



Set the table for learning

by Nancy Maldonado

According to many early childhood teachers, table puzzles are the preferred manipulative material, second only to Legos® in daily use. Table puzzles are popular because they provide satisfaction, enjoyment, and an opportunity for young children to focus on an activity that has an ending (Maldonado 1996).

Nonetheless, puzzles are often neglected or taken for granted. They are generally seen as reinforcement tools in the development of problem-solving skills and socialization. Actually, puzzles can enhance nearly all areas of a child's development, notably the following:

- **Physical skills.** As children grasp, hold, turn, and fit puzzle pieces, they develop eye-hand coordination and fine-motor dexterity.
- **Cognitive skills.** By piecing together an image, children gain experience in solving problems. Puzzle-solving experiences help children learn math concepts such as sorting, classifying, comparing, sets, size, and spatial relationships.
- **Social skills.** When puzzle solving with friends, children learn how to negotiate with others, control their own actions, and learn various problem-solving techniques. Watching others solve puzzles helps children discover new puzzle-solving strategies and encourages them to share their own. Guiding, supporting, and encouraging the process of a puzzle's completion helps children develop leadership skills.
- **Emotional skills.** Puzzle solving is fun and engaging. At the end of a puzzle-solving activity,

children feel pleased with themselves. They gain confidence in their ability as problem solvers and feel willing to try new puzzles or other challenging activities.

How to select puzzles

The following selection guidelines are based on developmental material and observation data (Maldonado 1996). Developmental and chronological age levels are derived from research experiences in solving puzzles within home and school environments.

Choose puzzles appropriate to each child's developmental abilities and needs.

Two-year-olds can work with puzzles that contain a complete figure (one piece) with a knob on it. An example is a fruit-scene puzzle with one to three whole fruits.

A 2-year-old enjoys putting in and taking out pieces as much as actually fitting a piece in its space. Manipulating the pieces—turning them, trying to fit them in, and so forth—is cause for engagement. Activity is the satisfaction at this age.

The knob is an attraction as well as an aid. Knobbed puzzles help with small-finger coordination.

Puzzles for 2-year-olds

- Knobbed for two-finger grasp
- One to three pieces in object shape
- Objects familiar to toddlers



Manipulating the knobs strengthens the pincer grip—thumb and index fingers meeting around an object—that will later be used for writing.

Piaget would view the use of single-object puzzles as enhancing eye-hand coordination and the identification and naming of objects (Piaget 1954; Lavatelli 1970). Vygotsky would see Johnny’s puzzle activity as the child’s engagement in his own development (Wertsch 1979).

Montessori (1965) would place great value on physical (small muscle) and mental play (color, shape, object recognition). Actually, she was the first educator to design and use knobbed puzzles and cylinder insets with young children. For her, the small knob provided a way that a 2-year-old could grasp a puzzle piece with two fingers in order to pick it up and put it down. This is seen as a pre-writing work and play activity.

Puzzles for 3-year-olds

- 5-12 pieces
- Knobbed for easy handling
- Objects divided into parts
- Recognizable shapes
- Basic eye-hand coordination

Three-year-olds still enjoy single-figure, knobbed puzzles. However, they are ready to have a familiar figure puzzle (fish, truck, or butterfly, for example,) divided into knobbed pieces. Three-year-olds can manage puzzles of five to 12 pieces with comparative ease when the object is a familiar one.

In a Piagetian framework, a transfer occurs from the mental to the manual to the mental as the child takes parts (pieces) and makes them whole (Micklo 1995). This principle is also seen in the Montessori insets that involve a triangle, circle, square, and rectangle cut into parts, each with its own knob.

Four-year-olds can handle knob-less puzzles with ease. Puzzles of 12 to 24 pieces usually provide the right mix of comfort and challenge. Four-year-olds particularly enjoy puzzles of familiar scenes and objects (trees and flowers, for example) and favorite characters (Humpty Dumpty, Cinderella, or fire fighters).

Four-year-olds use their basic problem-solving skills or previously learned puzzle-making strategies, such as color matching. But they are beginning

to make visual modifications and judgments while handling each piece.

Puzzles for 4-year-olds

- 12-24 pieces
- Hand control, no more knobs
- Finer finger control
- Eye-hand coordination
- Transition to full use of fingers
- Variations of color, size, shape
- Familiar images

Several developmental milestones are beginning to emerge here. One is the child’s ability to see complex relationships among separate pieces that can complete a picture or story. Another is relying on prior knowledge from previous work with puzzles and at the same time becoming more autonomous in mastering new tasks.

Five-year-olds are good puzzle solvers. They can handle both small (up to 18 pieces) and large (18-35 pieces) puzzles, depending on the theme. They particularly like puzzles that offer a challenge, where “puzzling it out” is more apparent. They might have to figure out body parts or plant parts, for example, or distinguish between buildings in a busy city scene.

Puzzles for 5-year-olds

- 18-35 pieces
- More complex puzzles
- Picture puzzles
- Grouping by color features
- Discrimination of color
- Encourages group solving
- Provides a degree of challenge

Five-year-olds move from the pleasure of the doing to the pleasure of task mastery. They also consider time on task an important factor in their work. They enjoy setting their own timeframe: the quicker the completion of the puzzle, the better, promoting feelings of satisfaction.

This overview of puzzles appropriate to children’s ages shows that puzzle solving develops through experience-related stages, from the simple to the complex. It’s important to note that not all

young children have had experiences with puzzles. This means some 5-year-olds can do 35-piece puzzles without frames, while others have difficulty with 12-piece framed puzzles.

As teachers, you will observe and work with children to provide puzzles that fit various individuals' needs. Know your children. By careful observation, you can provide for a range of developmental abilities, with puzzles ranging in type, size, and theme.

Choose puzzles that are attractive and sturdy. Table puzzles must be able to withstand repeated use by young children. Sturdy materials include wood, foam board, plastic, metal, and pressed cardboard.

Puzzles must also be attractive and appealing to children. The basic requirements are clarity of image and simplicity. For a 2- or 3-year-old, for example, a puzzle with a whole-piece carrot is more familiar and therefore more inviting than a puzzle in which the carrot is split into three pieces.

Another factor to think about is isolation of specific features such as color, shape, and image. Purple is confined to the queen's dress, for example, and not scattered throughout the scene. Isolation like this allows a child the opportunity "to see" and "to succeed." Puzzles that are familiar, attractive, and aesthetically beautiful invite the child to engage in the activity.

Choose puzzles with images that reflect what is familiar to children.

Figures and images on the puzzles ideally offer easy recognition. Examples are food, vehicles, community workers, girls and boys, and animals. Familiarity and identification with the subject is reassuring as well as interesting to children.

Two- and 3-year-olds understand simple shapes, such as circles or squares. When children can recognize the subject of a puzzle, they can more easily evaluate and recognize their success. "I made a banana!" and "Look, these circles are grapes" indicate a child's pleasure and fulfillment in puzzle solving.

Children's sense of reality is based on their interactions with the environment and the materials in it (Piaget 1954). Using puzzles that represent materials and objects from the children's environment enables them to recognize, verify, and store experiences for later use.

Choose puzzles that balance ease with challenge. Ideally, some classroom puzzles will be fairly easy for children to put together, and some puzzles will offer a challenge. Be attentive to individual children's interests and needs. For example, trains can fascinate many 5-year-olds, girls as well as boys and native English speakers as well as second-language learners. Using train puzzles may not be popular with the whole class, but it may interest a number of children of diverse backgrounds and abilities and enable them to participate in the puzzle-solving process (Maldonado 1991). In this way, puzzles can meet a child's unique interests and needs.

Occasionally you may observe that children are not using a particular puzzle. This may be due to the puzzle's theme, complexity, attractiveness, unfamiliarity, or size. Sometimes storing it away for a few weeks and placing it back on the puzzle rack can stir interest later on.

Keep in mind that children need to feel a sense of mastery and accomplishment to become autonomous in their actions and eventually in their thinking. Children enthusiastically use jigsaw puzzles because of the built-in control of error. Melinda sees that a particular piece doesn't fit and knows she has to keep looking until she finds the right one. Successful insertion of each piece allows the child to control the problem-solving process and ensure success.

How to use puzzles in the classroom

As teachers, you guide children in the most beneficial use of puzzles through routines and responsibilities. The guidelines below are based on hundreds of observations of children using puzzles in the classroom.

Web sites of puzzle suppliers: A sampling

- Childcraft, www.childcraft.com
- Judy/Instructo, www.schoolspecialtypublishing.com/Judy/
- Lakeshore, www.lakeshorelearning.com
- Lauri® puzzles, www.lauritoys.com
- Learning Resources, www.learningresources.com
- Living and Learning, www.livingandlearning.com
- Milton Bradley, www.hasbro.com/miltonbradley/
- Playskool®, www.hasbro.com/playskool/
- The Puzzle People, www.puzzlepeople.com



Store puzzles in one area. In most classrooms, puzzles are stored and used in the manipulatives center. You can create a puzzle library that changes with curriculum themes, such as family, community helpers, and weather.

Puzzles may be stored on labeled shelves or in special racks, available from educational suppliers, where puzzles can be neatly arranged in a small space. The disadvantage of racks is that children do not see the puzzles easily. They must slide the puzzle out of the rack to see and choose one. This works well for 4- and 5-year-olds, but not for younger children. For 2- and 3-year-olds, it's better to set out

each puzzle individually in one area. Seeing the puzzles tempts children to engage in the activity.

Trays are useful when a puzzle is in a box or not framed. The trays can be carriers and serve as frames and surfaces for puzzle solving. Similarly, puzzle mats enable children to work on difficult puzzles over several sessions. The mat rolls up for storage but the pieces stay in place until the child unrolls the mat to resume work.

Maintain quality. Regularly check puzzles for damage. Encourage children to report missing pieces. Nothing frustrates a child more than to find

Author's pick of the best puzzles

During 13 years of visiting hundreds of classrooms and conducting more than 300 observations of children solving puzzles, author Nancy Maldonado recorded the most popular and effective puzzles used by young children. She developed this chart, which she calls a "puzzle-ography."

To buy these puzzles, check with local teacher supply stores, bookstores, or the Web sites and catalogs of educational suppliers. Some puzzles may no longer be available, except perhaps at thrift shops and garage sales.

Age range	Puzzles	Manufacturer/Distributor
12-24 months	Pets Fuzzy Wooden Puzzle (4 pieces, textured)	Lights, Camera, Interaction, now Melissa & Doug
12-24 months	Simple Shape Board (chunky knobbed, 5 pieces)	Lakeshore
12-36 months	Jumbo Textured Shapes (9 pieces)	Lights, Camera, Interaction, now Melissa & Doug
12-36 months	Giant Knob First Puzzles (3 pieces, set of 4)	Lakeshore
18-24 months	Count on Thomas (9 pieces) Not available from supplier	Judy/Instructo, now owned by School Specialty
18-24 months	Farm Fuzzy Wooden Puzzle (4 pieces, textured)	Lights, Camera, Interaction, now Melissa & Doug
18-24 months	Giant Knobbed Puzzle Set Transportation, Fruit, Pets, Farm Animals (3 pieces each)	Lakeshore
18-24 months	Super-simple puzzle boards Zoo Animal Set (4 pieces, extra thick for easy lift)	Lakeshore
18-24 months	Super-simple puzzle boards Animal Farm Set (4 pieces, extra thick for easy lift)	Lakeshore
20 months	Two Apples (2 pieces)	Childcraft
20-36 months	Three Ducks (3 pieces)	Childcraft
24-36 months	Sea Horse (5 pieces) (knobbed puzzle)	Childcraft

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that the final piece needed to complete a puzzle is missing. It breaks the sense of completion and the continuity of the puzzle-solving activity. Some young children even become upset when given a cookie with a piece missing from it! Children need to see things whole and complete.

Children also need to know that the material they are using is of value to the teacher as well as to them. With 4- and 5-year-olds, you might appoint a “puzzle patrol” to assist in this daily task.

You can replace missing puzzle pieces by making them from foam board or wood. Make an impression with play dough or clay, and make sure it’s the equivalent thickness. Paint the piece to match the

missing puzzle part. Children can help by pounding the clay or painting the piece.

In some cases, you can order replacement pieces from the puzzle manufacturer. That’s true with the popular crepe rubber puzzles by Lauri. See www.laruitoys.com.

Introduce and demonstrate new puzzles. Children appreciate a teacher’s enthusiasm. When you bring a new puzzle to the attention of a child, group, or class, you help endorse the material’s uniqueness. Never take puzzles for granted.

Remember that the goal of puzzle solving is not presenting or testing concepts but rather involving children in the puzzle-solving activity. With puzzles,

Age range	Puzzles	Manufacturer/Distributor
36 months	Helicopter (7 pieces)	Lakeshore
40-48 months	School bus (13 pieces)	Lakeshore
36-48 months	Special Needs (9-14 pieces, set of 6)	Playskool®
36-48 months	Crayons (8 pieces)	Lakeshore
36-48 months	Balloon Colors (8 pieces)	The Puzzle People
36-48 months	1-2-3 Puzzle Blocks (10 pieces)	Learning Resources
36-48 months	Foot Number Puzzle (12 pieces)	Learning Resources
36-48 months	Noah’s Ark (13 pieces, crepe rubber puzzle)	Lauri® Puzzles
36-48 months	Nursery Rhymes Set (8-15 pieces)	Childcraft
36-48 months	Transportation Set (12-15 pieces)	Playskool®
36-48 months	Rainbow (10 pieces)	Lauri® Puzzles
36-48 months	Counting Dino (10 pieces)	The Puzzle People
36-48 months	Wood Puzzle Challenge (24-30 pieces, 5-layer puzzles)	Childcraft
36-48 months	United States Puzzle (50 pieces)	Milton Bradley
Kindergarten	Odd ‘n’ Even Duck	The Puzzle People
Kindergarten	Upper and lower case alphabet (52 pieces)	Lights, Camera, Interaction, now Melissa & Doug
Kindergarten	My Community floor puzzle (48 pieces)	Living and Learning
Kindergarten	The Very Hungry Caterpillar (33 pieces)	Lakeshore
Kindergarten	USA Map floor puzzle (51 pieces)	Lakeshore
Kindergarten	Special Needs Kids (8-9 pieces, set of 7)	The Puzzle People

the solving is the activity; it's the engagement of the child's body and mind with the material.

Working on a puzzle with a child requires a minimum of language. The child brings language to the puzzle-solving process, and you take cues from the child's action and speech.

Develop class rules and responsibilities.

Puzzles help children develop a sense of responsibility for attention to the materials they work with. You can set up simple and clear guidelines for selecting, using, and returning puzzles. For example, encourage children to do the following:

- Make sure you have a clear and clean workspace, such as the floor, a mat, or the table.
- Check the puzzle to see if the picture is complete: Are all the pieces in the frame?
- If a piece is missing, check the table, the floor, and nearby area.
- If you cannot find the missing piece, bring the puzzle to the teacher. (Don't leave an incomplete puzzle in the classroom.)
- When working at a table where someone else is also working on a puzzle, keep pieces separated by working on a tray or mat.
- Return a puzzle to its place, which may be the puzzle rack or a shelf.

Puzzle solving is problem solving

Working with table puzzles helps young children develop many skills, such as observing, analyzing, sharing, and solving problems. Puzzles become a significant educational tool in the development of children's thinking when teachers select puzzles appropriate to children's developmental levels, establish meaningful routines, and encourage responsible actions through this activity. What better way to set the table for learning?

References

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- Maldonado, N. 1996. Puzzles: A pathetically neglected, commonly available resource. *Young Children* 51 (4).
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More puzzle resources

The following are interesting sites for viewing, browsing, and purchasing:

- www.jigzone.com
- www.puzzlehistory.com
- www.puzzlehouse.com
- www.bitsandpieces.com
- www.21stsoftware.com

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Werstch, J.V. 1979. From social interaction to higher psychological processes: A clarification and application of Vygotsky's theory. *Human Development* 22:1-22.

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