

Constructing an understanding of the world using jigsaws

A number of questions were raised during the 2009-2010 training session on Competency 5 “To construct his/her understanding of the world.” Examples include: What are the differences between Competency 5 and Competency 6? What makes a child “exercise his or her thinking?” What role do knowledge and subject matter play in developing the competency? What evidence needs to be kept? Many of the questions raised were answered during the two-day session.

As a follow-up, and to expand on the answers given during the training session, we have decided to illustrate some specific aspects of Competency 5 and Competency 6 with a real-life example that involves observing how children go about completing jigsaw puzzles. Jigsaw puzzles can be found in every kindergarten classroom.

What is the definition of a jigsaw puzzle?

According to Webster’s:

A jigsaw: A puzzle consisting of small irregularly cut pieces that are fitted together to form a picture.

A puzzle: A question or contrivance designed for testing ingenuity.

A Chinese puzzle: An intricate or ingenious puzzle.

In the figurative sense: a very complicated problem that can only be solved by assembling a large number of scattered elements.

Where do jigsaw puzzles come from?

The text below is a translation of the French text found on the following website: http://www.merci-facteur.com/puzzle/histoire-puzzle_e76.html

The first jigsaw puzzle was produced around 1760 by John Spilsbury, a London mapmaker and engraver. Jigsaw puzzles require a great deal of patience, since they involve reconstituting a picture by assembling a number of interlocking pieces that only fit together in one way. They were originally invented as an enjoyable means of learning geography. The images were painted by hand on thin pieces of wood, and then cut using a jigsaw (hence the name). Over time, jigsaw puzzles have evolved considerably and now have more pieces and more complex pictures. Wooden jigsaw puzzles still exist, but most are now made out of cardboard. They may be two- or three-dimensional.

What should be the focus when children do jigsaw puzzles?

As children become more experienced, their action and observation sequences become more complex, and it is at this point that the jigsaw activity becomes a process. See the example in Table 1.

What do children learn by doing jigsaw puzzles?

What questions should teachers ask themselves?

When children do jigsaw puzzles, they can learn a number of things. In this document, connections are made only with competencies 5 and 6. This choice was made in response to the concerns raised during the training session on Competency 5.

What are the differences between Competency 5 and Competency 6, when observing a child do a jigsaw puzzle?

Connections with Competency 5 “To construct his/her understanding of the world.” This competency is related to the child’s cognitive development, and the aim here is for the teacher to understand how the child thinks, so as to support his/her learning process (see Table 2). There is also a connection with the child’s ability to do a jigsaw puzzle. Again, it should be remembered that we are only considering the aspects related to this particular competency. Some children may not be able to do jigsaws simply because they are not interested. In these cases, other games should be offered, so that the children have an opportunity to develop the competency.

Elements common to Competency 5 and Competency 6

Table 3 shows the aspects of both competencies for which the observations are similar.

Connections with Competency 6 “To complete an activity or project.” This competency involves the work method used by the child to do the jigsaw puzzle (see Table 4).

What role do the subject areas play in doing jigsaw puzzles?

During the training session, questions were raised regarding the role that subject areas play in the development of Competency 5. A summary of the thoughts expressed is presented below.

The subject areas provide a means of naming the learning acquired, of constructing the concepts that form part of the subject area, of intervening and helping the children put names to the things they do, and of decoding what they know. Language is used to name the concept on which a subject area is based, and this can provide information that will help the teachers know when they should intervene. In some cases, it can be the lens through which teachers observe what is being done in class. The subject areas provide a common language through which those concerned can speak to and understand one another. In this particular competency, the focus is on how children learn, so that they can be given the tools to become good learners throughout their lives. Described in this way, the subject areas become means as opposed to ends. By bearing the subject areas in mind, teachers are able to define a topic in its entirety, support the development of the theme and develop strategies. Through the topics, subject areas acquire meaning and become **contexts** to be developed (history, open attitude to the world, authors, illustrators, elements from other cultures, changes over time).

Examples:

- See the different types of calligraphy used in picture books
- See how the vocabulary differs according to the type of picture book (trucks)

In this document, a summary of the strategies and knowledge that can be used to do a jigsaw puzzle appears in Table 5.

What evidence should be kept to illustrate the children's learning?

- Take photographs of the children while they are doing jigsaw puzzles (see the examples in the Appendix)
- Use observation sheets for the jigsaw puzzles done by the children (see the example in the Appendix)
- Make a poster with the children, with tips to help them do jigsaw puzzles (see the example in the Appendix)

And what about extending the jigsaw puzzle notion to other games that allow the children to develop similar learning!

There are many interesting websites on this subject, including the following:

Different types of jigsaw puzzles

http://en.wikipedia.org/wiki/Mechanical_puzzle

Mathematics games (e.g. Architeck, Go-Getter, Zoologic)

http://www.braultbouthillier.com/brault_en/mathematique/jeux-mathematiques?p=4

Tangram

<http://en.wikipedia.org/wiki/Tangram>

Table 1 – Jigsaw puzzle process

The child has his or her first experience

Characteristics of the first jigsaw puzzles	Examples of what the child can do
<ul style="list-style-type: none"> ➤ One single piece to be placed ➤ Pieces with different shapes ➤ Usually made of wood 	<ul style="list-style-type: none"> ➤ Identifies the shape and puts it in the right place (or not) ➤

The child continues the discovery process

Characteristics of the jigsaw puzzles	Examples of what the child can do
<ul style="list-style-type: none"> ➤ Roughly 12 pieces ➤ The pieces are big enough and thick enough to be handled easily 	<ul style="list-style-type: none"> ➤ Becomes organized by turning all the pieces face up ➤ Redoes the same jigsaw puzzle regularly ➤ May use the picture on the box to help sort the pieces ➤ Tries to insert a piece, and if it does not immediately fit, puts it back and tries another piece ➤ Identifies the four corners (watch to see if the child works from the outside in) ➤ Identifies the pieces that form the edge of the jigsaw puzzle ➤ Identifies part of the picture by naturally selecting the pieces that have contrasting colours ➤ Rotates the pieces to assemble the jigsaw puzzle ➤

The child begins to devise more complex strategies

Characteristics of the jigsaw puzzles	Examples of what the child can do
<ul style="list-style-type: none"> ➤ Roughly 60 pieces ➤ The pieces are fairly big, to help with visual discrimination, and are thinner so that they are more appropriate to the child's age in terms of handling 	<ul style="list-style-type: none"> ➤ Continues using the same strategies as with the 12-piece jigsaw puzzles ➤ In addition, in areas where colours are similar, begins to look at the shape of the piece rather than the visual clues found on it ➤

The child becomes a jigsaw puzzle expert

Characteristics of the jigsaw puzzles	Examples of what the child can do
<ul style="list-style-type: none"> ➤ More than 100 pieces ➤ The pieces are much smaller and thinner, requiring finer motor skills and more detailed visual discrimination 	<ul style="list-style-type: none"> ➤ Continues using the same strategies as with the 12-piece and 60-piece jigsaw puzzles ➤ Becomes organized more easily ➤ Is more efficient when selecting strategies ➤ Examines the jigsaw puzzle in order to choose the best strategy ➤ May begin mentally rotating the pieces ➤ May begin to identify certain models that are repeated from one puzzle to the next ➤

Table 2 – Connections with Competency 5 “To construct his/her understanding of the world”

Evaluation criteria	Key feature of the competency	Examples of what the child may say or do	Examples of the questions a teacher may ask
Demonstration of interest, curiosity and a desire to learn	To show interest and curiosity concerning the arts, history, geography, mathematics, science and technology <ul style="list-style-type: none"> To experiment and use tools, materials and strategies in these subject areas To make connections with his/her everyday life 	<ul style="list-style-type: none"> Chooses to do a jigsaw puzzle during free-play periods Asks for help as needed As soon as the opportunity arises, asks to do a jigsaw puzzle (e.g. transition periods) 	Which jigsaw puzzles did the child choose? How many pieces do they have? ...
Experimentation with various ways of exercising thinking	To exercise thinking in a variety of contexts <ul style="list-style-type: none"> To observe, explore and manipulate To ask questions and make associations with ideas To make and test predictions 	<ul style="list-style-type: none"> Manipulates pieces Tries different ways of putting the pieces together Sorts the pieces in order to find them more easily 	How does the child go about doing the jigsaw puzzle? (see the process described in Table 1) ...
Use of pertinent information to learn	To organize information <ul style="list-style-type: none"> To express what he/she knows To seek, select and exchange information 	<ul style="list-style-type: none"> May put the picture in a place where he or she can see it Turns all the pieces face up Sorts the pieces according to a specific feature (e.g. colour) May refer to the checklist 	

Table 3 – Elements common to Competencies 5 and 6 for this type of game

Evaluation criteria	Key feature of the competency	Examples of what the child may say or do	Examples of the questions a teacher may ask
C5 Description of the process and strategies used in learning C6 Description of the strategies used in carrying out the activity or project	C5 To describe his/her learning <ul style="list-style-type: none"> To describe his/her method To define his/her learning and strategies To apply his/her learning C6 One of the aspects of “To transmit the results of the project <ul style="list-style-type: none"> To explain what he/she learned and how he/she will be able to use this new learning 	<ul style="list-style-type: none"> Describes what he or she did to complete the jigsaw puzzle, may use the process presented on the poster (see the example in the Appendix) 	What did the child do when he/she encountered difficulties? Once the jigsaw is done, can the child explain what he or she did? In which areas should I intervene to help the child continue his or her experience with jigsaw puzzles? ...

Table 4 – Connections with Competency 6 “To complete an activity or project”

Evaluation criteria	Key feature of the competency	Examples of what the child may say or do	Examples of the questions a teacher may ask
<p>Involvement in the activity or project</p> <p>Use of his/her resources in carrying out the activity or project</p> <p>Perseverance in carrying out the activity or project</p>	<p>To become involved in the project or activity, drawing on his/her resources</p> <ul style="list-style-type: none"> • To show interest • To speak of what he/she knows and research information in order to carry out the activity or project <p>To show tenacity in carrying out the project or activity</p> <ul style="list-style-type: none"> • To use a variety of strategies • To take time and space into account • To use creativity • To finish the activity or project 	<ul style="list-style-type: none"> • Asks to do a jigsaw puzzle • Chooses a jigsaw puzzle • <ul style="list-style-type: none"> • Uses the strategies displayed in the classroom (see the example in the Appendix) • Asks a friend, teacher or volunteer parent for help • <ul style="list-style-type: none"> • Finishes the jigsaw puzzle, even if it is more difficult for him or her • Uses several different strategies • Is able to organize his or her time and space (e.g. does not sit in front of a door, does a big jigsaw puzzle on the floor, if there is not enough time to finish, finds a place to continue later, or chooses a smaller puzzle) • 	<p>Which jigsaw puzzle did the child choose? How many pieces does it have? ...</p> <p>Does the child ask for help? Does the child use the poster if necessary? ...</p> <p>Where has the child chosen to work? How has the child organized his or her work? Has the child used strategies that he or she has already learned, or a new strategy? Did the child finish the jigsaw puzzle within an appropriate time? Did the child tidy up his or her space after finishing the jigsaw puzzle? ...</p>
<p>Assessment of the learning acquired and difficulties encountered</p>	<p>To transmit the results of the project</p> <ul style="list-style-type: none"> • To state his/her assessment • To speak of the difficulties involved 	<ul style="list-style-type: none"> • Speaks of the difficulties involved and what he or she did to overcome them • 	<p>How does the child express his or her satisfaction after finishing a jigsaw puzzle? ...</p>
<p>Expression of satisfaction with the activity or project</p>	<p>To show satisfaction with the project or activity</p> <ul style="list-style-type: none"> • To present his/her project • To describe his/her method • To explain the strategies and resources used 	<ul style="list-style-type: none"> • The child says “I did it, I’ve finished” • May ask the teacher to take a photograph, etc. • 	<p>...</p>

Table 5 – Essential knowledge that may be used to do a jigsaw puzzle

	English	Mathematics	Science and Technology	History and Geography	The Arts
Cognitive and metacognitive strategies (p. 66 and 67 of the Québec Education Program)	<ul style="list-style-type: none"> • Uses the right words to talk about what he or she has done, • Compares the jigsaw puzzles with others done previously • Questions the picture • ... 	<ul style="list-style-type: none"> • Organizes the pieces • Classifies the pieces according to a specific feature • Selects the right piece • Makes predictions when choosing a piece • ... 	<ul style="list-style-type: none"> • Observes • Tries to place a piece • Experiments • ... 	<ul style="list-style-type: none"> • Questions the origin of the picture • May go and look at the map on the classroom wall • ... 	
Learning (p. 67 and 68 of the Québec Education Program)	<ul style="list-style-type: none"> • Uses the appropriate pronouns and tenses when giving explanations • Can name the elements he or she knows, if there is something written on the puzzle (e.g. letters, words.) • ... 	<ul style="list-style-type: none"> • Counts the number of pieces • Matches the pieces that go together • Compares the pieces (straight line, curved line) • Intentionally groups the pieces together • Makes an assessment of the place where the piece should fit • Identifies a piece and organizes it in the workspace • ... 	<ul style="list-style-type: none"> • Manipulates the jigsaw pieces • ... 	<ul style="list-style-type: none"> • Situates the jigsaw picture in time and in space • ... 	<p>Sees how the jigsaw puzzle is constructed by observing:</p> <ul style="list-style-type: none"> • the colours and their intensity (light or dark) • the shapes (rounded or angular) • the textures • the lines (e.g. horizontal, vertical, curves, straight, broken, oblique circular, broad, narrow, short, long) • ...

Appendix – Examples of evidence,¹ observations and methods²



The children organized their work. They start by completing the main character. They sort the pieces by colour. All the pieces are facing up. They complete portions of the jigsaw puzzle and then assemble them. They work from bottom to top.



The child's strategy is to put the picture of the main character in front of him. All the pieces are facing up. He is working from bottom to top. Another child is watching what he is doing.



The children are talking about how they will get organized to do the jigsaw puzzle.

They are turning all the pieces face up.

The instruction sheet can be seen in the child's folder.

¹ Photographs taken in the classroom of Diane Cantin, a teacher at École Père-Marquette, CS des Patriotes, in Boucherville

² Method applied in the classroom of