiest ones and the house the most difficult. When the forms were drawn on paper he looked at the smaller and smaller forms for long periods of time and then looked at the adult as if asking, "What are you trying to tell me?". Now and then he pointed to the circle saying, "loh" (circle in Finnish is "pallo" = James' "loh"). He also used the signs of ball and apple (there is a deaf member in the family so he was accustomed to using signs) and about two weeks later started to use "nah" for apple (apple = omena = James' "nah").

When three LEA Playing Cards were put in front of him he could often point with his finger at the correct picture when asked, "Where is the ball?" and "Where is the TV (=square)?" However, it took another three months before he could really concentrate long enough so that binocular visual acuity could be measured.



# Vision Testing Products

The 3-D LEA Puzzle is a part of the LEA Vision Testing System that includes 30 vision tests used to test children of all ages. There are regular line charts and single symbol tests. It is easier for a young child to look at single symbols than on a line test chart. However, single symbols tests are less likely to reveal “lazy eye” than a line test. Finding the “lazy eye” is the most common important task of vision screening of young children.

Another less common but equally important finding is an early diagnosis of impaired vision in both eyes or loss of some visual functions due to brain damage. In the LEA Test System there are several tests for assessment of impaired vision.



Playing  
Cards

If you want more information on various Lea Tests, call Good-Lite at 1-800-362-3860, or you can visit Dr. Hyvärinen's homepage:

[www.lea-test.fi](http://www.lea-test.fi) or  
[med-aapos.bu.edu/leaweb/index.html](http://med-aapos.bu.edu/leaweb/index.html)

The video, “Testing Of Vision In Pre-School Years” (Cat. No. 2804) is available from Good-Lite. The video can also be seen at:  
[med-aapos.bu.edu/leaweb/Video.html](http://med-aapos.bu.edu/leaweb/Video.html)

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